PARTICIPATORY DESIGN OF INNOVATIVE HORTICULTURAL INTERCROPPING SYSTEMS IN PROTECTED MARKET GARDENING PRODUCTION

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In different agroecosystems, intercropping has proved to be a promising way to reduce pesticide use, as it can reduce risks of pests or diseases damages (i) by limiting their dispersal (physical or chemical processes) and (ii) by diversifying resources for natural enemies. However, up to now, intercropping in protected market gardening is poorly referenced. Biological processes operating in specific crop combinations are only partially understood and guidelines to design and manage these complex agro ecosystems are scarce. However, few market gardeners already develop intercropping under shelter on diversified farming systems. In order to design innovative cropping systems, we developed a participatory research program involving producers, extension agents and researchers. This research combined: (i) the organization of design workshops gathering these stakeholders. During these workshops, we collectively explored hitherto unseen ways, to design prototypes of innovative intercropping systems aiming at reducing pesticide reduction; (ii) the tracking of on-farm systems based on intercropping. We looked out for the rare intercropping systems developed by farmers to analyze their agronomical logics (practices, objectives inherent to their development) and their performances; (iii) the on-station experiment of innovative intercropping systems. System experiments allowed us to analyze biological processes operating in intercropping and to assess the performances of such systems. Combining these different resources allowed us to explore the complexity and diversity of intercropping systems as well as the diversity of motivations driving farmers to develop them, in order to discuss their benefits and drawbacks. This communication aims to present results of this method which led (i) to design prototypes which were tested and assessed on station, and (ii) to identify guidelines to design, assess and manage intercropping systems suited to contrasted farming systems.

Keywords: design workshop, intercropping, market gardening under shelter, participatory research, system experiment, tracking on-farm innovations.

TOPIC 4, SESSION 2 (Plenary, 11th of June,pm)

Oral Presentations

MULTIDISCIPLINARY AND MULTIAGENT INTERACTIONS FOR INNOVATIONS IN HORTICULTURE – PARADIGMS BEYOND THE WORDS

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The progression towards sustainable horticulture is usually associated with scientific and methodological breakthroughs. As a consequence, the innovation processes in the fields of biology and ecology and their agronomical implementation are increasingly recognized as main drivers to improve horticultural systems. At the same time, a horticultural system cannot be conceived without a good knowledge of the social and economic contexts in which it is embedded. It has to be considered as an integrated social-ecological system. This strong intertwining of the different research fields, as well as among agents along the horticultural chain from the grower to the consumer, poses new landmarks. There is a need for interdisciplinary researches combining the scientific fields usually involved in the studies of agricultural systems: biology, agronomy, environmental sciences and socioeconomy. Designing new horticultural systems in such a systemic framework is also relevant to develop and better implement exchanges of knowledge among agents. For example, this cross-knowledge constitutes the back-bone for building crop ideotypes and cropping systems well fitted to ecologically-based horticultural systems including genetics, agronomy and social-environmental levers and constraints. There is also a need in more participatory research and scaling-up to achieve adoption of innovations along the horticultural chain. Thus, the former linear and top-down scheme, i.e., from basic science to applied science and field work, is now reconsidered and the design of innovative agricultural production systems is viewed as an integrated, interactive and participative organization where agents are dynamically interacting. The new challenge is to better combine the detailed knowledge typical of the dominant reductionist paradigm mostly oriented towards the "one-size-fits-all" objective and the paradigm of complexity where the "custom-fit" approach predominates. Progressing towards these frameworks of knowledge and relationships among agents poses epistemological questions about multidisciplinarity and hybridization between scientific and expert knowledge.

Keywords: agroecology, innovation, integrated sciences, multiagent approach, participative organization, social-ecological-agrosystem, systemic approach.

COGNITIVE MAPPING OF ORGANIC VEGETABLE PRODUCTION IN FLANDERS TO SUPPORT FARMERS STRATEGY DESIGN

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Organic farmers inherently have to cope with complex farming system processes. Next to pursuing economic performance, farm management also encompasses optimization of the farm's ecological and social performance. For considering multiple criteria, the farmer needs a thorough knowledge on the highly interactive aspects of his production system. Furthermore, successful strategy design includes decisions at different levels -from field to market- within the farming system. To support strategic decisions, this study aims at modelling the key aspects and their inter-relations for successful organic vegetable production in Flanders. We used the qualitative cognitive mapping approach to represent and visualize the expert knowledge from different stakeholder groups (advisors, farm networks, research and educational institutions). Through in-depth interviews, experts were questioned on the key aspects of a successful organic farm management and how these aspects relate to each other. Next, the individual cognitive maps from the different interviewees were merged to build a social cognitive map. The strength of the relations between aspects reveals hot spots within the organic vegetable production. Preliminary results show that weed control, crop rotation and marketing channel are examples of central aspects. At sector level, the results will clarify strengths and weaknesses of organic vegetable production in Flanders. At farm level, focusing on one or more of the hot spots, while respecting its position in the organic farming system, can be helpful towards more adequate strategy design. The cognitive maps might serve as a communication tool for farmers and their advisors, or as a first step towards prospective or scenario evaluations when implementing new strategies.

Keywords: cognitive mapping, system analysis, strategy design.

SOCIAL ANCHORING IN THE COMMUNITY AND THE DESIGN OF VIABLE ORGANIC MARKET GARDENING MICROFARMS.

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Increasingly strong social movements built upon concrete experiences as organic market gardening microfarms to promote alternative food systems. These microfarms share some main characteristics: cultivated acreage smaller than official recommendations for market gardening set up; marketing in short distribution chains; high diversity of cultivated plants; low level of motorization and investment, agroecological practices. The study of 12 French microfarms, based on semi-structured interviews and cross-disciplinary analysis, pointed that alternative microfarms stands upon the access to immaterial or material resources, available in their social environment. Involvement in the community is thus a necessity, and at the same time the way to concretize ecological and social aspirations which are essential in the farmers' projects. Because they hardly take into account these kinds of no-merchant inputs, classical techno-economic frameworks are thus not adapted to analyze and assess their strategic choices. A larger conceptual framework, nourished by the inputs of concepts as multifunctionality of agriculture, ecosystems services, "double" sustainability seems indispensable in this purpose

Keywords: France, organic market gardening, alternative farming systems, microfarms, social aspirations, environmental aspirations, community involvement, short distribution chains, material and immaterial resources.

INTEGRATING KNOWLEDGE AND INFORMATION FOR A COMPETITIVE AND INNOVATIVE ORGANIC HORTICULTURE IN FLANDERS

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Networks are considered having a lot of potential in innovation as their members learn with and from each other by sharing information and knowledge, acting as one negotiation unit, investing collectively and/or involving relevant partners. Based on a study of innovation characteristics by Kanter (1988) our research used a novel conceptual framework to understand how networks can maximally support the farmer's innovation process. The framework comprised five components: (i) vision, (ii) knowledge capturing and exchange, (iii) communication, (iv) coalition formation and (v) institutional innovation.
Conversion to organic horticulture needs a radical change in the production system. The complexity of the system, the importance of precaution more than using problem solving practices make that organic horticulture is knowledge intensive. This knowledge is not always found in existing conventional networks. This paper explores three recently established networks for creating and exchange of knowledge in organic horticulture in Flanders and evaluates how these networks can contribute to the innovation capacity of the organic horticultural community. The analysis of the networks shows that networks, separately and together, have a high potential in assisting its members, the organic farmer in Flanders and the organic agricultural sector as a whole, directly or indirectly, in its innovation process. As important as the goals and tasks of the network, the actors and management of the networks are crucial to create trust, ownership and the necessary institutional support.

Keywords: innovation, networks, vision, knowledge exchange, communication, coalition building, institutional innovation.

CAN WE DEFINE A TYPOLOGY OF CROP PROTECTION WITHIN THE DIVERSITY OF ORGANIC PRODUCTION? WHAT ARE THE CONSEQUENCES ON THE NATURAL ENEMY ABUNDANCE AND DIVERSITY?

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