## EDITORS' NOTE

# SPATIAL APPROACHES FOR LAND USE AND LOCAL GOVERNANCE: INTRODUCTORY NOTE

*by*
*Patrick Caron*
*Frans Swanepoel* [1]
*Aldo Stroebel* [2]

## 1. INTRODUCTION: NEW PARADIGMS AND CHALLENGES FOR RESEARCH IN AGRICULTURE

Developing new technologies is a necessary, but not the only required condition for increasing agricultural production in a sustainable way and improving rural livelihoods. Since the 1980's, serious questions have been raised relating to the economic, social and ecological constraints associated to Green Revolution technologies (Swanepoel and Stroebel, 1999). They refer to unsatisfactory conditions of technology transfer and to the undesirable social and environmental impact of some of these technologies. To address the challenges of rural development, a shift is therefore required to adapt research practices.

As a result, new concepts and approaches for conducting research have emerged. Among them are the systems approach in the 1970's and eco-regionality in the 1980's. However, these have essentially been applied to technology development and transfer at farm level. They aimed at improving the adoption by farmers of new technologies validated at experimental stations, by taking into account socio-economic constraints and the environmental impact of these technologies. But the role of technology development and transfer as one of the various factors that impact on the development of the agricultural sector has rarely been questioned by researchers. Eco-regionality has for example been a useful concept for researchers to deal with the diversity of natural resources, by offering a basis for stratification that could prevent taking into consideration many diverse situation. Nevertheless, it has not been used to analyse the mechanisms of evolution of agricultural production by considering not only the natural resources base but also the socio-economic complexities.

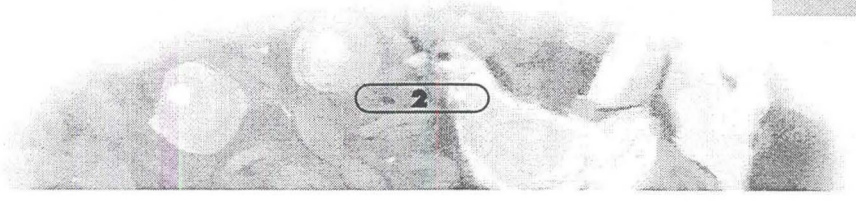
Yet, many decisions of fundamental importance to agricultural production are not taken at farm level. For agricultural research, recognition of this has led to the identification of three main activity areas:

(i) technology development and transfer at farm level, taking cognisance of socio-economic constraints at both farm level and the environment;
(ii) appropriate policies at national level;
(iii) supportive institutional arrangements to ensure successful and sustainable delivery of research products, especially focussing on emerging, resource-poor producers. However, these three areas have remained separated. There is in fact a continuum, if one for example considers the management of local common resources, local government policies, market organisation from local to international levels, etc. It presents a scientific challenge in integrating these three areas when addressing research and development issues and for taking into account other stakeholders' needs and practices than the only farmers' and policy makers' ones.

Among other issues that raise questions to be dealt with by researchers, is the theme of the workshop, i.e. Land Use and Local Governance. In a general context of decentralisation, Local Governments are increasingly accepting the responsibility in terms of policy planning and resource allocation. Yet, in many cases they are inexperienced in this regard. Moreover, between top-down planning at national level and participatory approaches at local level, there is an opportunity to design and apply intermediate methods at this particular level.

After presenting the context for this type of research, this introductory note will highlight the challenge for designing and validating methods that could facilitate the planning of agricultural and rural development at Local Government level. Special attention will be paid to the need for reliable and relevant information systems and to support stakeholders' co-ordination process (part 3). The role of research in this context will finally be discussed (part 4).

*1 Director, Post-Graduate School of Agriculture and Rural Development, University of Pretoria, Pretoria 0002, Republic of South Africa. E-mail: fswanep@postino.up.ac.za*
*2 Research Assistant, Post-Graduate School of Agriculture and Rural Development, University of Pretoria, Pretoria 0002, Republic of South Africa. E-mail: astroebe@postino.up.ac.za*



# 2. GLOBALISATION AND DECENTRALISATION: CHALLENGES FOR LOCAL STAKEHOLDERS

The agricultural sector in the SADC region is rapidly evolving. Globalisation is one of the main factors impacting on changing the region. Democratisation and political stability obtained during the past years in most of the countries have increased the importance of this process. It also relates to global agreements and conventions, e.g. trade, biodiversity, desertification. However, globalisation extends beyond these formal mechanisms and is generally characterised as a process of intensification of the flow of capital, products, people and information.

Changes in international and cross-border trade patterns are increasingly debated, but there are in fact other diversified in-depth re-organisations resulting from on-going globalisation. New stakeholders are playing an important role, including farmers' organisations and Non Governmental Organisations (NGOs). Relationships are developing between stakeholders, previously not used to exchange information and products. New informal stakeholders' networks are developing on the basis of common interest and initiative.

As a result, an increasing complexity of relationships related to agricultural production and marketing in different localities evolves, involving a multiplicity of stakeholders acting at different levels and pursuing different objectives. These relationships rely on new organisational patterns developed between local stakeholders, but also on the development of networks involving far distant institutions and individuals. This imply new rules, practices and flows and results in the multiplicity and tangle of hierarchised organisation patterns. The "production of new spaces and territories" is therefore regarded as a social process and the spatial patterns and characteristics produced as a consequence, reflect the complex interactions between stakeholders (Brunet, 1990). This assumption makes spatial approaches particularly relevant to understand rural transformation.

Because of their influence in this transformation process, urban centres turn to be organisation knots. They serve as a concentration of capital and political power. Urban cities attract rural people as a result of services, employment opportunities and living conditions offered, and also impact on rural areas as a result of their demand for agricultural products.

The way in which rural areas are connected to urban centres through the establishment of networks for exporting and importing information, labour, products and financial resources is fundamentally important. Together with the characteristics of the natural resources, the patterns and relative success of this connection is one of the factors that make each rural area unique.

The penetration of urban products and life style in rural areas and the problems associated with competition with other producing areas, raise concerns related to the loss of local identities in a global and uniform environment. For some people, the solution to maintain satisfactory living conditions for rural populations is based on a withdrawn attitude to reduce dependency and survive in an ever changing and uncertain environment. For others, this process offers new opportunities for development. Economic integration is regarded as a way to promote comparative advantages and local identity of agricultural products. It is argued that new developments in participatory approaches and information and communication technologies offer opportunities to address these concerns.

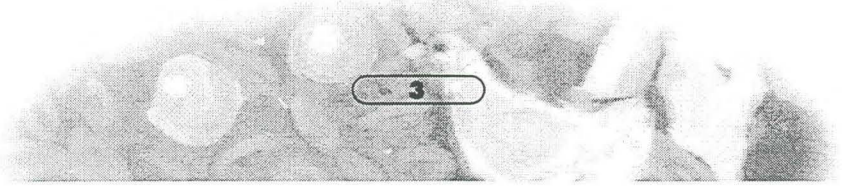
Between these two options, there is in fact numerous other development models available. Their implementation strongly depends on the development of new local stakeholders' networks and territorialities and on the local answers and activities that might be developed to address the problems and opportunities related to globalisation.

This challenge is amplified due to increased National Government withdrawal of responsibilities and resources to rural development initiatives, which is in fact indirectly related to the globalisation trend. This withdrawal results in the decrease in public funding, less support of programmes, subsidies, incentives and services, as well as the usually low effective transfer of national responsibilities and resources to Local Governments. The role of the private sector and NGOs is therefore becoming increasingly important, promoted as a strategy to reduce the negative impact of such an evolution.

The requirements for rural development are also becoming more complex, specifically relating to the multifunctional character of agriculture and land (Swanepoel and Stroebel, 1999). The increase in food production and food security through the improvement of productivity in both large and small-scale sectors is no longer the only issue that agricultural research and training should address. The competitiveness and quality of agricultural products, labour employment and income generation, equity and gender awareness, environmental concerns and management of natural resources also need to be taken into consideration (SACCAR, 1999).

As a consequence of the above, the public action of national and local Governments should be reviewed and adapted in light with the changing environment. Increasingly, local planning is regarded as a challenge. However, Governments represent only particular stakeholders that interact in the whole system. The social networks that induce technical, spatial and economic changes are usually not matched to the administrative limits and boundaries (Caron, 1998 a). There is therefore a need for an improved identification and understanding of spatial and social organisations that underlie agricultural and rural changes. With increasingly limited resources, the challenge for Government bodies shift from the execution of programmes to the facilitation and promotion of collective action for local development. The latter relies on organisations whose spatial, social and economic principles differ from those of Government.

This paper further discuss issues related to the contribution of agricultural research to this challenge through the production of information and methods.



# 3. LOCAL PLANNING: THE NEED FOR OPERATIONAL INFORMATION AND CO-ORDINATING MECHANISMS

## 3.1. Operational information specially organised for local planning

Local planning implies the availability of information organised in such a way that it can inform decision-makers to develop scenarios and design and implement new projects. In the case of Local Governments, this means the creation of an information system that reflects evolutions in progress and transformation dynamics with particular, but not exclusive, attention to the area defined by administrative boundaries.

The information in support of rural development is usually scattered, sometimes irrelevant, and there is in most cases a need for organising the available information.

The latter is usually sectorial (pedology, climatology, demography, production volumes, health, etc) and rarely up to date. It is static and does not account for the transformation processes of the rural environment. Even when recent censuses are available, they deal with the description of subjects according to administrative boundaries and are thus not always relevant to understand the evolutions and prospects of agricultural production (Caron, 1998 b).

The knowledge of what rural stakeholders are producing and reasons for their priorities and activities, are of fundamental importance. To conduct an analysis of farming systems' sustainability, Hubert (1998) suggests the need to focus on four issues: (i) their diversity; (ii) their complexity; (iii) their spatial and time dynamics; and (iv) their interactivity with other local systems. The same principles apply also to rural areas, considered as agrarian systems and highlight the need to identify the stakeholders, factors and processes that are meaningful to rural changes, in other words, the stakeholders' networks, their principles of organisation and their evolution. Such an analysis is a prerequisite to the design of a relevant and operational information system by providing an evolution model useful as a conceptual framework to define the type of information to be collected.

This is of particular importance when situations are complex, such as places where farmers do not only depend on agricultural activities to make their livelihoods, where increases in production and productivity strongly depend on socio-economic complexities and ecological sustainability is threatened.

Spatial approaches are particularly useful in implementing the suggested information system. They provide a representation of the whole study area through the integration of different types of information. Based on an analysis of changes along the time, they also facilitate the identification of meaningful networks and their interactivity. Finally, recent development in Geographic Information System (GIS) provide tools to integrate heterogeneous data.

## 3.2. From information to planning: the need for co-ordination mechanisms

Information, as an input for local planning, should be timely delivered and in a format useful for its appropriation by different types of stakeholders. The objective is to contribute through information to the formalisation of individual and collective projects, by creating new representations and models, and arousing discussion and debates for decision-makers. The challenge is to support stakeholders' decision-making, although information always remains incomplete and uncertain (Simon, 1969; Le Moigne, 1990).

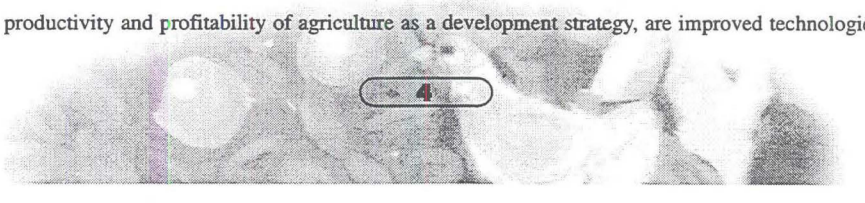
Yet, information is not neutral. It is strongly dependent on agents and mechanisms responsible for developing and transferring the information. There is an asymmetry between stakeholders in the capacity to access and use information. It relates to their position within power networks, to their education and skills, to the resources they can mobilise to implement projects, etc. The democratisation of information is not a sufficient condition to address the needs of less advantaged social groups and integrate them into decision-making processes. According to Bertomé and Mercoiret (1992), "it is a dangerous myth to think that dominated and alienated peasants in survival conditions will transform themselves through verbal stimulation into entrepreneurs able to negotiate their projects with other stakeholders".

To address this concern, the stimulation and support to a learning process is a necessity. It also calls for specific mechanisms of dialogue and mediation. The information, as (im)perfect as it can be, can not solve the participation problems of the farmers or professional organisations. It can, nevertheless, promote participation by offering a basis for reflection for the definition of priority projects regarding regional development, financial and technical support to individual and collective initiatives, legislation, price policies, etc. Institutional innovation and methods for supporting a collective decision-making process and the mobilisation of adequate resources are required (Caron et al., 1997).

# 4. THE ROLE OF RESEARCH

Agricultural strategies are perhaps the most important component of overall development strategies in a continent where agriculture still accounts for **70 percent of employment, 40 percent of exports and 30 percent of Gross Domestic Product (GDP)** (Delgado, 1997).

Central to improving the productivity and profitability of agriculture as a development strategy, are improved technologies, appropriate policies



and supportive institutions. At the core of technological improvement is agricultural research. A prominent feature of new strategies in agricultural research and development in southern Africa and elsewhere in the world is the consideration, from the start of a project, of the needs and aspirations and of the socio-economic circumstances of the potential beneficiaries.

In addition to technology development and transfer, there is a need to produce knowledge and information regarding agrarian situations, production process and mechanisms for social, economic and technical transformation, conditions and pathways for technological changes and support. This confers to development oriented research three inter-related functions:

- An **analysis function**, through diagnosis of agrarian situations and of technical, economic, social and spatial factors which give rise to changes;
- An **experimentation function**, through testing of technical (off and on-farm), economic and organisational innovations, with the objective of producing knowledge regarding possible changes of the production process. Results should be related to experimental protocols and to the specific conditions of experimentation to deliver references that can be used by extensionists and farmers after adapting them to their needs.

- A **planning function** to support stakeholders' decision making in order to help them to design, implement and follow-up technical and economic individual and collective "projects". This function includes: (i) the production and delivery of information regarding the current situation and possible changes (diagnosis, mobilisation of available technical and economic information); (ii) the facilitating of stakeholders dialogue and creativity in order to design collective and public action to take place, thus promoting contractual relationship between private and public stakeholders; (iii) the monitoring of the activities and their impact through the production of references, in order to adapt/readapt the activities on a permanent basis.

Inter-disciplinarity (multi-disciplinary, collaborative, problem-focussed approach) is a necessary mode of organisation of development oriented research. Research has to consider, through system approach, different levels of social and spatial organisation and the interactions between them, from macro- to micro scale, namely:

- the regional and national scale (SADC, country, Province, large watershed, etc), at the level of which it is possible to analyse or promote policies and planning, infrastructures implementation, market organisation, demographic and migration patterns, and to organise public and private support services;

- the local scale (village, small watershed, etc), which is relevant to understand the production, consumption and marketing patterns, the mechanisms of common resources management (land allocation, grazing areas, water and wood resources, etc) and to plan and test possible interventions;

- the household level, at which the main economic and technical decisions are taken as far as agricultural production is concerned; it is relevant for understanding the rationale of economic and technical choices by considering the whole farming system, and for testing innovations; the plot (or the herd) level (by extension the plant or the animal), at which it is possible to analyse and modify the technical and biological mechanisms of production.

From one level to the other, there are strong linkages: what is observed or promoted at one level is not independent of what is happening at the other. As a consequence, a specific issue can be dealt with at various levels. For example, to analyse and improve cattle feeding, one might have to consider, not as constraint but as research and development issues, the organisation of extension and input delivery systems at regional and local level, the management of grazing areas (fences, access, stocking rate, etc) at the village level, the practices of the farmers according to the available resources at the household level, the feeding practices and their nutritional consequences at the herd and at the animal level.

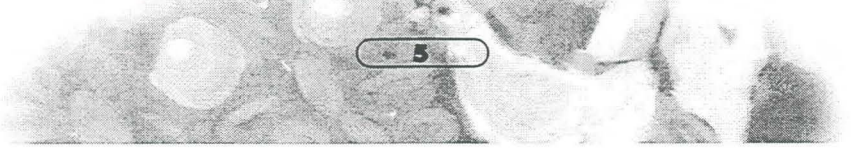
Spatial approaches provide thus an adequate framework to integrate processes occurring at different levels and contribute to the production of operational knowledge. GIS offers opportunities for addressing these issues and increasing the effectiveness of the contribution of research to local planning. They are related to the production and delivery of relevant information and to the design of methods and software.

Nevertheless, the use of such tools does not prevent previous identification of relevant levels and information to be considered. As we have seen previously, it is impossible to define a *priori* the levels of organisation that are consistent and meaningful to explain and understand stakeholders' behaviours and practices and to design new activities. The analysis of the stakeholders' networks, their principles of organisation and their evolution is a first step to the identification of the relevant levels to consider, which might be undertaken by the study of changes along the time.

At each of the relevant levels, diversity and complexity are key elements. To design and test relevant innovations, it is necessary to understand how stakeholders take decisions to manage resources in order to achieve their objectives (Landais and Deffontaines, 1990).

## 5. CONCLUSION

Researchers have recently tested new approaches to understand changes in agricultural production processes, integrating different spatial levels of analysis. These approaches aim to identify possible actions and combinations to address development issues, including technology development and transfer. These are based on the analysis of stakeholders' practices and of individual and collective decision making processes, taking into



account indigenous knowledge and representation. They focus on the identification of stakeholders' networks that are responsible for inducing change and on co-ordination parameters.

Nevertheless, these experiences are rooted in local situations and remain isolated from an institutional point of view, even more so because of the diversity of research institutions involved (national research institutes, Universities, NGOs).

There is consequently a challenge for promoting collaborative activities in order to validate and transfer local experiences and methodologies to other areas. In addition, such a transfer raises new questions to be addressed by research, such as the adaptation to local conditions or the promotion of actions to take place at macro-scale in order to ensure the success of local initiatives.

These local experiences offer a basis to set a new agenda for research in agriculture, cutting across national boundaries. Although local responses for planning might be different in each case, methods to be tested and implemented should benefit from such an exchange.

To achieve such an objective, there is a need to experiment and validate methodologies, to compare results obtained in different contexts, but also to identify the limitations, areas of validity and the fields of application of the methods. The organisation, objectives and challenges of this Regional Workshop on "Spatial Approaches for Land Use and Local Governance" address these concerns.

## 6. REFERENCES

Brunet, R., 1990. Mondes nouveaux : géographie universelle. Ed. Hachette/Reclus, Paris, 551 p.

Bertomé, J., and Mercoiret, J., 1992. Planification du développement local : Guide méthodologique. Suivi de trois études de cas en Afrique de l'Ouest. Paris, France, Ministère de la Coopération et du Développement, 344 p.

Caron, P., Sabourin, E., Sautier, D., Silva, P.C.G. da, and, Tonneau J.P., 1997. A la recherche de l'opérationnalité : approches de la recherche pour le développement de l'agriculture familiale dans le Nordeste du Brésil. In : La ruralité dans les pays du Sud à la fin du XXème siècle. ORSTOM éditions, Paris, France, pp 639-662.

Caron, P., 1998, a. Espace, élevage et dynamique du changement. Analyse, niveaux d'organisation et action. Le cas du Nordeste semi-aride du Brésil. Thèse de Doctorat en Géographie, Université Paris X - Nanterre. 396 p.

Caron, P., 1998, b. Zoning taking into account the verbal representations of stakeholders in the Amatola District in South Africa. Mission report 13-30 April 1998 in the Eastern Cape Province. CIRAD/TERA, n°60/98, Montpellier, France, 33 p.

Delgado, C.L., 1997. Africa's changing development strategies. A 2020 Vision for food, agriculture and development. IFPRI.

Hubert, B., 1998. Short-term versus long-term: a system approach to sustainable farming. 15th International Symposium, Association for Farming Systems Research-Extension, Pretoria, South Africa, 29 November- 4 December 1998.

Landais, E., and Deffontaines, J.P., 1990. Les pratiques des agriculteurs: point de vue sur un courant nouveau de la recherche agronomique. In: Séminaire du Département de Recherche INRA/SAD, INRA, St Maximin "Modélisation systémique et systèmes agraires. Décision et organisation", Proceedings, INRA/SAD, Paris, France, pp 31-64.

Le Moigne, J.L., 1990. La modélisation des systèmes complexes. Paris, France, Dunod, 178 p.

SACCAR, 1999. Long-Term Strategy and Five-Year Plan. Draft Document. Southern Africa Centre for Agricultural Research and Training, Gaborone, Botswana, 34 p.

Simon, H.A., 1969. Science of systems, Sciences of artificial.

Swanepoel, F. and Stroebel, A., 1999. Multifunctional Character of Agriculture and Land (MFCAL): A South African perspective. Paper presented at the Multifunctionality of Agriculture and Land for South Africa Workshop. National Department of Agriculture. 18 August 1999. Pretoria, South Africa.