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Overview and Discussion: Sustainable Agro-Ecological Systems

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As the numerous mentions in the various papers show, our workshop cannot ignore the EU's agricultural policy and, above all, the 1992 reform of the CAP. This reform, despite all the criticisms and doubts that followed, represents a true watershed for the Union's agricultural policy. The reform recognises and exploits the double function of agriculture as an activity directed both towards production and environmental protection.

The authors of some papers appear perplexed about the ability of the law to significantly reduce environmental risks. Stoyke and Waibel, amongst others, see the need for further adjustments giving greater importance to more sustainable forms of agriculture, in order to strengthen the CAP's environmental objectives. The law clearly specifies the actions the Community intends to encourage. With regard to the part which interests us most, it establishes that measures of an environmental nature be activated within the sphere of long-term programmes, and that funding is envisaged to support actions which have a positive effect on the environment. Regulation 2078/92 contains a series of programmes aimed at environmental sustainability:

- reduction of the use of fertilisers and phytopharmaceuticals (4 of the papers presented refer mainly to this subject);
- introduction and maintenance of biological agriculture (one paper refers to this subject);
- extensification of animal and crop production, diffusion of practices favourable to the safeguarding of natural resources and maintenance of rural areas and landscapes (four papers deal with subjects falling into these categories).

Naturally, the subjects of the papers are much more articulated; they have been grouped together according to what appear to be their most important features. Some papers, although included in the environmental theme group, have an exclusively methodological content and cannot be classified in this section. The list of regulation 2078/92 programmes continues with:

- management of abandoned land;
- fallowing land for long periods;
- the use of previously agricultural areas for the creation of green areas for the general public;
- professional training of agricultural workers for the purposes of carrying out agro-environmental activities.

Basically, the reform of the CAP should lead to two distinct types of farmer: the smaller ones, whose type of agriculture requires subsidies and is defined as residential, and the bigger ones, who have to compete on the market using their own resources, and who will have to increasingly integrate themselves into the agro-alimentary process. Although the support guaranteed by the accompanying measures does not appear to be sufficient to resolve all the problems of the less favoured agricultural sectors, it still represents an appreciable integration of income for farmers who cannot adapt to the market, but who continue the important function of land protection.

The guidelines of the reform are in agreement with the changing expectations of our society. A society which can be described overall as being an opulent one. A society where primary food requirements have been satisfied for some time now, and an increasing demand for typical, top quality, healthy products for consumers is emerging. The idea of a type of agriculture which respects and actively protects the environment is becoming increasingly widespread. In other words, agriculture should not only avoid causing pollution through the abuse of chemicals or degradation due to incorrect practices, but it should also play an active role in safeguarding natural resources and in preserving the landscape. Although susceptible to improvement, the law lays the foundations for a radical change in European agriculture, increasingly discouraging a "plundering" attitude and favouring the development of a more "friendly" and "protective" relationship with the environment.

Such an evolving situation, forces all those working in the agricultural and rural sectors to make a greater effort to find more specific solutions which differ from the conventional ones, in order to cope with the various environmental and socio-economic situations. The systemic approach acquires a central role for the analysis and research into eco-compatible solutions, as it makes it possible to evaluate and act in an organic way on the complexity of elements in the system and their interrelations. We shall not dwell on the characteristics and merits of the systemic approach, since we believe that those attending this conference already have clear ideas on the subject and that there is a certain agreement of opinion. The introduction of the environmental variable makes economic evaluations more complex. In their papers, Ciani and his co-authors underline the importance of introducing economic aspects into the planning of sustainable agro-ecological systems. From the point of view of the conventional farmer who begins practising sustainable agriculture, the aim of maximising income is not realised simply through the combination of the means of production normally at his disposal; he must take into account interference from the collectively which, in order to reach environmental sustainability, utilises limitations and contributions.

In order to be called sustainable, this type of agriculture requires targeted, specific and re-orientable interventions in relation to the various environmental and socio-economic situations. It is, therefore, necessary for the systems to be flexible in order to meet particular needs, and contain feedback and monitoring mechanisms to allow for reorientation and adjustment in order to overcome shortcomings and to adapt to changing framework. These needs are directly or indirectly expressed in many of the papers presented at this workshop. Aviles Benitez and Jacquet have studied the agrosylvapastoral "Dehsas" system, typical of the mountainous regions of southwest Spain. After constructing a model for studying the complexities of the different types of production, system elements and their interrelations, they use a "multiobjective programming method to analyse the condition to satisfy simultaneously the objectives private of the owner and the social of the employment and sustainability".

Masson evaluates the impact on fire prevention of 4 farming systems located in the cork oak forest of the Eastern Pyrenees. The main element is the control of the regrowth of scrub by animal grazing. The method used is that of an economical, technical and social analysis of the system. As environmental sustainability becomes one of the goals of farming, the range of options becomes more complex and research widens both under the spatial and time aspects. The limits of the production system are no longer the crop or the farm, but extend to a certainly wider entity, the environment, which is not so easily defined in its physical and socio-economic dimensions. The reference time sphere is no longer the brief one of cultivation cycles or farming year, but the wider and often unlimited one necessary for the realisation and verification of sustainability.

In their paper, Capillon and David present a framework for a diagnosis of the sustainability in agriculture that helps the understanding of the related complexity. The necessary qualities required for sustainable agriculture are described in four points which correspond to four questions: fulfilment of the objectives, reproducibility of the production process, ability to adjust and respect of the environment. The questions are related to three levels: plot, farm and region and the answers are generated by two viewpoints that of the farmer and that of the society. Experience, any training he has received, the imitation of other farmers' successes, companies supplying inputs and public services, as well as, in a more indirect way, researchers, guide the actions of the conventional farmer. When the traditional farmer becomes an innovative farmer, a large part of his references are lost, and he has to face new solutions in the field of realisation as well as of objectives.

In order to obtain the active participation of the farmer in initiatives of change, it is important that he is convinced of their technical and economic validity and that he possesses the elements for evaluating the additional risk of the particular innovation. Seeking the consensus of the farmer is, therefore, an important and indispensable step towards obtaining his involvement. In addition to determining an effective response, greater levels of participation, with the active involvement of the farmer, can improve the actual quality of the research. When we talk of farmers' participation in the processes of analysis, research and development of farming systems, we are faced with a vast range of interpretations of this concept. Starting with the generic meaning attributed to the term in common language, and leading up to methodological structures that follow the entire process step by step. The problem cannot be examined more extensively here, but I would like to say a few words about the wisdom of involving the farmer in the process of change up to the level of having him participate. Although it is well known, it is important to reflect on the fact that, in reality, the farmer participates in all or part of the following actions: he organises the production and sale of products, confers all or part of the work, invests the capital, lives on the farm and/or by means of the farm and, above all, he takes on the risks deriving from his choices. Normally, the farmer knows his work and his farm's environment well and, last but not least, he is an expert on the interdisciplinary approach. In fact, knowledge inherent to the various disciplines regarding agricultural activities, and the interrelations between the same, all converge on him. This should be enough to highlight the importance of the contribution the farmer can give in important phases of the research such as the identification of constraints and lines of research, the choice of solutions and the preparation and control during the implementation. A natural consequence of active participation is the overcoming of distrust and uncertainty, which is normally inherent to process of change.

I previously mentioned the fact that the farmer is an "expert" in carrying out his activities. His experience is, however, often limited to the sphere of his farm in the sense of a territorial as well as a socio-economic base. When the farmer extends his perspective to include the environment, it becomes necessary, for him to possess a higher level of knowledge, which enables him to introduce his activities into an agro-ecological context. Participation in the above mentioned sense is an important learning opportunity, which has a valid place alongside other more or less institutional forms.

I cannot deny the fact that it is much easier to talk about participation than actually put it into practice. Apart from difficulties of an organisational nature, there can also be difficulties in establishing equal relationships between researchers, technicians and farmers. Moreover, participation is not automatically a synonym with rapidity, and the need for more time should be taken into account. Despite these and other difficulties connected with specific situations, the positive effects of participation can be such as to justify any committed attempt. Some papers in this workshop highlight the importance of the participatory approach:

Anderson and his co-authors, in the paper: "Consultative appraisal: Linking farmers' and researchers' perspectives for a mediation of a more sustainable agriculture", consider "primarily the farmers and also social and technical researchers" as the principal agents of change in agriculture and in the use of natural resources. I believe this sentence highlights the importance, dare I say the central position, of the farmer in processes of change. I therefore agree when the authors continue by maintaining that "a requirement for coherent attempts at change is a mutual understanding of the perspectives held by both sectors: farmers and researchers". As this kind of experience is still scarce in our countries, the authors suggest to refer to the rural inquiries successfully carried out in Developing Countries. As they say, the greatest successes, were obtained in the characterisation of agro-ecosystems, research priority setting and the development of appropriate technology.

The experience described by Ansary and Viaux of ITCF on the reduction of inputs external to farms, presents interesting aspects about the farmer's participation in change. The work involved 16 pilot-farms. After the initial phase, which included the territorial diagnosis of the watershed and the agricultural and environmental diagnosis of each pilot-farm, the farmers were left to prepare and carry out their own projects. The farmers learned integrated agricultural techniques through training courses, crop walks and also drew from their own experiences. The method adopted by Guzman Casado and his co-authors is on the same line. Their approach, divided into two phases, participatory observation and participatory action research, foresees a great interaction between farmers, researchers and other Figures involved in the agro-ecological process of transition. They talk, in fact, of a "symmetrical relationship between farmers and researchers", as well as agreement between them on "topics to study the solutions and strategies to employ in front of the problems surging during the research". According to the authors, the role of the researcher is that of a catalyst oriented towards training. Training not only in the classical sense of the word but also meaning experience deriving from participation in "social collective action". For the authors this method allows for continuous feedback and facilitates a rapid re-orientation of the research. The conventional farmer normally operates on the basis of short term forecasts and he is used to a certain degree of uncertainty. The environment variable influences choices that must become more specific and flexible and at the same time entails longer forecasting times that greatly increase the degree of uncertainty. As expressed in some papers, this leads to the need, to adequately support the farmers in the decision-making process.

Aubry, Havet and Navarrete in their paper: "Management of technical systems on the farm", maintain that it is not enough to supply farmers with technical references aimed at the optimisation of productivity, but it is necessary to work towards "decision-making aid systems", which make it possible to handle uncertainty but which are, at the same time, adaptable to various situations. In order to do this, it is necessary first of all to "understand and formalise the farmer's own technical decision-making processes", and subsequently "to model the management of the technical systems as perceived by the farmers themselves". After stating that sustainability in agriculture is "inexorably linked with the dynamics of ecological and socio-economic change", Park and Keatinge, of Reading University, highlight the importance of adaptability and flexibility within a system, and thus the method with which information from various research activities is "integrated to inform the decision-making process".

From an overall examination of the papers, I have attempted to extract the subjects most frequently covered by the authors. The description is given in decreasing order:

- The need for a systemic approach is felt by all authors but in at least three cases it is mentioned in a cryptic way.
- More than half of the authors talk explicitly of the importance of an approach centered on the farm and farmer.
- Less mentioned but not necessarily forgotten are the following concepts:
- Flexibility often linked to the specificness and mechanisms of feedback.
- Need for support in decision-making.
- Need for precise interventions.
- Farmer participation. I am covering this subject last because I intend to use it to conclude my talk as it is the guiding theme of the workshop. In order to evaluate the importance attributed to this subject in the papers, it is necessary to distinguish two cases: participation in the generic sense of the term, and participation as a comprehensive approach. Many papers refer to it in the general sense of the term, which also includes seeking consensus. In a more specific sense, the subject occupies an important part in three papers. Some more examples would have been useful, considering that participatory research is the guiding theme of this workshop. However, from another point of view, this shortage confirms the usefulness of the discussion we are about to undertake.