

Overview and Discussion: From Farming Systems Research to Agroecology

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Introduction

Farming Systems Research has an interesting history in terms of its genesis and development. In our opinion, however, this approach to agrarian development is still found wanting in terms of its scope and theoretical framework. We would like to illustrate these deficiencies from an agroecological perspective, by illuminating some of the underlying similarities and differences of both approaches. During the sessions of the First European Symposium held in Edinburgh a controversial debate was generated, which unfortunately was not continued in the second meeting in Granada. After various discussions on the theme¹, we decided to write the present paper together as a framework with which to link the presentations of Workshop N°3 (Making the Most Ecological Diversity and Local Knowledge) of the Granada meeting, from which seven papers (three from Spain, two from France and two more from Italy and Germany) were accepted.

The three Spanish papers were very much connected with Agroecology as the authors were linked to this approach through their association with the Institute of Sociology and Peasants Studies of the University of Córdoba: Two of them (“Green Manuring of Agroecosystems through Ethno-ecology: Some Empirical Data from the Contraviesa, Spain”, by Gaston Remmers, and “Traditional Knowledge and Management of Vegetable Gardens in Four Andalusian Municipalities”, by Antonio Alonso Mielgo et al.) form part of the results of European Union projects. The other, on “Rapid Rural Appraisal in the Northwest Iberian Peninsula” is drawn from an excellent PhD thesis written in the field of ecological economics by Xavier Simon.

The paper presented by Raid N. Al-Baqain (Department of Agricultural Economics and Social Sciences in the Tropics and Subtropics, University of Hohenheim) considered “Systems Interaction in Relation to Marginal and High Potential Zones in Madaba Governorate, Jordan”. By means of 90 interviews Al-Baqain analysed relationships and linkages using a framework of regional and farming systems’ interaction between three different zones: marginal montane, marginal rainfed and high potential. The author concluded that the shape and degree of relationships are regulated by various socio-economic factors, but that regulation always occurs in one direction - what occurs in marginal zones is regulated by the dynamics of high potential areas.

¹ This paper was written as a consequence of our interventions in the Agroecological Sociology Module (15-19 July, 1996) of the Masters in Agroecology & Sustainable Rural Development, which took place in the International University of Andalucía, La Rábida, Huelva, Spain.

“Agricultural Spatial Differentiation versus Homogenisation”, by Liano Angeli and Saverio Senni, provides a comparison of cropping patterns in Tuscan agriculture between 1982 and 1990, using clustering techniques to analyse agricultural census data. Angeli and Senni’s paper supports the ‘specialisation’ hypothesis of agricultural industrialisation, with local-level data. The first of the French papers was Bellon and colleagues’, “Fallows in a Pre-Alpine Valley of Southern France : From Two-Course Rotation to Set-Aside. Farmer Practices and Representation”. This paper made an interesting analysis of the reintroduction, in 1992, of an old agricultural practice (fallowing) as a consequence of European Common Agricultural Policy reform, and the process of integrating local farmers’ knowledge of fallow management into a new regulatory frame for set-aside. The second contribution from France was entitled: “Towards Social Management of Livestock Farming Systems”, in which Vissac (Département de Recherches sur les Systemes Agraires et le Developpement) highlights the need to take into account collective management in livestock farming systems.

Having provided a brief outline of the specific contributions of these seven papers, we now intend to move to a more abstract level and reflect on the general characteristics of Farming Systems Research. By comparing and contrasting it with the Agroecological approach to agrarian development, we shall make the case that FSR is limited both by its scope and its theoretical framework. These limitations suggest, we would argue, that in its present form conventional Farming Systems Research is unlikely to generate more than short term palliatives to the problems of industrialisation currently confronted by those seeking more sustainable pathways for agrarian development.

On Farming Systems Research

The term Farming Systems Research refers to attempts to develop an agriculture which reduces the negative impacts on underlying ecological and social systems relative to those experienced with Green Revolution technologies. Although many authors differentiate between Francophone and Anglophone approaches to FSR, we wish to show here that they share many aspects in common.

During the 1970s several criticisms of conventional agricultural research arose in France. Dumont recognised both the ecological and cultural impacts of the techniques and technologies developed using conventional approaches, while Henin and Sebillote proposed a model for on-farm research, which introduced the concept of ‘technological pathways’ and redefined the concept of cropping systems. Criticisms and proposals such as these led to the formation, in 1979, of a group of non-sectoral researchers within the French National Agricultural Research Institute (INRA), which was to focus its attention on agrarian systems and development (INRA-SAD) (Institute Nationale de la Recherche Agronomique - Systemes Agraires et le Developpement).

The key features of the INRA-SAD approach to FSR are : a) the ‘farm system’ as an object for the analysis of technological pathways which allows for the management and development of both biological and economic efficiency. Key to this task was the introduction of temporal and spatial subsystems. Beyond the farm system this approach also emphasises b) the need to locate the analysis of the farm within the wider context of the ‘agrarian system’ as a delimited rural social space (perhaps the parish or municipality), within which people attempt to generate income from natural resources. (Gras et al., 1989, and Bonnemaire in Dent and McGregor, 1994).

Hildebrand and Poey (1989) focus on Anglophone FSR the genesis of which they also link with the problems created by the Green Revolution and, in particular, its failure to meet the needs of small scale agricultural producers. The American and British approaches to FSR start by defining the purpose of agricultural production as the satisfaction of both individual and national needs (Spedding, 1988, p.2). The central elements of the Anglophone approach include: a) an holistic perspective with respect to the socio-economic and political environment; b) client orientation and; c) multidisciplinary (Gibbon in Haan and Van der Ploeg, 1991 and Gibbon in Dent and MacGregor, 1994). In addition to the features which both Francophone and Anglophone approaches have in common, we would also suggest that they are comparable in terms of their failure to deal with a number of important issues. We shall consider these shortcomings of FSR only briefly, preferring instead to illustrate them by setting out the more radical approach and agenda represented by Agroecology.

Although both francophone and anglophone FSR claim to address problems experienced at the farm level, no attempt is made to liberate producers from their technological dependence on transnational corporations. While a systemic approach may be evident, it fails to recognise both people and natural resources as elements of living ecosystems. The multidisciplinary approach adopted by most farming systems research falls short of true interdisciplinarity and has as yet taken no account of the concept of transdisciplinarity (Leff, 1994 pp.41-51). In the same way, while much research is carried out on-farm, the relationship is one of patron-client (researcher-farmer) rather than one of equals as developed within the Participatory Action Research movement (Fals-Borda, 1987 and Salazar, 1992).

The holism claimed by FSR, as we have already mentioned above in respect of technological dependency, also misses the point which Maxwell (1986) makes, that structural changes without the farm economy represent a key influence on production strategies. During the 1990s the most important dynamic influencing agricultural production has been processes of globalisation, which have yet to be considered by the FSR movement. Perhaps the most important criticism to be levelled at FSR is its adherence to the epistemological cannons of conventional science. Ironically, in constructing linear, mechanistic models of farm systems, based on average data concerning inputs and outputs, our appreciation of their dynamic nature is obscured (Allen in Ayres and Simonis, 1994). The richness and vitality of agroecosystems relies upon the existence of a wide diversity in both natural and cultural elements, which cannot be understood in terms of averages. If these are some of the basic criticisms to be levelled at FSR then, how are these shortcomings addressed by the alternative approach of agroecology?

Agroecology: an alternative approach

What do we understand by the term ‘agroecology’? As a point of departure we can offer an initial definition, which we can then unpack in terms of its key conceptual components. Agroecology then,

“is the ecological management of biological systems through collective forms of social action, and thereby redirect the course of co-evolution between nature and society in order to address the what has been called the crisis of modernity. This is to be achieved by systemic strategies that control the development of the forces and relations of production in order selectively to change modes of human production and consumption that have produced this crisis. Central to such strategies is the local dimension where we encounter endogenous

potential which we find encoded within knowledge systems (local, peasant or indigenous) that allow for and promote both ecological and cultural diversity. Such diversity should form the starting point of alternative agricultures. In turn these agricultures provide the basis for the establishment of dynamic yet sustainable societies.”

This definition should not be taken to imply that conventional science has no role to play within systemic strategies, simply that science should not be confused with wisdom. Science should be understood as one way of generating knowledge among many (Redclift and Woodgate, 1993), while wisdom, although relying on access to sound knowledge, also incorporates an essential ethical element. Having defined agroecology, we must now go a little more deeply into some of its key components. While we shall be developing each of the concepts that we emphasised in our initial definition, we shall not do so in strict order of appearance. Instead, we shall begin with the context in which agroecology has arisen, and that it intends to address. We have described this context in shorthand as the crisis of modernity.

The crisis of modernity relates to two major problems that have arisen from modern society's industrial perception of nature. Firstly in the search for equitable economic growth, we have in fact provoked an ever widening gap between the welfare of the rich and the poor. Rather than 'trickling down' to the poorer members of society, as elite social groups would have us believe, the 'veil of democracy' that has been generated has disguised the true fact that the material benefits of economic growth have tended to accumulate to those who control the reigns of power. The second dimension of the crisis is ecological. The industrial focus of modern society has socially constructed nature as an inanimate set of resources that function as inputs to the development process. As a result of this perception, ecological structures and processes have been substituted by industrial ones rupturing the underlying elements and cycles of the biosphere. The response of the global elite, articulated within international organisations such as the World Bank and International Monetary Fund, has been the generation of an ecotechnocratic discourse (Sevilla-Guzmán and Woodgate in Woodgate and Redclift, forthcoming) based on an 'official definition of sustainability', which suggests that ecological problems can be addressed through the further application of conventional science and industrial technology and the extension of so-called democratic structures. (Sachs, 1992 and 1993). Agroecology implies an alternative definition of sustainability from which is generated an ecologically-, rather than industrially-oriented discourse. A central element of this discourse is the concept of 'co-evolution'.

The notion of co-evolution is derived from ecology, where it is used to explain the parallel development of morphological or physiological characteristics of two species such that each depends upon the other for its continued reproduction. The concept has been developed by Richard Norgaard (c.f. 1994), by whom it is employed to characterise the parallel development of society and nature. The industrial transformation of nature through the application of science and highly concentrated, yet strictly limited, energy sources has, in just a few hundred years, seriously degraded the bases of renewability of all previous ecosystems. This simple fact obliges us to identify and rehabilitate such mechanisms of reproduction. Agroecology intends to undertake this project starting from an analysis of the ways in which traditional cultures have captured the agricultural potential of both social and biological systems in the course of their co-evolution. Such potential is represented within knowledge systems (Sevilla-Guzmán and González de Molina, 1994). Local, peasant or indigenous knowledge systems tend to differ from scientific knowledge in that they are practical and encoded in culture rather than theoretical and abstract (Toledo, 1992). In this sense the

difference reflects that which we mentioned between wisdom and science (a point also made by Toledo *ibid.*) in as much as culture has an essential ethical element as part of its unique identity. Science, on the contrary bases its claim to objectivity on its cultural neutrality or universal nature. That is to say, it claims to be context independent. The problem with such a claim, we would suggest, is that when we come to consider agriculture, we are immediately aware that it is actually defined not just by its biophysical context, but also with reference to its socio-political environment.

The hegemony of the ecotechnocratic discourse that we mentioned in reference to the official response to the crisis of modernity, is based on a reciprocal process of legitimisation between elite groups and the scientific establishment: the ecotechnocratic discourse of elite groups in modern society builds its claims to authority on its basis in science, while science is empowered by the economic and political patrons by whom research and extension are financed. Such is the dominance of this discourse, that all forms of knowledge other than conventional science, tend to be dismissed as little more than myth or superstition. The agroecological approach attempts to rescue and revitalise local, peasant or indigenous knowledge systems and thereby re-empower local groups to take control of their own reproduction. Therefore, it is also important for agroecology to demonstrate the wisdom of such systems in the context of their specific biophysical and social settings and, we believe, to seek suitable mechanisms for their defence in the face of the ecotechnocratic discourse, both in respect of its negation of local knowledge and, ironically, its co-optation such as is evidenced, for example, in the registering of genetic property rights (Hobbelink, 1992).

Every agroecosystem has an endogenous potential in terms of the production of materials and information (knowledge and genetic codes) that arises from the historical articulation of society and nature (co-evolution). Such potential tends to have been masked and degraded both in its social and ecological aspects by processes of industrial modernisation. Agroecology seeks to utilise and further develop this endogenous potential rather than negating it and replacing it with industrial structures and processes. The social aspects of endogenous potential may be brought to light in the struggles of local groups to resist processes of industrial modernisation, while the ecological dimensions are to be found in the genetic diversity of the agroecosystems that such groups seek to maintain or reclaim. It is our belief that the role of the agroecologist is not only to investigate the technical aspects of endogenous potential, but also to engage with the political and ethical struggles of local groups that seek to maintain it together with their local identity.

The further development of endogenous potential depends upon the ecological management of biological systems. This differs from the industrial model in as much as it tends to reinforce rather than override or replace the mechanisms which provide for the reproduction of nature (Gliessman, 1990; Altieri, 1987). One of the prime characteristic of agroecology is its respect for the ecological structures and processes from which, as an associated species, we may achieve social reproduction through collective forms of social action. In the context of the pursuit of ecofriendly pathways for agrarian development, collective forms of social action relate to the relationships which agroecologists enter into with those social groups that are attempting to challenge industrial modes of production, consumption and circulation. Such groups include citizens of both the centre and the periphery, the urban and rural, all of whom act in opposition to the negative impacts on nature and society that we have cited in our brief explanation of the crisis of modernity. Collective social action can be employed in the generation and employment of systemic strategies (Martínez Alier, 1995).

Systemic strategies imply an holistic approach to the redirection of co-evolution between society and nature. The social factors that we need to take account of include ethnic, epistemological, ethical, religious, political and economic and gender-based elements of agroecosystems. However, rather than trying to understand them in reductionist isolation, they must be interrelated within an overall understanding of society. Similarly, we need to take account of a broad range of biophysical factors such as water, soil, solar energy and plant and animal species, in terms of the ways in which they interact not only among themselves but with social factors such as those we have already mentioned. Systemic strategies require an understanding of energy, material and information flows generated in processes of production, consumption and circulation within and between systems. The redirection of co-evolution towards more sustainable modes of production, consumption and circulation requires the taking of ethical decisions. With respect to production, such decisions relate to the maintenance of the potential for biological reproduction and local self-sufficiency. In terms of consumption we must take on board the necessity to achieve an equitable distribution of access to the means of social reproduction in order to maintain the cultural diversity which forms such an important element of sustainability. Finally, with respect to circulation we must minimise the distance between producers and consumers through the dismantling of global structures and the development of alternative markets which allow for the retention of added value at the local level.

Ecological and cultural diversity. It should be self-evident in the foregoing discussion that sustainability relies, most importantly, on the existence of both ecological and cultural diversity. Agricultural biodiversity cannot be separated from natural biodiversity given that wild genes have constituted, historically, a continuum within traditional agriculture, which in its many forms is a product of myriad cultural groups. Agroecology thus aims to revindicate the concept of cultural diversity in order to maintain an important legacy for future generations. Conventional scientific thought and the politics of modernisation, on the other hand, have consistently adopted an ethnocentric position, which suggests that the European experience represents the pinnacle of social achievement and a model which should be extended on a global scale (Shiva, 1991). The continued expansion of processes of globalisation promotes a vision of the world as a collection of supra-national entities in a structure of increasingly interdependent social, economic and political relations under the supposedly benevolent control of the global market place (Vandermeer and Perfecto, 1996). This neo-liberal interpretation of social progress also encompasses the sanctioning of global institutions and processes as the only possible way of counteracting the ecological crisis that is currently faced. This is a key element of the ecotechnocratic discourse which we need to confront.

The agroecological discourse that we have attempted to elucidate in the preceding paragraphs not only forms the basis of an alternative approach to the search for sustainable agricultures, but also, as we noted in our initial definition, the wider needs to move towards more sustainable societies. As we also pointed out, however, sustainable societies can only be constructed on the basis of sustainable, locally relevant agricultures. In reaching such a conclusion we imply a complete rejection of the homogenising tendencies of the neo-liberal, global modernisation project and the redirection of co-evolution towards more sustainable ways of living that are based upon the endogenous potential of an infinite diversity of locally relevant agroecosystems.

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