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Agriculture and degrowth: State of the art and assessment of organic and biotech-based agriculture from a degrowth perspective

Tiziano Gomiero Independent Scholar, Consultant, Fellow at the Department of Environmental Studies ^{a, b, *}

^a Mogliano Veneto, TV, Italy

^b Masaryk University, Brno, Czech Republic

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ABSTRACT

Agriculture stands as the foundation of modern human societies. Any changes in social functioning should seriously consider how to guarantee people a proper supply of food, in terms of both quantity and quality. Degrowth is a movement that aims at achieving a radical change in the societal metabolism of societies, toward a more frugal, sustainable and convivial lifestyle. The movement envisages a society where concepts as sharing, conviviality, care, commons, justice could stand at its foundation, and replace the call for economic growth, which is, obviously, biophysically unsustainable. This paper aims to (1) review how agriculture has been addressed within the degrowth discourse, (2) analyse the relation between agriculture and societal metabolism and its relevance from a degrowth perspective, (3) discuss how different agricultural techniques and technologies may represent appropriate technologies (*sensu* Schumacher, 1973), and meet the call for conviviality (*sensu* Illich, 1975). The latter point focusses on a comparison between organic agriculture (OA, which bans the use of agrochemicals and Genetically Modified Organisms - GMOs) and biotech-based agriculture (BTA, reliant on GMOs). The paper points out that although many relevant socioeconomic, political and environmental issues have been addressed by degrowth scholars, agriculture is still poorly analysed. Recommendations are made with regard to studying possible alternative transition paths, by assessing their impact on society's structure and functioning. It is argued that "conviviality" and "appropriate technology" concepts are rather complex and multifaceted. Therefore, different practices might be considered convivial and appropriate under some criteria, and not under others. With regard to conviviality, organic agriculture might not fully respond to the call for autonomy. Notwithstanding claims made by GMOs supporters, BTA does neither suit the call for appropriate technology, nor represent a convivial tool under any criteria.

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1. Introduction

Agriculture stands as the basis of human life; therefore, it is important to adopt management strategies to preserve our support system and enhance its resilience, *i.e.* its capacity to recover from stressors (but slightly different definitions exist¹). It is also important to reduce the impact of agricultural activities on resources, on

the environment and on human health. The problems caused by intensive agriculture have been widely discussed. They include depletion of soil fertility and soil erosion, the wide use of harmful agrochemicals (Stehle and Schulz, 2015, argue that water contamination from pesticides should be considered a planetary emergency), large GHGs emissions (particularly in relation to livestock and land use change), the depletion of the water table and biodiversity loss (Foley et al., 2011; Gomiero et al., 2011a; Gomiero, 2016). More sustainable agricultural practices should be devised to reduce such impact, also in view of the challenges posed by climate change, fossil fuel depletion, and the rising global food demand, as world population is expected to grow from the present 7.5 billion to 8.5–9 billion in 2030, and to about 10 billion in 2050 (Alexandratos and Bruinsma, 2012; Gerland et al., 2014; UN, 2015). Scholars working within the mainstream "growth paradigm"

* Mogliano Veneto, TV, Italy; Masaryk University, Brno, Czech Republic.

E-mail address: tiziano.gomiero@libero.it.

¹ Resilience can be defined as the capacity of a system to recover from stressors (Carpenter et al., 2001; HLPE, 2012). Gunderson and Holling (2001), refer to resilience as the magnitude of disturbance that can be absorbed by a system before the system changes its structure by changing the variables and processes that control behaviour, and describe it as "ecosystem resilience".

envisage that solutions can be found in “more growth”, i.e., increasing economic growth, more technology (i.e., adoption of Genetic Modified Organisms - GMOs), pushing productivity, more free markets, more globalisation (The Economist, 2010; Carlson, 2016; Taylor and Uhlig, 2016). In a 2010 editorial, The Economist titled “Economic growth: The solution to all problems” (The Economist, 2010). A different view is taken by people working within the “degrowth paradigm”. Such scholars believe, instead, that the proper answer to our increasing problems should be found in the reduction of societal metabolism (reduction in the flow of energy and materials transformed by societies). This should be coupled with a reorganization of society toward a more convivial and frugal lifestyle aimed at self-sufficiency (e.g., Illich, 1975; Latouche, 1993, 2012; Kallis et al., 2012a). The degrowth movement envisages a society where concepts as sharing, conviviality, care, commons, justice could stand at its foundation, and replace the call for economic growth, which is, obviously, biophysically unsustainable [see D’Alisia et al. (2015), for a review of the concepts].

The paper aims to (1) review how agriculture has been addressed within the degrowth discourse, (2) analyse the relation between agriculture and societal metabolism and its relevance from a degrowth perspective, (3) discuss how different agricultural techniques and technologies (e.g., organic farming, GMOs) may fit into the degrowth discourse. The paper is organised as follows: Section 2 provides a review of the concept of degrowth and analyses how agriculture has been addressed by degrowth scholars. The paper focuses in particular on food procurement. It has to be pointed out that degrowth scholars carried out much work concerning non-food crops (e.g., the impact of biofuels), with particular reference to conflicts with food production and environmental justice issues (Martinez-Alier, 2012). Although this is surely an important issue, in this paper I focus on the analysis on food production as “endosomatic energy flow”, i.e. the energy that flows and is metabolized by humans to sustain themselves (Giampietro et al., 2012, 2014; Sorman and Giampietro, 2013). (The “exosomatic energy flow” refers instead to the flow of energy that humans control and use to manage and sustain their external activities and environment). Section 3 analyses the relation between energy efficiency in food production, energy flow (both as food and as the amount of energy provided by energy carriers) and societal metabolism. The degrowth movement is very concerned with energy issues, such as peak oil (Hall and Day, 2009) and the decreasing efficiency of energy production, concerning both fossil fuels and renewables (Kallis et al., 2012a, 2015; D’Alisia et al., 2015). It is argued that a transition to renewable energies will inevitably support smaller economies, and that it will be a degrowth transition (Kallis et al., 2015). Discussions often focus on declining EROI (Energy Return On Investment, or EROEI, the Energy Return on Energy Invested), (e.g., Kallis et al., 2012a, 2015) i.e. the amount of energy returned from one unit of energy invested in an energy-producing activity (Hall et al., 1992, 2011). In this section, it is pointed out that, in order to better understand the role of agriculture in societal metabolism, energy flow per time unit (labour), i.e. the power of the agricultural sector, is also a very important indicator to study societal transitions (Giampietro et al., 2012, 2013, 2014). Departing from concepts of efficiency, power and societal metabolism, an analysis of some scenarios envisaged by the degrowth movement is carried out (i.e., the possibility to achieve food self-sufficiency on low-input traditional agriculture, basically without the use of agrochemicals and with a limited amount of fossil fuels). Section 4 reviews how different agricultural techniques and technologies, namely organic agriculture (OA) and biotech/GMOs-based agriculture (BTA), may fit into the degrowth discourse and represent “convivial tools” (sensu Illich, 1975), and

“appropriate technologies” (sensu Schumacher, 1973; see also Kirk, 1982). The above agricultural practices are discussed because organic agriculture is often referred to in works concerning degrowth and biotechnology are proposed as a sustainable way forward by those who back the growth paradigm. It has to be pointed out that these two concepts, although crucial for degrowth, are actually part of a broader and more complex discourse (see D’Alisia et al., 2015). Given the space constraints associated with this type of publication, I chose to focus only on these key concepts. Section 5 offers some conclusions.

2. Degrowth and agriculture: state of the art

This section first provides a brief review of the development of the idea of degrowth, with particular reference to natural resources; it then focuses specifically on agriculture and degrowth.

2.1. The limits of growth and the raise of the degrowth movement

The roots of the degrowth movement can be traced to the discussions that took place in the 1960 and early 1970s concerning the fossil fuel crisis and the side effects of fast industrialization, and to the publication of the *Limits to Growth* report by Meadows et al. (1972), concerning the risks lying ahead if humans continue to consume natural resources and pollute at an increasing rate (Ellwood, 2014; Asara et al., 2015; Kallis et al., 2015). The first analysis of the deleterious and uneconomic effects of growth was probably provided by economist Ezra J. Mishan, of the London School of Economics in his book *The cost of economic growth* (1967).² The term degrowth (décroissance in the original French publication) was introduced in 1972 by André Gorz³ in a discussion organised by Le Nouvel Observateur in Paris, as a follow-up to the *Limits to Growth* report (Gorz, 1972; Asara et al., 2015; Kallis et al., 2015) (published under the pseudonym of Michael Bosquet). Gorz was an Austrian leftist intellectual and philosopher (an engineer by training), who wrote extensively on the theory of society, on political ecology and against the capitalist idea of society. Latouche (2016), in his broad review of the notable figures who shaped and influenced the degrowth movement, refers to Jacques Grineval’s 1994 edition of essays by Georgescu-Roegen (first published in 1979), as the occasion that made the term degrowth (in French *décroissance*) widespread within the movement. During the 2000s, in France, the term *décroissance* gained popularity and was adopted in scholarly works and in the press (Kallis et al., 2015; Latouche, 2004, 2006, 2016; see also entry “Décroissance (économie)” in wikipedia⁴). By the mid 2000s, the term was adopted in Italy (*decrescita*) and Spain (*decrecimiento*) (Kallis et al., 2015; Latouche, 2016). In 2003, in the English edition of *Le Monde Diplomatique*, Latouche (2003) uses “downscaling” as a possible English translation of *décroissance*. In a subsequent 2004 article by Latouche, in the same monthly newspaper, *décroissance* is translated as “degrowth” (Latouche, 2004; see also Latouche, 2006). As “Degrowth”, the term had already been used by Latouche in a 2007 publication in *The International Journal of Inclusive Democracy* (Latouche, 2007a). The English term “degrowth” started to appear in scholarly works in the English language in 2008, at a conference

² Mishan was working on the topic already in the early 1960, and had his book ready by 1965, but was unable to find a publisher till 1967, as the publishers he contacted considered the work unsuitable for publication (Mishan and Turner, 2006).

³ Gerhart Hirsch was his true name; he changed it during the WWII, to hide his Jewish origins.

⁴ [https://fr.wikipedia.org/wiki/D%C3%A9croissance_\(%C3%A9conomie\)#cite_note-1](https://fr.wikipedia.org/wiki/D%C3%A9croissance_(%C3%A9conomie)#cite_note-1).

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