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Overview and Discussion: Systems Thinking in Agricultural Training - Exchanging Ideas, Changing Practices -

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1st Movement - Debating and Innovating

How has the concept and practice of Farming Systems Research affected the training sector, namely at the higher education level? What should be done to stimulate the adoption of systems views in agricultural education and training for rural development in general? These were some of the questions which prompted the discussion in Granada. As stated in the Symposium leaflet:

- The conventional ways of training professionals and policy makers have failed; and
- A farming systems perspective has hardly penetrated the curriculum of European universities and agricultural schools and colleges.

However, as also stressed, this perspective and method have much to offer. This issue has been debated in many instances, and perspectives have been offered by different authors, coming from a variety of institutions and countries. At the First European Symposium, held in 1993, D. Gibbon introduced it in his analysis of the problem areas in the implementation of systems approaches. As he said: "One area where farming systems research has failed to have an impact is in agricultural education programmes, particularly at degree level. Most agricultural education institutions have developed structures that reflect the proliferation of disciplines which have emerged over the past 30 years. This is true for both developing and developed country institutions" (Gibbon 1994, 8). In 1994, at the International Symposium on Systems-Oriented Research in Agriculture and Rural Development, held in Montpellier, France, the debate was broadened to some extent. Gibbon and Bell, for example, dedicated a paper to farming systems and learning systems, analysing the experience of the School of Development Studies, University of East Anglia. But another 20 papers were presented in relation to training, attempting to address a major question: How can the formal training of researchers and extensionists best be modified to reflect systems approaches more fully?

Jiggins challenged university teaching and presented innovative experiences in Holland, Denmark, Australia and the USA. Knickel compared the experience in Germany with that of Holland and Australia. Bordage and Jouve presented French perspectives and experiences, the first in relation to continuing education of researchers and the second about the training of agriculturists. Bory and others described university experiences in the Caribbean settings. Cardoso and Martins discussed the introduction of systems thinking in the training of rural development professionals in Brasil. The paper by Roberts is about one of the most referred

cases of innovation in agriculture curriculum, presenting a brief but comprehensive overview of the systems agricultural courses at the Hawkesbury School of Agriculture and Rural Development, in Australia. Hawkins and others described the experience of the International Centre for Development Oriented Research in Agriculture (ICRA). Still others presented specific training methods and techniques, reflecting system views and facilitating the development of new capacities and attitudes: decision cases, gender analysis, models and simulation, participatory on-farm research, etc.Also in recent years, other works and experiences made us aware that the debate is permanent and that the innovative initiatives are growing in different parts of the world. Three recent books can serve as examples, as they challenge our minds, question conventional practice, and present alternative models and methodologies. The one by Chambers (1993), Challenging the Professions - Frontiers for Rural Development, strongly questions the dominant approaches of professions, disciplines and bureaucracies concerned with rural development, advocating reversals in thinking and practice.

The one edited by Scoones and Thompson (1994), Beyond Farmer First - Rural People's Knowledge, Agricultural Research and Extension Practice, is also about a new professionalism. As stressed right at the introduction, "So often ... the missing link in sustained institutional transformation is in the area of training. With new professional challenges for agricultural research, extension and development workers, the need for fundamental changes in curricular and teaching styles in educational institutions become essential ingredients for success. In addition to the conventional technical understanding of agriculture, agricultural professionals must now learn skills of facilitation, co-ordination and institutional development that previously were never thought part of the agricultural professional's kit-bag. These must be supported by attitudes and behaviours that encourage listening and learning, rather than lecturing and prescribing". As said, few agricultural training institutions offer this type of training, and the Hawkesbury College example is (once again) provided (Scoones and Thampson, 1994, 11). In this same book, the chapter by Bawden became a reference, as it reflection on learning systems offered a fresh insight into the question of institutional change and the particular case of Universities. The third one, edited by Feldstein and Jiggins (1994), Tools for the Field: Methodologies for Gender Analysis in Agriculture, presents a broad range of tools and techniques, with application cases from different parts of the world. The whole book constitutes a valuable instrument for systems practitioners and trainers.

In terms of experience, not yet described in the literature, I would like to mention the NECTAR Programme, animated by NATURA (Network of European Agricultural - tropically and subtropically oriented - Universities and Scientific Complexes Related with Agricultural Development). Initiated in 1991, this programme is directed to the preparation of training modules in eight thematic fields, in partnership with universities in the South, particularly in Africa. The thematic field on the "Rural World and Development Intervention" is closely linked to Extension. Four European institutions (University of Reading, Wageningen Agricultural University, University of Tras-os-Montes and Alto Douro and Centre National d'Etudes Agronomiques des Regions Chaudes) are associated with four Southern institutions (Can Thô University, University Eduardo Mondlane, National University of Benin and Botswana College of Agriculture).

Five training modules on extension and rural development subjects are under preparation: (1) extension strategies for rural development; (2) planning, implementation and evaluation of extension programmes; (3) innovation and knowledge in rural societies; (4) dynamics of organisations in rural areas; and (5) research methodology in extension and rural development

work. In the preparation of such modules, besides stressing a systems view, the working group is applying an approach which assumes:

(1) a dialogical communication process, with the active involvement of students in the whole process;

(2) the importance of building new knowledge on the basis of the students' previous knowledge, ideas and experience;

(3) the importance of experiential learning, mainly through field work activities, developed in collaboration with specific development actors;

(4) the importance for participants to analyse critically their own professional practice;

(5) that tutors should act as learning facilitators, providing orientation to the students inquiry, stimulating critical assessments of learning outcomes and permanently adjusting the teaching-learning strategy, in close articulation with the group.

Small group activities, lectures, individual readings and discussions alternate with fieldwork inquiry, exchanges with development institutions, individual reflection, and definition of strategies of intervention and action plans appropriate to the specific contexts in which the participants work. It is important to stress that this modules are intended mainly for mature individuals, with previous field experience, actively involved in training, research and/or rural extension work.

2nd Movement - Challenging Conventional Training

Let us now analyse briefly the four papers presented to this workshop, which reflect experiences from Brasil, France, Greece and Scotland (UK), and are a good point of departure. Three of them are mainly centred on university education and the fourth one on farmers' training. The paper by Koutsouris and Papadopoulos addresses the training issues in global terms, questioning and challenging conventional university teaching, stressing the importance of introducing sustainability concerns in the curriculum as well as systems thinking, and asking for major reversals. These reversals, as the authors say, are not only needed in universities and extension services, but in the society as a whole, giving the nature and major importance of the sustainability debate.

Mussoi talks about a new pedagogical system to train development agents at the university level, with farmers' involvement and under the framework of resources' sustainability and agricultural systems. He strongly argues for major changes in the university training model, based on: (1) a shift from neutrality to critical vision and engagement in change; (2) demythologising the university character and missions; (3) stressing the understanding of farming and farmers (systems, thinking and decision-making patterns, contradictions, injustices, real problems and potentialities). In essence, his proposal is close to the soft systems methodology, as defined and described, for instance, by Packham et al. (1988).

Lossouarn et al. describes a specific pedagogical approach, stressing the use of discovery and project methods, and implying the involvement of students in real situations and problems, analysing them from a systems perspective, in partnership with professional and economic organisations. Finally, Sutherland et al. centre their analysis in the importance of knowledge and information in change processes, emphasising the role of training in the production of

behavioural changes. They use the results of a survey of 245 Scottish farmers to demonstrate the importance of assessing personality and coping styles in the context of farmers' training activities. As they conclude, knowledge of these two psychological traits might affect behaviour and objectives related with decision making, making farmers aware of their operating styles.

In common, the four papers have the characteristic of challenging conventional training, both in conceptual and practice terms. However, each one is a different character. In theoretical terms, the papers by Koutsouris and Papadopoulos and Mussoi, have sustainability as a major reference, and both propose radical changes in the training structures. The first one argues in favour of "soft systems" thinking and constructivist approaches to science, demanding major institutional and curricular changes. The second one criticises the dominant agricultural modernisation paradigm, and asks for a new training model, in order to promote a paradigm shift. This model implies a new educator - student relationship, based on "authentic dialogue", "joint discovery" and "educational exploration". The other two papers essentially focus on the training act, the one by Lossouarn et al. with a pedagogical emphasis and the one by Sutherland et al., attempting to link psychology and pedagogy. For Lossouarn et al., "problem solving", "project construction", "production systems" and "product chain" are key words, and the training act should be linked to concrete development actors, through "partnerships with professional and economic organisations". For Sutherland, "information", "knowledge", "behavioural change" and "decision making" are key words, and the introduction of psychological concerns into the training act seems to be the major proposal.

3rd Movement - A Time of Turmoil

It is now time to think about our debate. From my perspective it will have to focus, inevitably, on the challenges we are confronted with. They emerge from the radical changes in the agricultural and rural worlds, and are mostly related to institutional transformation and the conceptualisation of new training models.

The current views of agriculture and development have changed quite drastically. We are confronted with globalisation and rapid rural restructuring (van den Bor et al. 1995a, 29-30). In the last few years we observed “not only the turnaround in agricultural policy in the west and early attempts to build market economies in post-socialist central and eastern Europe but ... also ... determined attempts to re-negotiate the terms of international trade, a growing realisation of the full implications of the rapidly evolving global food system and a search for a new paradigm for sustainable development” (Symes and Jansen 1994, 1). The agricultural sector lost power and rural development gained a new status, particularly in relation to the vast marginalised areas of Europe, subject to human desertification and socio-economic decline, but also concerning many other areas which saw signs of crises due to the adoption of the productivist model of intensive food production. The development picture is quite complex, as the conditions and processes vary from country to country and within each country, and as more variables need now to be taken into consideration when defining policies and measures.

Privatisation became a critical issue, as the character of state intervention tended to change: “Among the most dramatic turnaround has been the changing function of the state, with a deliberate withdrawal from centre stage in the direct management of the rural economy. In but a short space of time, the state has changed its role from the sponsorship of productivist agriculture to one of environment regulator and, ultimately, the patron of the market economy”

(Symes and Jansen 1994, 2). As a result, Research institutions and Extension Services have been subject to critical scrutiny and transformation. In some countries, like Portugal, the public Extension Services practically disappeared and field workers became office bureaucrats. New institutions also emerged, and partnership arrangements are increasingly adopted, namely in relation to local development initiatives in rural areas.

The university scene has also changed. Massification of higher education occurred in many countries, implying in most instances decreases in quality. The class with 15 to 20 undergraduate students gave place to the auditorium with 80 to 100 or more. At the same time, budgets were squeezed and the number of faculty did not grow in the same proportion. Graduate training was expanded, with the creation of new courses and the diversification of course subjects and type of students. Quality of teaching and management, programme evaluation, and institutional rationalisation became central issues. Each university or college is a case. Some are reflecting about these changes and building solutions. Some are even promoting the debate in European terms, and proposing new ways of acting together. In fact, a large number of higher education institutions linked to agriculture recently (April, 1996) convened in Gent, Belgium, at the "Inter-university Conference for Agriculture and Related Sciences in Europe", to analyse the changes in agriculture and rural areas and equate the indispensable institutional changes. International co-operation and networking were key words.

In the past, universities (and other institutions) were active allies in the promotion of the urban-industrial development model, collaborating in the conceptualisation and application of modernisation technologies and technology transfer systems. In fact, " The industrial model has been largely maintained to this day by an alliance of government, industrial and academic interests under which recognition and support to alternative agricultures (e.g. low-input farming), part-time farming and small family farms have been minimal" (Munton 1992, 30, citing Munton 1990). We are indeed facing a major task, as "For far too long, the heart of development practice has been characterised by an irony which saps the energies and motivations of even the most enthusiastic practitioner: those very institutions that are established to facilitate societal change at one moment, invariably become its next major constraint" (Bawden 1994, 258). Will universities and other training (and research) institutions change their attitudes and culture, being able to transform themselves and participate actively in societal transformation?

This transformation will certainly require a transition from industrial-age to information-age organisations, which Patton (1987, 24) describes as having an integrative culture based on integrative thinking. The typical reactive character, the narrow disciplinary segmentation, the hierarchical information flows, the linear input-output thinking, and short term orientation will have to give place to a proactive position, flexible disciplinary organisation, multiple interface information networking, holistic systems perspectives, and future-orientation (Patton 1987, 23). As Bawden (1994, 258) also stresses, the challenge is "to create a different kind of institutional organisation which has the capacity to retain its abilities to facilitate, as well as respond to, change; one which is able to co-evolve in its relationships with the dynamic and complex environment in which it exists". Learning is then the key issue.

4th Movement - Focusing the Debate

There is no doubt that past experience provides enough ground to challenge the basic assumptions under which education and training activities were developed. We all probably agree that, today, training should (Cristovão and Portela 1992, 15-20):

- be more concerned with the development of attitudes and skills, and less concerned with the acquisition of a given body of knowledge;
- value scientific humbleness and respect of the different kinds of knowledge, instead of intellectual superiority;
- encourage critical thinking, innovative attitudes and reflective practice, instead of routine and acquiescence;
- be based on real life experiences in rural areas and question preconceived views and ideas;
- provide a systemic and integrated view of farming and rural areas and problems, instead of disciplinary and sectorial ones.

In reality, however, teaching is done predominantly within the walls of universities and training centres, often with a reduced and poorly integrated social sciences dimension, with a lack of disciplinary articulation. Universities and colleges tend to be a collection of departments and divisions, which are responsible for teaching an even larger collection of more or less isolated disciplines and modules. Students are mostly confronted with abstract lectures, requiring content memorisation, which are far from the real processes and problems. Practice and experiential learning activities are scarce, as well as student's involvement in research. A strong technocratic character is still dominant: technology is overvalued and the social and political dimensions of development are underestimated. Students' schedules are often a patchwork of small and dissociated teaching events, rather than a fabric of integrated learning opportunities. At the same time, teaching, research and extension functions are not closely integrated. The extension function, in many instances, conflicts with the well-established teaching and research missions.

There is not a single way out of this picture. The global situation is not optimistic, but there are multiple positive signs, indicating that a significant margin to manoeuvre exists, permitting experimentation and innovation in different levels, and allowing progressive changes. The debate is launched, as demonstrated in the first part of this report. It needs to be fuelled, with workshop like this one and papers such as the ones which prompted our presence here. Occasions for debate, exchange of ideas and experiences must be multiplied, and we all have the responsibility to contribute. Within the European Union we have instruments, such as SOCRATES, with a great potential in this regard. They can be used for student exchanges, faculty mobility and joint preparation of innovative training activities. Research parnerships should also be explored. In our own institutions we can use the available forum - departmental and interdepartmental meetings, pedagogical committees, planning and evaluation councils, advisory groups, etc. - to begin a critical analysis of issues. This workshop was a good opportunity to define or clarify them. As a contribution, I offer some questions, which were considerably inspired by the reflection done by different authors, including those who prepared the four papers. They relate to two major aspects, the need for institutional transformation and the definition of new training models.

On institutional transformation:

- Which changes should be promoted in the University's internal structures, in order to facilitate the adoption of systems perspectives? How to promote such changes?
- How to create learning systems which create learning organisations through the synthesis of different ways of learning? (Bawden 1994, 259)
- At the University level, how to build internal dialogues across departments and disciplines? And how to build connections with society, particularly with other development actors? (inspired by Bawden 1994, 258)
- What are the major constraints to institutional change in Universities and other training institutions?

On the new training models:

- How do alternative conceptualisations of agriculture and development affect training? (inspired by van den Bor 1995a, Johnson and Bentley 1992, and Pearson and Ison 1992, 345)
- What type of system to establish to promote curricular assessment and change? What are the known experiences in this regard? (inspired by van den Bor *et al.* 1995b, 2-4, and Wallace *et al*. 1996, 16-20)
- What major field of competency, skills and attitudes should systems agriculturists have?
- How to encourage socially responsive training approaches and practices?
- What types of training should be prioritarily developed (in-service, university graduate, university undergraduate, ...) and directed to whom (professionals, university students, ...)?
- What role can farmers' organisations and other rural-based institutions play in the necessary reversals? (inspired by Wallace 1994, 9-9)
- How to bring the education, research and extension functions together, in order to promote project-based learning and problem solving in real situations? (inspired by Person and Ison 1992, 355)

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