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Rules of Utopia

**Policies to drive us
out of the crisis**

Edited by

Enrica Chiappero

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Rules of Utopia

Policies to drive us out of the crisis

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Is there any Italian specific model for Agroecology?

Stefano Bocchi

The article focusses on the evolution of agroecology, initially by considering the French case, in its different characteristics, then by analyzing the historical evolution of the concept and the many personalities who contributed to its diffusion at Italian level. Lastly, the Author tries to understand why, no matter its potential, the current agrif-ood system is still lacking in fulfilling the goal of reducing hunger at a global level, and to investigate this further, he presents and comments some reasons highlighted by International Organizations. Building on those, he presents some gateways to enable the transition towards Agroecology-based local agri-food systems, shedding light on the need to consider “innovation” in its wider meaning, including novel processes and technologies, new products and tools, new educational degree programs with interdisciplinary approach for preparing a deep and real transition toward sustainability.

Introduction

Agroecological roots are generally found in the thought of agrarian ecologists working before the Green Revolution, between the two World Wars. During this pioneering phase, some scientists such as Azzi in Italy or Bensin in Russia, proposed a new approach and new conceptualization for adopting ecological methods in studying crops and farms. After this ‘old age’ of agroecology, a second phase followed with the diffusion in other areas of the World. Each geographical area, with its ecological structure, culture, geography and history, contributed, contributes and will contribute

to the diffusion and development of Agroecology, in the specific context. The evolution and diffusion of agroecology have been strongly influenced by the geographical and historical context. The analysis of the French case, considering its positive trends during the last decade, would be useful for detecting successful components to be considered for future Agroecology diffusion in other contexts

In the research papers published since 1957 by research institutes such Centre de Cooperation Internationale en Recherche CIRAD, Institute de Recherche pour le Development IRD in Southern Countries (former Office de la Recherche scientifique et Technique Outre-Mer ORSTOM and the Institute National de la Recherche Agronomique INRA or Universities) Agroecology term was mainly synonymous of “pedoclimatic” (Bellon and Ollivier, 2018) considering the strong effects of the interactions between features of climate (temperature, solar radiation, rainfall, humidity, wind) and soil (physical, chemical, biological) on agri-food system. The term was used increasingly since 2002 from French national and regional mass media, but the real rapid increase occurred just after the election of Le Foll as Minister of Agriculture, followed by Hulot, Minister of Ecological Transition since 2017. Many articles related to Le Foll’ Policy were dedicated to “Loi d’Avenir pour l’Agriculture” describing Agroecological principles, approach, practices. During the decades before the Le Foll ministry, the articles on national mass media have been around some decades per year, whereas after that the number sharply increased over thousands per year.

It is also noticeable that in France, some charismatic persons like René Dumont or Pierre Rabhi had a strong influence on both the public opinion and political life, not only locally, but also abroad. Since 1980s the agroecological debate grew thanks to social movements: the NGO “Nature Progrès”, Terre Humanisme, Colibris, Mouvement des Oasis en Tous Lieux, Mouvement Appel pour une Insurrection des Consciences, Fondation Pierre Rabhi, Kaizen magazine played an important role. For Rabhi Agroecology was “ethics of life”.

Briefly, the successful French experience, has at least four components: heritage (in terms of thoughts, culture, significant events); society (movements, requirements, visions); scientific environment (Research Centers, Universities etc.) and Institutions' strategies/commitment (i.e. Ministries, local authorities' policies). Every single component participated in developing and diffusing principles, policies, ways of thinking and acting inside a dynamic and evolving framework.

The Agroecological framework should be considered as a specific and contextualized "ways of acting", that in turns can generate new "ways of thinking" and "ways of generating innovation". The main Agroecological properties are autonomy, diversity, recycling, elasticity, flexibility, resilience, robustness, adaptability capacity. The ability to adapt can be developed from three principles: a system maintains a buffering capacity; a system organizes a sort of regulation among its components for keep on functioning in an uncertain context; a system is able to produce adjustments for facing external drivers and internal changes, allowing development within the current regime (Darnhofer et al 2010). The dynamic adaptive and transformative capacity behaviour is related also to other components capacity to adjust, and be active during the transition phase.

Starting from general principles, framework and practices of agroecology and considering the evolution of agroecology in France, the aim of the present paper is to analyse the Italian environment, describing its main features for identifying possible agroecology policies at local level.

Is there an enabling environment in Italy for activating Agroecology policies?

It has been before observed that the successful French experience has been structured based on the four components of heritage, society, scientific environment, and Institutions' strategies/commitment. In the following paragraphs these four components will be analysed looking at the Italian context, starting from the heritage one.

Azzi (1916, 1920, 1928) proposed the expression Agricultural Ecology to Accademia dei Lincei in 1920, asking for creating a new academic course, that only four years later was activated at the University of Perugia. Azzi's theory was appreciated by many international scientists as Vavilov, Marconi (Baltadorin and Pinnola, 1994) and many others. During his long study period, Azzi elaborated a scientific theory based on the analysis of long series of agrometeorological and phenological data, recovered from many stations of Italian rural territories and collected at the Ufficio Centrale di Ecologia Agraria UCEA (Central Office of Agricultural Ecology). He analysed the crop productivity based on the relationships between meteorology, crop' cycles and environmental features, considering the dynamic and local connections between plant/crop genetic and environment, crucial for informing the farmers about plausible sources of stresses, varietal choices, and suitable agri-techniques. He proposed new concepts like "meteorological equivalent" or the "ecological features of plants" or "agroecological unit and soil series".

Before Azzi, Pietro Cuppari, during his work, gave an important contribution for developing the "organic theory" considering farming system in terms of a living entity composed by "farming co-operators" (climate, soil, crops, livestock, rural buildings, human resources and capital) (Caporali, 2017). Cuppari stressed the importance of education for all people active in agriculture, from land-owners to the peasants. Several scientists, working at the so-called *Cattedre ambulanti* ("Itinerant Chairs") were involved in the debate. *Cattedre ambulanti* have been representing for decades (1880 - 1930) the more dynamic tool for informing, training, involving the farmers, integrating economic, social, scientific issues. This was considered an efficient bottom-up tool for facing the "general agri-food malaise" (*malessere agrario e alimentare dell'Italia*), occurring with social-economic difficulties and high rate of internal migration fluxes. At the end of the XIX century, Italian agro-food system faced the prices collapse crises and a growing international competition. *Cattedre Ambulanti* grew bottom

up without any institutionalization during the pioneer period, differently from other processes promoted by State Institutions in France, UK, Swiss, Germany.

During the second phase (1920 – 1930), the Italian public administration institutionalized the *Cattedre*, maintaining the aim of local empowerment, so that there was a general cultural and social development. During the '30s the *Cattedre* changed in Agrarian Offices, another step toward the final institutionalization.

At the end of the Second War World, Italy was broadly considered a Developing Country strategically located, requiring a specific intervention. The Marshall plan was based on two main pillars (Bernardi, 2015): i) military alliances in Europe for facing possible attacks from East; ii) fast improvement and diffusion of productions/consumptions model as a fuel for “feeding democracy”, clearly inspired on the dominant American way of life, based on consumptions, individualism, competition. The innovation strategy in agriculture was completely different from the model of *Cattedre Ambulanti*. The horizontal interactions between researcher and farmers was replaced by top-down, vertical flux of products and knowledge packages from research centres toward a ground level of farmers and consumers. The Green Revolution was initially described in terms of required agricultural modernization and standardization for producing commodities for national and international markets, consisting in increasing reliance on fossil energy (chemical fertilizers, pesticides, herbicides, mechanization), large-scale irrigation, reducing labor, increasing consolidation of economic surplus. The green revolution concentrated the resources on main crop yield’ improvement through the application of genetic (the principal aim was to create the so-called High Yielding Varieties HYV for wheat, corn, rice, soybean) and standardized agri-techniques. In opposition to Azzi theory, the yield was not anymore considered in terms of result of the interaction genotype x environment, but in terms of genotype: the environmental limiting factors would be overcome thanks to some products offered by the

market. This was the nucleus of industrial agriculture. The uniformity of cropping systems made it possible, for the first time, new links among research, technical assistance, commercial activities focused on a commodity (Nichols, 1948). This specialized, competitive, fragmented model was sponsored and taught in most of the Universities; reductionism was, after all, the *humus* of this cultural revolution. The farm was not anymore considered as a dynamic and complex system, but as a machine with the unique goal of increasing the production of some commodities. In Italy this approach was more deeply rooted comparing to other European Countries with many consequences, in spite of the Peninsula environmental/cultural characters. Indeed, Italy is a consistent part of the territorial systems composing the Mediterranean bioclimatic region, one of the most important biodiversity hot spot of Europe. Italy was often described as “the Country of the 100 Agricultures”, expression used for recognizing its several pedoclimatic environments, its richness of agrobiodiversities and its agronomic traditions, able to leave on the landscapes their different signatures. In Italy, particularly in hilly and mountain areas, we can still recognize links between producer (farmers) and society, thanks to traditional agricultural knowledge based on ecological principles theorized by Cuppari, Azzi, Draghetti, Haussmann and many others.

Moreover, Italy is where the Mediterranean Diet was born and spread, with its intangible cultural heritage, including convivial values, relationships between the quality of the environment, the production process and the qualities of products. Inside this cultural, social, and ecological environment, many new NGOs, associations, alliances arose from the '70s-'80s of the last century, for proposing, in reaction to green revolution negative impacts, new ways for sustainable development. Slow Food was born in the '80s, suggesting a “new model” in opposition to the “fast food” consuming approach proposed by the U.S.A.

Nevertheless, “in the mainstream view of national Academies, Agroecology was marginalized until the late of 90s” (Migliorini et al, 2018),

when the approach and the application of some principles by organic farming made it possible to re-discover its potentiality and when few people (Caporali, C. Vazzana) started to organize, at some Universities (Florence, Perugia, Pisa, Tuscia, Milan), new courses or launching new researches related to sustainability issues. CREA (Italian Council for Research in Agriculture and analysis of agricultural economy) also started to carry out some researches on sustainable agriculture (Barberi and Bocchi, 2018). From the '90 up today the numbers of scientific papers on Agroecology have increased and in the Mediterranean Area (excluding France, with 128), Spain and Italy are the countries with the highest number. On a total of 272 scientific papers, Spain and Italy contributed with 58 and 43 respectively, followed by Croatia (21), Greece (9), Portugal (5), Montenegro (3), Macedonia (2), Slovenia (2), Albania (1). (Migliorini et al, 2018; Scopus data base, accessed June 2018)

Italy in 2015 ratified, with other 193 Countries, the Agenda 2030 for Sustainable Development. The European Union's Standing Committee on Agricultural Research (SCAR) have stressed several times the importance of the need to invest in agroecological research and innovation for sustainable development, particularly for creating "radically new farming systems different in significant respect from current mainstream production systems". In 2016 the National Strategic Plan for organic farming was approved by the Italian Ministry of Agriculture. Many are the Italian NGOs and associations (Legambiente, WWF, FAI, LIPU, ISDE, Federbio, AIAB, Pronatura, ACRA etc.), active in agri-food system innovation for sustainability and involved in the Agroecological transitions (#cambiamoagricoltura). As observed by Migliorini et al (2018) "There are a number of ongoing activities somehow related to the political side of Agroecology taking place in various Italian regions, but a census of them is difficult because of their fragmentation and heterogeneity". For overcoming this Italian paradox, consisting in richness of resources in a fragmented frame, the new Associazione Italiana di Agroecologia (AIDA Italian

Association of Agroecology) was launched in 2018 for locally organizing the network and connecting it with Agroecology Europe. New Interdisciplinary academic programs, such as “Land, landscape and heritage” at Politecnico of Milan or a new Master in Global Health, have been recently created.

The Agroecological transition towards agri-food system sustainability

Globally speaking, current agri-food systems are failing to feed the world, since agriculture produces food for 12 to 14 billion people, but about 30 % of this food is regularly wasted, and one in eight of the world population live in chronic hunger (FAO, 2013). Hunger and malnutrition are not caused by lack of food, but by a not assured social-economic access, that is to say poverty, which represents indeed the first SDG included in the 2030 Agenda for Sustainable Development. The actual system is characterized by many paradoxes: 60 percent of the undernourished are women, who make up 43 percent of the agricultural labour force and suffer deep discrimination in access to land and other resources and services. Considering SDG n°1, it would be misleading to analyse the Italian agri-food system as standing alone, without considering the connections, the fluxes, and the cycles inside the entire international system.

We should build and stabilize, within the 2030 scenario, “a world free from hunger and malnutrition, where food and agriculture contribute to improving the living standards of all, especially the poorest, in an economically, socially and environmentally sustainable manner” (FAO, 2014).

Sustainability occurs when: i) the agri-food systems contribute to create a Planet where food is nutritious and accessible for all, resources are agroecologically managed so that ecosystem keep on assuring ecosystem services required for the quality of life; ii) all the national agri-food systems have the opportunity to participate in creating new equilibria and reducing/eliminating inequalities among developed and developing

countries, rich and poor economies; iii) all the communities live in security, thanks to sustainable governance assuring a real control of the livelihoods and equitable access to resources; iv) the equitable and sustainable well-being (ESW) indicators replace GDP (Gross Domestic Product) in the measurement of the national richness. The agroecological transition at Italian level could be organized by improving the agroecological culture in the society, by increasing research in terms of scientific activities, strictly related to society, co-evolving relationships with the governance/political environment, with a gradual, bottom up institutionalization. Bellon and Ollivier suggest to consider institutionalization not limited to formal entities, but in terms of a “gradual process of creating and stabilizing relationships among actors, as well as sharing common ideas and norms that make collective action possible” (Bellon and Ollivier, 2018, p 2).

FAO, reminding that agroecology is based on bottom-up processes with contextualized solutions to local problems, proposes 10 elements for identifying the most important properties of agroecological systems and approaches (FAO, 2018). The following ten elements, listed below, can become a guide for policymakers, practitioners and stakeholders for an agroecological transition.

1. Diversity: the diversification is considered the key to agroecological transitions to ensure food security and nutrition while conserving, protecting and enhancing natural resources.
2. Co-creation and sharing of knowledge: agricultural innovations respond better to local challenges when they are co-created through participatory processes.
3. Synergies: building synergies enhances key functions across food systems, supporting production and multiple ecosystem services.
4. Efficiency: Innovative agroecological practices produce more, using less external resources.
5. Recycling: more recycling means agricultural production with lower economic and environmental costs.
6. Resilience: enhanced resilience of people, communities and ecosystems is key to sustainable food and agricultural systems.
7. Human and social values: protecting and improving rural livelihoods, equity and social well-being is essential for sustainable food and agricultural systems.

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8. Culture and food tradition: by supporting healthy, diversified and culturally appropriate diets, agroecology contributes to food security and nutrition while maintaining the health of ecosystems.
 9. Responsible governance: sustainable food and agriculture requires responsible and effective governance mechanisms at different scales – from local to national to global.
 10. Circular and solidarity economy: economies that reconnect producers and consumers provide innovative solutions for living within our planetary boundaries while ensuring the social foundation for inclusive and sustainable development.

Agroecology will help the transition to sustainable agriculture through contextualized actions leading us to reconsidering the knowledge to be created as well as the tools and forms of support (Toffolini et al. 2018). Green Revolution developed knowledge in formalized general programs, obtained through a technological standardization. Agroecology differently should help to individuate principles to be adopted in studying local resources and means leading farmers, consumers, citizens to reach and maintain adaptation and flexibility, also thanks to new learning/educational processes. The agroecological tailor-made solutions and ways of acting initially related to local Agri-food Systems, alternative to the global food model, will represent efficient leverages for both real innovative place-based policies and local case studies useful for educational programs developed based on the concepts of diversification, diversity, evolution.

Toffolini and colleagues suggested to distinguish general principles (such as strengthening the natural control of pests, promoting agrobiodiversity, making use of regulations systems), properties and practices, but also suggest to construct links between those pillars or, better, a conceptual framework useful for theorizing the links between the principles, the properties of the agroecosystems and the “ways of acting”.

Bocchi (2019) described the transition toward Agroecology in term of building a new cultural bridge between the current green revolution model to a completely new strategy as described in the table below.

Table 2. Transition from industrial model to Agroecological innovative strategy (Bocchi 2019)

Specialized Industrial agriculture	Agroecology-based local agri-food systems
Specialization: connected to a socio-economic paradigm of productivism Farming analogous to industrial processes.	Diversification: maximise biodiversity for ecosystem services
Disconnections from natural cycles, fluxes, feedback processes.	Connection with natural cycles, fluxes, feedback mechanism
No limiting factors in agriculture production (overcoming Liebig theory)	Considering local limiting factors and Planetary boundaries
Focus on Commodities for global market.	Focus on products and ecosystem services locally markets.
Focus on technologies (genetics, chemical, mechanical)	Focus on technologies based on local knowledge and skills
Upgrading of dimension as dominant trend (big farm is better than little farm)	Cooperation, creation of association, local districts
Intensification as technological function (more factors/external inputs; fossil fuel, chemicals).	Intensification based in quantity and quality of labour. Labour/knowledge-intensive systems; low external inputs
Sectorial specialisation (farm, research, governance)	Multifunctionality, multisector, interdisciplinarity, integration
Crop monocultures; Concentrated	Temporal diversification (e.g. crop

Animal Feeding Operations (CAFOs). Genetically uniform cv.	rotation) and spatial diversification (e.g. intercropping; mixed farming). Wide range of species not uniform
Disconnecting past-present-future	Connecting past, present, future.
Vertical and horizontal segregation of product chains, e.g. animal feed production and animal rearing in separate farms, value chains and regions (IPES, 2014)	Natural synergies emphasized and production types integrated (e.g. mixed crop-livestock-tree farming systems and landscapes) IPES, 2014
Only one global model. Uniform system	Comparison among models, locally analysed. Diversified system for diverse outputs
No linkages between farm and territory	Place-based strategy
External and specialized research	Interdisciplinarity, transdisciplinarity, participation
Global market	Global Health
Productive and Intensive agriculture for maximizing yield/economic returns from a single product or limited number of products	Maximization of multiple outputs. Ecosystem functions/services, nutrition-sensitive agriculture.
Privatization of the resources and unequal distribution of richness	Increase of the social and territorial richness
Ecosystem services not considered	Evaluation of ecosystem services

Beyond the effort to make purposes, principles and elements of agroecology clearer, the so-called institutionalization, that is to say the stabilization of the networks of people acting in different environment (movements, universities, research centres, NGO, institutional agencies etc.) is a prerequisite for the diffusion and development of Agroecology (Bellon and Ollivier, 2018) in a single country, or in the World.

By considering the cultural legacy of some Italian scientists, we can individuate three more prerequisites: i) Agroecology requires a strong and clear system approach, that should be always reminded for avoiding misunderstandings of the other principles and practices (Ingegnoli e Bocchi, 2018); ii) new ethics must be a component of the new science; iii) Agroecology should not be limited to the agri-food systems, but developed by considering all the links with health and well-being issues (global health and sustainable well-being) and with the landscape issues (urban planning, infrastructure growing, equilibria between human habitat, natural and semi-natural habitats, Biological Territorial Capacity or BTC).

Related the issue of the need of a new ethics for a real change of the agri-food system, we could remind Giovanni Haussmann thought: knowledge isolated from ethics becomes ambiguous. "Science has been useful in creating tools for material human prosperity, but also tools for destroying human consortium, with mechanisms often corrupting vital processes in the environment or sometimes advisedly eliminating living entities" (1979). He asks: "Where and how is possible to learn the pure ethics?" In the past – he argues – it was possible to develop an ethical behaviour (both individually and socially) thanks to the "intimate relationship with nature" (Haussmann, 1979 not edited; 1992). In the context of a limited planet, the environmental ethics calls everybody in considering new behaviour and respect of principles such as responsibility, justice, equity, prevention, precaution, cooperation, participation, social inclusion.

All the European Countries, as many others in the World, are engaged in keeping their commitment for the Agenda 2030 goals; this implies a new approach also for research methodologies and for education at different levels. Doubts still remain concerning the capacity of our agri-food systems to simultaneously guarantee food security and environmental sustainability under uncertainty (climatic, political, socio economic, financial). Social, political, educational systems still tend to conceptualize and manage agri-food systems as fragmented and disconnected issues: this is the real key obstacle to system innovation.

This is the time to consider “Innovation” in its wider meaning, including novel processes and methodologies, new products and tools, new educational degree programs with interdisciplinary approach for preparing a deep and real transition toward sustainability.

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