The use of ITC: Constructing a participatory extension tool

Koutsouris A., Goussios D.

in

Dubeuf J.-P. (ed.).
L'évolution des systèmes de production ovine et caprine : avenir des systèmes extensifs face aux changements de la société

Zaragoza : CIHEAM
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 61

2004
pages 105-111

The use of ICT: Constructing a participatory extension tool

A. Koutsouris* and D. Goussios**
*Dept. of Agr. Economics and Rural Development, Agricultural University of Athens, 75 Iera Odos, 11855 Athens, Greece, e-mail: koutsouris@aua.gr
**Dept. Planning and Regional Development, University of Thessaly, Argonafton and Filellinon, 38221 Volos, Greece

SUMMARY – Information and Communication Technologies (ITCs) are technologies offering new ways for communicating and exchanging information and knowledge. A field of quite fierce debates concerns their use and impact on local development; it is often stressed that there is a need to develop ICT strategies and investments for rural areas taking into account differences in languages, culture, socio-economic conditions and infrastructure. The present paper aims to discuss an example of a participatory methodology, i.e. a methodology involving local people, in the construction of an extension tool. Such a tool aims at providing support to local people in order to improve access to, and manage natural resources and, thus, to achieve a more sustainable use of the natural resource base on which their production (livestock) system depends. The proposed methodology is based on the application of satellite and Geographic Information Systems (GIS) technologies in order to produce a tool enabling collective negotiations and decision-making. The innovative aspect of the methodology is that despite the high tech used it allows, on the one hand, for the direct participation of the local producers and agencies in the construction of the tool and, on the other, for planning the management of their pasturelands, flocks and production.

Key words: Information system, participatory method, extension.

RESUME – *"L'utilisation des TIC : Construire un modèle de développement participatif". Les technologies de l'information et de la communication (TIC) sont des technologies ouvrant de nouvelles formes de communication et d'échange d'information et de connaissance. Un sujet de débats passionnés concerne leur utilisation et leur impact pour le développement local. Il est souvent avancé qu'il est nécessaire de développer des stratégies TIC et des investissements pour les zones rurales en prenant en compte les différences de langage, de culture, de conditions socio-économiques et d'infrastructure. Le présent article vise à discuter un exemple de méthode participative c'est-à-dire une méthode impliquant les gens à l'échelon local pour construire un outil de développement. Un tel outil a pour objectif d'apporter une aide aux populations locales pour améliorer leur accès aux ressources naturelles et les gérer et donc pour permettre une utilisation plus durable de la ressource naturelle dont dépend leur système d'élevage. La méthodologie proposée est basée sur l'application des technologies GIS (systèmes d'information géographique) et satellitaires pour produire un outil permettant des négociations collectives et de l'aide à la décision. L'aspect innovant de la méthodologie est qu'en dépit de la haute technologie utilisée, elle permet d'une part la participation directe des producteurs locaux et des agences pour construire un outil, et d'autre part pour planifier la gestion des terres de pâturage, des troupeaux et leur production.*

Mots-clés : *Système d'information, méthode participative, développement.*

Introduction

Over the past few years, the "information highway" has become the object of special attention in the public arena; terms such as "information society", "knowledge society", "information economy" and the like are widely used in the public discourse. In such a context it is argued that information and knowledge play a key role in ensuring sustainable development with Information and Communication Technologies (ICTs) enabling low-cost creation, access and distribution of information. At the same time, it is recognised that current trends are biased against rural populations. There is therefore a need for broad-based and equitable access to ICTs in rural areas consistent with ongoing processes of decentralisation, democratisation and policy revisions (FAO, 2000).

It follows that the wide and unquestioned acceptance (mainly among academic and research circles) of modern technology as the means to solve a wide range of problems, including such issues as the animation – mobilisation – provision of technical assistance and information to the farming population has to be dealt with scepticism.

First of all, because it stems from an extreme simplification, or the ideology, of globalisation and the paramount role of technology which, as such, rather obscures instead of clarifying the issues at stake. Within such a "technological determinism"[1] framework the profound inequalities that exist around the world (even within the industrialised countries) are usually forgotten.

Indeed, under the current situation[2] it is more likely, than not, to expect the widening of the so-called "digital gap" in such a way that the access to ICTs by the currently "poor" or "not-haves" may become impossible. Thus, a new type of socio-technical exclusion arises. Despite claims about the structuring of a "global democracy" based on the use of ICTs it should be clear that, to the extent that the transmission of knowledge will continue to be ruled by the current political and economic (neo-liberal) regime, such a claim has to be discarded[3].

This is so, since, in the first place, the connection with the web is, among other factors, an economic matter; before an individual is able to use the content for learning s/he must have access. Nevertheless, it is well known that, for example, access to computers remains beyond the means of certain rural and remote areas even in the industrialised world. Furthermore, among the farming community access is proven to be strongly related to farm size and production orientation[4].

In addition, it is well known, at least among extensionists and development workers, that many campaigns have failed because they did not recognise the integrated nature of learning[5], and the importance of relevance and applicability of information to the lives of farmers/learners. Despite appeals to the need to develop ICT strategies for rural areas taking into account differences in languages, culture and socio-economic conditions, reflected in participatory needs assessment and development of both the technology itself and the forms taken by information content, nowadays, the web provides mostly unilingual and top-down information; currently, the ones who build sites and tools are located in the industrialised (mainly the Anglo-saxon) world, providing the rest of the users/recipients with "solutions". Such a situation certainly cannot be considered as either the transfer of appropriate technology, a participatory process or the building of co-operative networks.

Furthermore, the production of sites and tools through the use of multimedia results in new, complex products. This, in turn, creates a new "grammar"; everyone has to "surf" in a "pre-defined culture". This culture, then, has to be learned so that people will not become the victims of the "new magicians" of ICTs. The dictatorship of the unique "discourse" and "picture" implies the same (biased) style of life to everyone[6].

The challenge, thus, is to develop user-specific, locally sensitive content and applications, and procedures enabling feedback and widening participation. People need to be in command of the knowledge they require in order to understand the world in which they live[7]. On the one hand, information needs to be timely, retrievable and easily applied by a broad range of users, that is, to be accessible in their own languages and consistent with their values[8]. On the other, at the local level, rural people have to be supported to generate and maintain ownership of their own content and applications. Hence, there is also a need to combine indigenous and vernacular knowledge with external knowledge; there is a need

---

[1] i.e. the widely-held belief which holds that technical change is a prime cause of social change. For a critical discussion of this thesis and the alternative "social shaping of technology" perspective, see: Edge (1995), Mackay (1995) and Edwards (1995).

[2] The current situation is characterised by facts such as: (i) half of the world's population does not have a telephone (not to mention the illiterates); (ii) even in the USA the wide use of the Internet is confined only among the wealthier social strata; (iii) that in many, European at least, countries the cost of a local phone call increases while the cost for international calls and for big businesses decreases; and (iv) that the Internet is really booming only after the private tele-communication companies became interested in the digital revolution a period when privatisation became the obsession and dogma of G7 and, consequently, the rest of the governments and international organisations (WB, IFM, WTO, etc.)

[3] For the shortcomings of community networks and democracy, see: Virnoche (1998).

[4] See: Warren (2001), Leeuwis (1993) and An Foras Taluntais (1988).

[5] See: Cerf *et al.* (2000).

[6] An important point refers to the capability of the individual to use and not to be used by technology, i.e. to be aware of the psychological, social and political consequences of (the use of) technologies.

[7] See: Challot (1999).

[8] For discussion of alternatives such as "design-in-action" IT modeling, and "design as critique" see: Korac-Boisvert and Kouzmin (1995) and Berg (1998) respectively.

to support indigenous/vernacular content and local cultures. Moreover, there is a need, on the part of the local populations, to learn to use technologies for the production and dissemination of their own work[9,10].

In the final analysis it seems that, unless the problem of access for what, by whom and to what is seriously and honestly addressed[11], ICTs and the content they carry will end up having little significance and relevance for the rural populations especially the poor[12]. Thus, the dangers of the "virtual" and exclusion, within the present paradigm of development which further marginalizes and disempowers the disadvantaged, needs to be challenged.

Participation for rural development

Nowadays, an increasing number of both academics and practitioners argue that the "conventional" practice of rural development does not meet the needs of the concerned stakeholders. Thus, accepting that the traditional (first-order[13]) practice has fallen down, a change in perspective or level (i.e. a second-order[14] change) is sought after. The task, then, is an alternative design of rural development entailing the development of mutually beneficial relationships between experts, administrative cadres and producers.

The work of Checkland on soft systems, since the early 80s, is characteristic of such a change. The conception of soft systems was based on the understanding than in fuzzy situations, involving human beings and cultural considerations, goals are not given and system boundaries are negotiated. Therefrom, soft systems methodology follows four steps:

(i) Finding out about a problem situation, including culturally/politically.

(ii) Formulating some relevant purposeful activity models.

(iii) Debating the situation, using the models, seeking from that debate both

- Changes which would improve the situation and are regarded as both desirable and (culturally) feasible.
- The accommodations between conflicting interests which will enable action-to-improve to be taken.

(iv) Taking action in the situation to bring about improvement (Checkland, 1999).

Soft systems[15] are social constructs; they exist only to the extent that people agree on their goals, their boundaries, their membership and their usefulness (Roling and Wagemakers, 1998, p. 16). Reality, then, is actively "constructed" by people, being created in the discourse of, and negotiations among, people as social actors. Within such a context, sustainability has to be understood as an emergent property of a "soft system"; i.e. the outcome of the collective decision-making that arises from interaction among stakeholders (op. cit., p. 7).

Consequently, the issue of participation arises. Its importance is now recognised, at least rhetorically, in the "sustainability discourse". Following the United Nations Research Institute for Social Development (UNRISD), participation is the organised effort to increase control over resources and regulative institutions by groups and movements of those excluded from such control (Shepherd, 1998, p. 179).

---

[9] Further considerations may relate to skills teaching/learning as well as the skills of extension workers as well.
[10] For a discussion on the use of information technology see: Cavanagh (1997).
[11] See: Gurstein (2000).
[12] Technological change has to be viewed as a social process, i.e. technologies are social products that embody power relationships and social goals and structures (see: note 2).
[13] First order R&D is characterised by scientists remaining outside the system being studied, claiming objectivity and treating the system as a closed one, though it is often spoken of in open system terms. The "problem" then is a mismatch between what is scientifically known and feasible, and the current situation; there is strong belief in technological solutions, which after being developed by scientists will have to be transferred to farmers (Ison and Russel, 2000).
[14] Second order R&D aims at "unpackaging" the first-order interpretation of science towards a contextual, systemic and dialectical science (op. cit.).
[15] Often characterised as human activity systems or learning systems as well.

In the field of rural development, especially within the Farming Systems tradition and under the umbrella of Participatory Rural Appraisal (PRA), a wide range of participatory approaches and methods have been developed[16] (Pretty and Chambers, 1993)[17]. These have evolved from Rapid Rural Appraisal (RRA) approaches and methods with which they share a number of characteristics such as reversals of learning, learning rapidly and collectively, offsetting biases, optimising trade-offs, triangulating and seeking diversity. On top of these PRA adds facilitation (they do it), self-critical awareness and responsibility and sharing of information and ideas (Chambers, 1992).

Following, the case of traditional extensive systems in mountainous areas will be used as an example from Greece, in order to explore manifestations of the need for new participatory approaches and methodologies, and the appropriate use of ICTs.

The construction of an extension tool

Up to date, research methods at local level as well as the tools used do not facilitate the effective participation of local producers and the utilisation of local information and knowledge. Maps, management studies and the like, more often than not, do not provide local populations with a comprehensive background, while studies tend to relate (and, thus, collect information) within rather narrow, mono-disciplinary frames (animal science, production economics, agronomy, etc.). Moreover, especially in the case of mountainous areas, their specific natural characteristics along with the size of the area, the fragmentation of land uses, the number of producers, etc., do not allow for sufficient field work given the usually restricted research resources in terms of personnel, budget and time.

Nevertheless, the participation of producers is of paramount importance in terms of both the analysis of the current situation and the elaboration of interventions and specific actions. The successful implementation of any (development) plan undoubtedly depends on information concerning the organisation and function of the current management system. Besides, information in relation to the availability and quality of (mainly natural) resources and the evolving production system are also of crucial importance. The quality and validity of such information, due to the, usually, large size of the areas under examination, depend on the capability of incorporating local producers in an accessible and understandable process of conveyance of knowledge, information and experience.

Securing such pre-requisites allows for a "territorial diagnosis" to take place. The use of new technologies and know-how to support such a territorial diagnosis has been the focus of the Lab. of Rural Space, University of Thessaly[18]. The Lab. aimed at constructing a tool appropriate for facilitating a participatory diagnostic process.

The intervention area was the village of Anavra, Magnisia Prefecture, Central Greece. The village is located at Othrys Mt at an altitude of 900 m. The village area extends over 122 km^2 of which around 10% is cultivated with minimal irrigation. Nowadays, the dominant crop is wheat (due to the fact that it is subsidised), but the main activity of the inhabitants (600 people according to the 2001 census) concerns traditional, extensive animal husbandry. More specifically, the livestock capital of the village comprises of around 12,000 sheep and goats, as well as 4000 free ranging bovines and 1000 free ranging pigs. One third of the farms keep a mix of the aforementioned animals. In previous contacts of the research team with the village, problems concerning the degradation of its pasturelands and their management had emerged.

The multi-disciplinary team of the Lab., comprising of 11 experts and technicians, had, as mentioned, already established contacts with the villagers. The team, in launching the project, presented and discussed its aims at a village gathering; however, the villagers were quite reserved in getting involved in it right from the beginning. Therefore, in the first place, a group of 20 animal breeders willing to co-operate in the initial phase of the project was picked up.

---

[16] Almost exclusively, though, in the context of the so-called "developing countries".

[17] The menu of methods includes, among others, semi-structured interviews; groups of various kinds; mapping, modelling and diagramming; transect walks; time lines, trend analysis and ethno-biographies.

[18] See: project "Diversification et réorganisation des activités productives liées à l'elevage dans les zones défavorisées", Contract No.: FAIR3-CT96-1893 (1997-2000).

The production of a tool favouring active grassroots participation in the process of designing interventions was proved both innovative and effective. Its innovative character relates to the fact that for the successful implementation of the method, producers should participate in the construction of the tool that would, in turn, be utilised by themselves and the local society as well as by related agencies. Therefore, it was essential that the producers would be able to identify their own area with the help of 3D images.

Such an identification was based on relief, land use and land cover, transportation networks, the position of the village and other infrastructure and fixed capital which are structural parts of the family production system. Thereon, the specification, upon the 3D background, of toponyms and land uses based on the information provided by 4 out of the 20 producers, specifically chosen due to their special capability of orientation and space scouting, led to a spatial model – tool that was, afterwards, easily identified and accepted by the producers. Thus, this model proved appropriate in allowing the incorporation of producers in the process of exploration and analysis of the village territory to follow.

At this phase, the research team was able to present the village gatherings with videos and charts that aroused the inhabitants' interest in actively participating in the project. Based on the capability to "read" such a 3D spatial background, further information was added on from both primary (field research) and secondary sources. Of crucial, though, importance has again been the thematic, quantitative as well as qualitative information provided by the involved agencies/services and producers. Information mainly concerned the spatial specification of land use and, consequently, of the spatio-temporal organisation of livestock production practices[19,20]. Such information was primarily collected from 40 producers representing the 125 breeders of the community[21].

The territorial projection and representation of such a voluminous and accurate data set was attained through the use of Geographic Information Systems (GIS). For the collection and classification of information, the community territory was divided into successive zones; their use and relations portray the organisation of the local production system on the space as well as producers' strategies and practices. Thereon, the in-depth exploration of the roles and behaviours of local social actors and (mainly informal) co-operation schemes as regards the organisation of activities and system's function/dysfunction was attained[22].

The system, in its totality, is influenced by the varying family strategies with the latter being, more or less, dependent upon the existing agricultural policies. This underlines the value of the active participation of producers in the evaluation of their own system. The implementation of the method substantially contributed to the detection of strategies as well as of the socio-economic factors and actors influencing them. Thus, structural features of the production-management system are located, discussed and evaluated[23].

In sum, the work of the team was to a substantial degree based on the dialogue (or, two-way communication) either with the villagers in toto (through 5 village gatherings, including the launching of the project), or with small groups of breeders as well as individual breeders. Producers' participation in the development of the tool resulted in a user-friendly model, enabling the smooth collection, analysis and interpretation of data.

Conclusion

Rural areas are markedly heterogeneous. Moreover, they represent highly complex situations; a multiplicity of factors drive land use changes in both time and space. Such factors include:

---

[19] Such as: movement and tracks of flocks, temporal distribution in grazing zones, etc.

[20] This was attained with the use of a virtual flight model that facilitated producers to determine the organisation and function of the spatio-temporal system of pasturelands' management.

[21] Representation is based on the fact that small groups of animal breeders follow common practices. Therefore, it was not necessary to interview all the 125 breeders of the village.

[22] The basic concepts used are those of "seasonal practice" and "spatio-temporal system of the distribution of activities" which allow for the organisation and classification of information in a way that depicts and relates the activities of the community production system and of family farms with space.

[23] Such as: mixed production system, lack of working hands, excessive animals' populations, etc.

"*the non-linearity and asymmetry of the relationship among the components and its structure; the different levels of organisation and constraints; the simultaneous existence of functional and structural boundaries; the level of uncertainty of systems indicators; the permanent state of evolution in systems' components and interactions between them; varied sources of perturbations which destabilise a range of parametres; the spatial diversity of the landscapes and the interactions between the social, economic and ecological systems*" (Miranta, 2000).

The construction of the extension tool presented largely depends on GIS. GIS was born as a way to digitise cartography. Linked to a numeric data bank, a GIS is an efficient tool to characterise the spatial division of a great number of phenomena and their dynamics. GIS allows area, perimeter and volume calculations and a series of basic operations for quantifying the spatial expression of variables. GIS also allows qualitative spatial analysis, such as diversity, proper or improper land use, the simulation of alternative uses, the interactions between different uses and the probable impact of new agricultural technologies on the environment.

In general, in computer modelling experimentation is easy, cheap and speedy, once a suitable model has been developed. Nevertheless, caution should be taken in a number of issues. First of all, modelling is only an analytical tool and not an end in itself. Secondly, models are at best simple, thus, imperfect representations of reality; they should be seen only as decision support tools. Thirdly, models often lack a sociocultural component, vital for emulating real-world farms; modelling sociocultural attitudes imposes a great challenge (Quiroz *et al.*, 2000).

Nevertheless, nowadays, numerous techniques exist allowing for participatory "stakeholder" identification and needs assessment (diagnosis). Such techniques, on the one hand, have considerably improved communication and understanding between researchers and farmers and, on the other, resulted in supplying a profile of the social and biophysical environment, that incorporate local knowledge and priorities.

As far as agroecological niches are concerned it is now well known that people destroy them in both favourable and harsh environments. But, breaking "unsustainable practices" is not just a matter of investments for agroecological rehabilitation or even investments in modern agricultural technology. Reversal requires the rebuilding of social organisation, institutions for local empowerment and community spirit as well as the careful development of markets and technologies (Lightfoot, 2000).

Through the methodology presented, aiming at the construction of an extension tool, the overall picture of the organisation and function of a local management system has been attained. The use of high tech along with the active participation of producers, further allows for the exploration of relevant regulations – interventions in agro-ecological zones via the incorporation of information concerning the production system. Thus, implications related, either directly or indirectly, to land uses, management practices and the environment are detected.

Such a process contributes decisively in the understanding and the acceptance on the part of specialists and relevant services of spatial/environmental problems the way the producers/local people experience and bring out themselves. This is of considerable importance for the adoption of commonly agreed proposals (i.e. building consensus) concerning the re-organisation of spatial management system on the part of all the involved parties and services with a view to sustainability.

The overall result of the above mentioned action-research practice is possible to be further utilised for the development of a tool, which will map proposals for the improved organisation and function of spatio-temporal management systems and their implications on the environment. Finally, another dimension of this methodology and the derived tool concerns its contribution, as a methodological and design means, to the emergence of a new field for the function and expression of local democracy as well as to the facilitation of the communication and co-operation between administrative levels.

References

An Foras Taluntais (1988). *Information Technology in Agriculture, Food and Rural Development, Proceedings of International Conference,* Dublin (Irish Republic), 19-20 April, 1988.

Berg, M. (1998). The politics of technology. *Science, Technology and Human Values,* 23(4): 456-490.

Cavanagh, C. (1997). Adult learning, media, culture, and new information and communication technologies. *Adult Education and Development,* 49: 143-158.
Cerf, M., Gibbon, D., Humbert, B., Ison, R., Jiggins, J., Paine, M., Proost, J. and Roling, N. (eds) (2000). *Cow up a Tree: Learning and Knowing Processes for Change in Agriculture in Industrialised Countries*. INRA Editions, Paris.
Challot, B. (1999). *The Relationship with Knowledge*. Metechmio Publ., Athens (in Greek).
Chambers, R. (1992). *Rural appraisal: Rapid, relaxed and participatory,* IDS Discussion Paper No. 331. IDS, University of Sussex, UK.
Checkland, P. (1999). *Soft Systems Methodology in Action*. John Wiley and Sons Ltd., Chichester, UK.
Edge, D. (1995). The social shaping of technology. In: *Information Technology and Society*, Heap, N., Thomas, R., Einon, G., Mason, R. and Mackay, H. (eds). Sage Publ. Ltd., London, pp. 14-32.
Edwards, P. (1995). From "impact" to social processes. In: *Handbook of Science and Technology Studies*, Jasanoff, S., Markle, G.E., Petersen, J.C. and Pinch, T. (eds). Sage Publ. Ltd., London, pp. 257-285.
FAO (2000). *The role of information and communication technologies in rural development and food security.* SD Dimensions. www.fao.org/sd/Cddirect/Cdre0055.htm.
Gurstein, M. (2000). *E-commerce and community economic development. Enemy or ally?* FAO-SD Dimensions. www.fao.org/sd/Cddirect/Cdre0055i.htm.
Ison, R. and Russel, D. (2000). *Agricultural Extension and Rural Development*. Cambridge University Press, Cambridge.
Korac-Boisvert, N. and Kouzmin, A. (1995). IT development: Methodology overload or crisis? *Science Communication,* 17(1): 57-89.
Leeuwis, C. (1993). *On computers, myths and modelling.* PhD Thesis, Agricultural University of Wageningen, The Netherlands.
Lightfoot, C. (2000). Agroecosystems analysis. In: *A History of Farming Systems Reserch.* FAO, IFSA and CAB International, Wallingford, pp. 363-381.
Mackay, H. (1995). Theorising the IT/Society Relationship. In: *Information Technology and Society*. Heap, N., Thomas, R., Einon, G., Mason, R. and Mackay, H. (eds). Sage Publ. Ltd., London, pp. 41-53.
Miranta, E. (2000). The GIS and remote sensing contribution to the elaboration of system hierrchies in FSR. In: *A History of Farming Systems Reserch.* FAO, IFSA and CAB International, Wallingford, pp. 334-341.
Pretty, J. and Chambers, R. (1993). *Towards a learning paradigm,* IDS Discussion Paper No. 334. IDS, University of Sussex, Brighton.
Quiroz, R., León-Velarde, C. and Bowen, W. (2000). FSR from modelling perspective. Experiences in Latin America. In: *A History of Farming Systems Reserch.* FAO, IFSA and CAB International, Wallingford, pp. 342-353.
Roling, N. and Wagemakers, A. (eds) (1998). *Facilitating Sustainable Agriculture*. Cambridge University Press, Cambridge.
Shepherd, A. (1998). *Sustainable Rural Development*. Macmillan Press, London.
Virnoche, M. (1998). The seamless web and communications equity. *Science, Technology and Human Values,* 23(2): 199-220.
Warren, M. (2001). Digital divides and the adoption of information and communication technologies in the UK farm sector. Unpublished paper, University of Plymouth.