

Traditional Knowledge and the Management of Vegetable Gardens in four Andalusian Municipalities (Spain)

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Introduction

The study we present here is a part of the research project "On-Farm Research, Development and Evaluation of Organic Farming Systems: The Role of Livestock and Agroforestry". This project is financed by the European Union and the Spanish State, and involves five European research centres: The Division of Ecological Agriculture (University of Kassel, Germany); The Laboratory of Ecology and Environmental Protection (Aristotelian University of Thessaloniki, Greece); The Institut Supérieur D'Agriculture Rhones-Alpes (France); Elm Farm Research Centre (United Kingdom); and The Instituto de Sociología y Estudios Campesinos (University of Córdoba, Spain). The Andalusian part of the project focuses on a farm-level study of the process of transition from conventional to organic agriculture.

The purpose of this paper is to describe some of the elements of traditional horticultural management found in the four municipalities. Special attention is focused those sub-systems and elements whose ecological characteristics offer the possibility of incorporation into the design of organic farms. The work is divided into the following parts: first we present the general agro-ecological framework which has guided our analysis; second, we present case study materials from the four Andalusian municipalities; and, finally, we draw some tentative conclusions.

Agro-ecology: an analytic framework

Investigation of the ways in which human societies perceive and use nature through a series of beliefs, knowledges and objectives has been a common element in ecologically oriented research by anthropologists, agronomists and human ecologists. Together they have been developing what has been called the "ethno-ecological approach" (Toledo, 1994). We can identify four principal intellectual roots of this approach: a) ethno-science - developed by anthropologists; b) ethno-biology - an interdisciplinary school, studying interactions between humans and the biotic world; c) agro-ecology - which proceeds from agronomy and studies the practices and knowledge which are associated with agriculture and; d) environmental geography, which studies the relationship between humans and the abiotic world.

Our analysis is based on an agro-ecological framework, constructed from a broad range of insights accumulated by researchers and scientists from various disciplines. This epistemological structure supposes a break with the conventional paradigms of 'official

science': in contrast to the atomistic and reductionist approach of 'official science', which looks for linear causality of physical processes, agro-ecology is based on an holistic and systemic approach, which looks for dynamic multi-causality and complex inter-relationships.

Many authors have explored the different dimensions of traditional knowledges that are associated with agriculture (Toledo et al., 1985; Berlín et al., 1973, Chambers, 1983; Rhoades, 1989; Hernández y Cuevas, 1989; Rist y San Martín, 1991; García, 1992). These studies have shown that the analysis of traditional agro-ecosystem management generates multiple benefits. An understanding of features of traditional agriculture such as its ability to avoid risks, or the local biological taxonomies which it produces generate valuable data which allow us, amongst other things: a) to develop sensible and appropriate agricultural strategies for improving agronomic and socio-economic processes in line with social and ecological objectives; b) to design technologies which satisfy the specific needs of farmer groups and the characteristics of local agro-ecosystems; c) to define critical elements of agricultural research, which may lead to the development of sustainable agro-ecosystems; d) to demonstrate the main points and logic of sequences of agrarian practices; e) to link agrarian systems from an holistic perspective; f) to correct the social and environmental deficiencies of the modern, industrial agriculture; g) to highlight dynamic (in situ) forms of germplasm conservation; h) to emphasise some of the organisational forms which are the medium and outcome of practices which constitute the production systems.

Elements of traditional management of vegetable gardens in four Andalusian municipalities (Spain)

The study was carried out in the following regions: Antequera (Málaga) and Estepa (Sevilla) (a unique unit of analysis), Campiña Baja (Córdoba) and, Sierra de Segura (Jaén). A single municipality was chosen in each region: Antequera, Lora de Estepa, Posadas and Puente de Génave, respectively.

Our research was carried out using open and semi-structured interviews, which were undertaken with five farmers in each municipality, except in the last case, where six farmers were interviewed. We tried to orient farmers' discourse by making reference to various key themes: a) agro-ecosystem design (spatial and temporal arrangement, species associations, biodiversity and rotations); system management (pest, disease and weed control, fertilisation, etc.); and, c) the vegetal material (employment and management of the native varieties). In the case of system design, we found that the spatial arrangement of the crops is linked to a general criterion of maximum use, although in some cases there are other associated functions such as soil conservation, for example. There is also a series of crop associations which responds to various functions (to use space and water, to repel insects...). Temporal arrangements, or rotations, encompass three broad phases: a) dryland cropping in order to rest the soil and break the cycle of some wetland weeds; b) fodder crops to feed animals (there is a relationship between the vegetable garden and the animal component); and, c) a legume cycle to feed the soil.

One of the central elements of system design is, without doubt, the great quantity of crop plant and fruit tree species and varieties that are cultivated by the farmers, in a continuous sequence. The farmers justified such practices by reference to the need for flexibility in switching between crops in the face of product price fluctuations. We also noted the presence of animals as an additional element of vegetable garden design incorporated by all of the

farmers with whom we spoke. Livestock have a high ecological value in terms of transforming plant residues into manure and, in some cases, a significant economic value too.

With respect to management we focused on two aspects which are crucial to the efficient running of the agro-ecosystem: a) the control of pests and diseases control and, b) the maintenance of soil fertility. Farmers agreed that, in general, they experience few problems with pests and diseases, and that the use of chemicals is exceptional. The use of animals (hens and pigs), cultural practices (weeding, rotations, sowing dates, etc.) and the use of particular plants (*Mentha rotundifolia* L., *Ocimum basilicum* L. inter alia) are some of the control techniques that we managed to uncover.

The basic element for the maintenance of soil fertility is manure. Although none of the farmers with whom we work produces sufficient quantity on the home farm, they all have additional sources in the guise of local livestock enterprises. All of the farmers believe that it is important to incorporate manure in order to regenerate the soil and thus continue production. In terms of vegetal material, we found the existence of numerous native varieties which are still cultivated. Moreover, we have identified a specific knowledge linked to the management of the vegetal material of the vegetable garden.

Conclusion

The research illustrates the existence of a traditional knowledge linked to the ecological management of the vegetable garden. However, such knowledge is, in some cases, limited to specific and concrete aspects of the global management of the vegetable garden. Nevertheless, when we amalgamated all the different elements discussed by the farmers we uncovered a knowledge which is expressed in multiple aspects of daily management including: the recycling of the agrarian sub-products for animal feed, the use of manure for fertilisation, the use of some animals to control harmful agents, the management of water through spatial arrangements and crop association, the ability to reduce productive and economic risks through strategies of multi-use of space, pest control using 'rudimentary' techniques and technologies, and the improvement of productive efficiency through the use of symbiotic crop association.

We are obviously aware that the extent and depth of our approach has its limits, but this is explained by reference to our initial objective, which was only to uncover the tip of an iceberg that has been created over centuries of co-evolution between society and nature. The creation of research topics oriented towards the analysis and assessment of traditional knowledge, with the participation of various disciplines (agronomists, ecologists, geographers, etc.) should lead to the revelation of the greater part of the iceberg, which still lies beneath the surface. The interaction between traditional and scientific knowledge which this research process will afford should facilitate the development of more appropriate agrarian strategies, which are more sensitive to the complexity of agro-ecological processes. Such strategies should produce an agriculture which is more in tune with nature and thus avoids the environmental problems associated with conventional, industrial agriculture.

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