

# **Information and Communications for Rural Communities (InforCom) Project**

## **Section 2: Planning for Rural Development**

### **Abstract**

This section addresses how territorial entities and community-based organizations can use planning as a mechanism for rural development, and how scientists and information providers can use planning as an entry point into development. This work began in 1999 as the “Land Use” component of the agreement between CIAT and the Ministry of Agriculture and Rural Development (MADR, the Spanish acronym), and this year has seen the addition of case studies in Bolivia, Peru, and Senegal. We aim at facilitating the use of information by local stakeholders for the management of their natural resources by providing methods and tools, documented examples of planning, and principles (or insight) that can help successful planning and the efficient use of information. These are developed through case studies in specific locations, and are then diffused through training events, seminars, reports, and publications, as well as through the CIAT Web page. This year in Colombia, the prototypes of a series of decision support tools were “launched” and made available through the CIAT Web page. They will continue to be co-developed with users in Colombia. Following CIAT’s restructuring, this group was placed in the new project “Information for Rural Communities (InforCom)”, under the Rural Innovation Institute.

### **Introduction**

We are aiming at validating a series of hypotheses on why certain approaches work better than others, why planning simply does not work in certain circumstances, and why information is seldom used for decision making. This research component, which we had previously approached by trial and error through development applications, is just beginning to emerge more formally.

### ***Scientists and information providers can use planning as an “entry point” to rural development***

Planning is part of the coordination and management process of any individual, group, or organization. In some cases, the law requires official planning mechanisms, which makes them less appealing, but turns them into a predictable process to which scientists and information providers can link. Decentralized countries are divided into a hierarchic arrangement of “territorial entities” that are responsible for coordinating development activities and resources over their entire territory, both urban and rural. These entities are obliged to conduct regular planning exercises, supported with monitoring and evaluation. Although these exercises are often perceived as bureaucratic requirements, and are not sufficiently taken advantage of, they are extremely valuable mechanisms to coordinate the various players of rural development. Local groups and administrations can make good use of planning if they are proactive, and approach the exercises with a learning attitude, where local actors consider the different actions they (and others) have to conduct to reach a desired future.

During planning, monitoring, and evaluation, participants have to determine their desired situation, and periodically evaluate and compare it with their present one. They then have to consider different possible actions that they can put forward to get closer to the desired conditions, and determine what contributions are needed from outside. When they make decisions, they are actually making hypotheses about what should work best, and they can validate these through monitoring and evaluation. Indeed, as they go along, they observe the consequences of their decisions and actions, and eventually adjust their plans, learning in the process. Planning groups can benefit from the input of scientists, experts, and information to better evaluate their situation and their context, to broaden their range of possible options, to explore their long-term implications, and eventually to choose between them. Scientists and information providers can benefit from these exercises to put their knowledge to work, and to better focus their research and data collection regarding the needs of rural development processes. They can even work on testing local hypotheses with local groups. To participate in local development, they need not necessarily participate actively in the meetings of local groups, but can be linked to them through ICTs.

### ***Planning as a research theme in itself***

The systems approach to planning that we are promoting is not something fundamentally new, as many aspects of rural development have been approached systematically for decades. However, we have some research hypotheses that we want to verify through our case studies:

- Planning, where groups engage in a continuous process of diagnosis, action planning, and monitoring and evaluation, can greatly improve local learning, rural innovation, and the capacity of rural populations to adapt to adverse or changing conditions (this can seem obvious, but seeing how few consistent processes of planning are being implemented, we think this hypothesis is worth demonstrating).
- Many of the obstacles related to planning and politics result from an inadequate sense of responsibility on the part of leaders and citizens, or are related to counterproductive logic, such as looking at issues with a “winners and losers” perspective, being obsessed with growth (either economical, social, or emotional) at the detriment of the group’s well-being, the quest for quick and easy gain, a dependence on assistance, or a focus that is too short term or too restricted to certain economic sectors. These can be strongly moderated by adopting a logic of progression towards long-term and collective goals. This logic can be developed in planning workshops where participants discuss their desired future conditions, their possible contributions, and the contribution they need from other players (or requests).
- During diagnosis, monitoring, and evaluation, information is not used optimally if participants and planners do not have a clear idea of their desired future conditions. Clearly stating these allows indicators to be defined, and allows a reference with which to compare observed conditions. In their absence, diagnosis and monitoring remain purely descriptive, not allowing judgment, and thus reducing the possibilities of learning in the process, and data can be accumulated without ever being used for decision-making.
- Different hierarchic levels of territorial administration can improve the coordination of their development efforts by articulating various “contributions” and “requests” of the

players from one level to the next, from the bottom up. This approach can be used in the articulation of municipal plans at departmental level, and of departmental plans at national level.

### ***Context of the development of research activities on planning in CIAT***

This work began in 1999 with the contribution of the Land Use project to the agreement between CIAT and MADR. We wanted to put geographical information and decision support tools (DSTs) to the service of decision makers so they could improve the rationality of land use. Planning mechanisms, required from all administrative levels, and that can also be implemented at the village level, appeared as our best entry point, for the reasons mentioned above. Through our case studies in Colombia, described in more detail later, we observed that the potential of planning is often not well taken advantage of, neither as a learning and development tool, nor as an entry point by scientists and information providers. We realized that planning processes could be improved greatly, not so much by the use of specific methods, but by a change in the approach and logics behind the activity. In addition to continuing to work on how geographical information could be used in planning, and how scientific results could be made into DSTs and also used in planning, we started looking at ways to improve the planning processes themselves. Our Colombian case study spurred interest, and we received much demand for training on territorial planning, in which we needed to give recommendations to participants. This encouraged us to reflect on ways to improve planning, and we are presently promoting a systems approach to planning, based on the consideration of society as a system, interrelated with biophysical systems, organized hierarchically. We have developed a very simple participatory planning approach that allows municipalities to quickly articulate visions, proposed actions, and requests of different stakeholder groups (Beaulieu et al., 2000b; 2002b), and that departments could use to articulate municipal plans. We have also become interested on how planning processes can catalyze and facilitate learning and rural innovation. This team therefore joined the InforCom project in 2003, while continuing to contribute to some outputs of the Land Use project.

In 2003, we began case studies in other countries—Bolivia, Peru, and Senegal. Our partners in these countries have a strong interest in revising existing planning guidelines to improve planning processes. We are therefore continuing our reflections on these methodological issues with a much larger range of partners and cultural contexts. The work in Peru was initiated through an alliance with GTZ and CONDESAN, who were interested in applying some of our methods, jointly with theirs, in some of the pilot watersheds of the CONDESAN consortium. The work in Bolivia has resulted from the hosting of Hubert Mazurek, a scientist from IRD, in the InforCom project. The work in Senegal is conducted in relation with the Desert Margins Program (DMP), and involved the posting of Nathalie Beaulieu in Dakar. These case studies will be described in more detail below, but it is important to mention that, through them, we have agreed to follow a coherent research agenda, where the studies in different countries will contribute to our understanding of how rural development can be improved, and help us demonstrate some basic hypotheses.

Our work in Colombia will continue through a new agreement with MADR, and will be oriented more specifically towards improving the efficiency of rural technical assistance through municipal planning in the entire country, and through follow-up in coordination at the

department level. As the 1999-2003 agreement is presently finishing, this year involved concluding and launching the various DSTs prepared for the Colombian llanos.

Through case studies in Colombia, Bolivia, Peru, and Senegal, we will test the research hypotheses mentioned above, develop documented examples that can be helpful in other sites, and develop methods and tools for rural planning. The experience acquired in these case studies is then communicated to others during training, and in reports and publications. Note that we are not studying planning as an end in itself, but as a mechanism allowing collective learning and organization for rural development.

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## Colombia

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## Materials and Methods

The Colombian MADR funds work in Colombia. The area chosen by the MADR for its 1999-2003 agreement with CIAT was the Colombian llanos, or eastern plains, with a particular interest in the area between the cities of Puerto Lopez and Puerto Gaitan, previously dominated by livestock, but with potential for new crop varieties that are tolerant to acid soils. Municipal planning appeared the best mechanism to make use of the geographic information that had already been digitized by the Land Use project, and to have a concrete influence on land use decisions. Incidentally, all municipalities in Colombia were under the pressure of producing their *Plan de Ordenamiento Territorial* (POT), a new, long-term, spatialized planning exercise that they had never experienced before. We supported the administration of the municipality of Puerto Lopez, which almost reaches the city of Puerto Gaitan, in the elaboration of their *Plan Basico de Ordenamiento Territorial* (PBOT; Alcaldía de Puerto López-CIAT, 2000). This experience triggered an important demand for training in planning methodology and GIS tools, to which we responded with a number of courses given from 2000 to 2002. We then supported the municipality in the elaboration of its *Plan de Desarrollo Municipal* (PMD) in 2002 (Alcaldía de Puerto López-CIAT, 2002).

Understanding the importance of the contributions of all administrative levels, we have designed our activities to support decisions at the national, regional, departmental, municipal, and village levels, although until now we have worked mostly at the municipal and village level. Through the logistic support of local projects related to cassava, we realized that planning workshops and follow-up at the village level, which were conducted for municipal planning, helped develop new partnerships between local groups, the municipality, the municipal unit of agricultural technical assistance, researchers, and private industry. In Colombia, municipalities are responsible for providing free technical assistance to small-scale farmers, and thus of planning this assistance

with the beneficiaries, through a municipal committee of rural development. In Puerto Lopez, the various committees formed to follow up on specific aspects of the municipal plans (local emergencies, territorial planning, sports, rural development, etc.) were combined into one committee that holds more frequent meetings for the follow-up of activities, and has the possibility of articulating activities that affect various sectors.

## **Results**

The highlights of the Puerto López case study for this year are:

- A multi-sectoral committee of the civil society, with our support, is conducting follow-up of the municipal PBOT and PMD, using the SEGUIMIENTO tool, presented later.
- With the UMATA of Puerto Lopez, we are continuously following up planning meetings in communities, and have supported various initiatives.
- A cassava drying trial, conducted in 2002, led to the adoption of this practice in the village of El Turpial, the commercialization of dry cassava with animal feed factories, and the funding of a drying facility by the municipal administration.
- Cassava variety trials were conducted in five of the rural communities, jointly between farmers and CIAT's cassava project.
- The indigenous communities of Humapo and La Victoria constructed a tree reproduction greenhouse, and have begun producing small trees for the reforestation of their reserve and for commercialization.
- A poster was presented at the Global Forum on Agricultural Research (GFAR) meeting in Dakar, May 2003, explaining how municipal planning catalyzed local innovation and partnerships related to the cassava crop (CIAT, 2003).
- With MADR, we have identified specific contributions of rural planning for the next phase of the agreement with CIAT, oriented towards improving the efficiency and relevance of rural technical assistance, through municipal planning and monitoring, as well as monitoring at the department level.

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## **Bolivia**

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## **Materials and Methods**

Our work in Bolivia is funded by IRD UMR-151, CIAT and the Bolivian Vice Ministerio de Planificación. Since 1994, the Bolivian laws of popular participation and decentralization provide municipalities with responsibilities and financial resources to administer their territory.

Territorial planning as such is the object of a normative and methodological framework defined by the *Dirección general del Ordenamiento Territorial*. Since 1996, departmental administrations have elaborated land use plans (Planes de Uso del Suelo, [PLUS]) which represent an agro-ecological zoning, but lack relevance for the planning and elaboration of development policy. Very recently, a few municipalities have started the same process. However, most of these plans are elaborated by external organizations or consultants and are not effectively used, on one hand because they don't correspond to the needs of populations, and on the other hand because they are difficult to understand by municipal technicians. In addition to this, the methodology used for the OT plans is based almost exclusively on biophysical parameters used to establish a balance of the use of the land's potential. Our work in Bolivia therefore aims, on one hand, at engaging a learning process, within the institutions in charge of planning, about participatory planning. In addition to this we aim to develop, jointly with these institutions, a set of regionally adaptable guidelines for participatory territorial planning that can be used for municipalities, groups of municipalities (*mancomunidades*) or departments to articulate their activities in the various economical sectors, as well as to integrate local and regional development projects.

Methodological collaborations have been initiated with the dirección del Ordenamiento Territorial (OT) (much oriented towards biophysical considerations), and CODEPO (which establishes demographic policies), the Instituto Nacional de Estadística (INE), the Ministry of Agriculture, and institutions of the Sistema Boliviano de Transferencia Agropecuaria (SIBTA). As explained in the introduction, the case studies are conducted to ensure that the proposed guidelines are adapted to the Bolivian context, and contrasted sites were chosen to allow Bolivian diversity to be taken into account. Like in the other countries, these case studies will also yield examples that will be communicated throughout Bolivia, and are providing opportunities to test our research hypotheses.

## **Results**

In Bolivia, the highlights of our activities for this year are:

- Three groups of municipalities (four in Altiplano south of La Paz, four in department of Pando and one in department of Cochabamba) have been chosen for pilot study sites. Initiation workshops have been conducted in two municipalities which signed an agreement of engagement (with the *dirección del Ordenamiento Territorial*) to conduct participatory planning. Meetings with mayors of the other municipalities were conducted in September 2003 in which we jointly agreed to start the planning processes in March 2004. General Agreements between OT, CIAT and municipalities should be signed before the end of 2003.
- A collaborative agreement was drafted between CIAT / IRD, the Dirección del OT, the Consejo de Población (CODEPO) and the Instituto Nacional de Estadística (INE) to define respective roles in the collaborations under way
- We are currently reviewing the methodology used by the Bolivian government for territorial planning to include many more socio-economic aspects and participatory practices

- We participated in the teaching of courses of the Masters degree in Rural Development of the Universidad San Simón de Cochabamba and in the directorship of three Masters theses on rural innovation.
- On September 29<sup>th</sup> and 30<sup>th</sup> 2003, we organized in Cochabamba a seminar on stakeholders, territory and local development, where we analyzed the progress of local development planning in different regions of Bolivia, in the context of the 50<sup>th</sup> anniversary of the agrarian reform.
- We organized a statistical cartography course at the end of October 2003, for technical staff working in the organizations with a role in public planning

Figure XX shows the signing of the *acuerdo de compromiso* between the municipality of Comalarca and the *Dirección del ordenamiento territorial*. The white man sitting at the table is the lawyer. Figure XX shows a picture taken during the seminar of September 29<sup>th</sup> and 30<sup>th</sup>.



Figure XX: signing of the *acuerdo de compromiso* between the municipality of Comalarca and the *Dirección del ordenamiento territorial*



Figure XX: Seminar on stakeholders, territory and local development, in Cochabamba, September 29<sup>th</sup>.

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## Peru

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### Materials and Methods

Work in Peru is funded by GTZ-Peru. In May 2003, The Peruvian Congress approved the new municipalities law, the *Ley Orgánica de Municipalidades*, defining the responsibilities of municipalities, which can either be provinces or districts. One responsibility is to promote the integral, sustainable, and harmonious development of the municipality's circumscription, with the help of a local planning process that must be integral, permanent, and participatory, and coordinated with the regional and national levels of government. A variety of sectoral and multi-sectoral plans are required regularly from municipalities. Multi-sectoral plans include the *Plan de Desarrollo* as well as the *Plan Urbano Rural* (for districts), and the *Plan de Acondicionamiento Territorial* (for provinces). Each year, municipalities have to plan their budget through a participatory process, resulting in the "presupuesto participativo".

Through an alliance with CONDESAN and GTZ, we agreed to give support to GTZ in Peru for the implementation of territorial plans, and at the same time participate in these experiences as case studies. We jointly decided to begin this collaborative work in the region of Arequipa to benefit from links with projects such as "Gestión de Riesgo de Desastres Naturales con Enfoque de Seguridad Alimentaria en el Departamento de Arequipa" (executed by COPASA-GTZ), "Cuencas Andinas", and CONDESAN, which is active in the region. The district of Pampacolca was chosen as a pilot site for the elaboration of the *Plan Urbano Rural*. Before starting actual work in the pilot site, we agreed to jointly organize a course on territorial planning directed to some of the institutions of the regional government of Arequipa and of the district of Pampacolca, to members of universities and NGOs of the region, and to GTZ staff in Peru. We

agreed also to organize a workshop on the importance of territorial planning, involving decision-makers of the districts, provinces, and regional government of Arequipa. These workshops were conducted in September this year.

## Results

The highlights of our work in Peru for this year are:

- We conducted field visits in the districts where GTZ-COPASA intervene, to become acquainted with their development plans, and the problems they have experienced.
- We conducted the workshop/seminar entitled “Bases para la Formulación de Planes de Ordenamiento Territorial”, in Arequipa, from 8 to 14 September 2003, including a practical component in the district of Pampacocla.
- We conducted the workshop/seminar entitled “Planes de Ordenamiento Territorial como herramienta de gestión del espacio en Arequipa” on September 16<sup>th</sup> in Arequipa.
- CIAT and GTZ-Colombia are assisting GTZ-Peru in the writing of terms of reference for the elaboration of a pilot territorial plan in the district of Pampacocla.

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## Senegal

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## Rationale

Work in Senegal is funded by GEF. As previously mentioned, our work in Senegal is made possible by the hosting of Nathalie Beaulieu at ISRA, and her inclusion in the DMP team. The DMP is not a project on territorial planning, but is a project that aims at improving rural livelihoods through the improvement of biodiversity and soil fertility. One of its objectives is to improve knowledge on the existence and management of this biodiversity and soil fertility. It started in 2003 and works in nine sub-Saharan countries—Senegal, Niger, Mali, Burkina Faso, Namibia, Kenya, South Africa, Zimbabwe, and Botswana. Two of its outputs are entitled “stakeholder participation” and “capacity building”. In Senegal, planning (including monitoring and evaluation) is the mechanism that has been chosen for their implementation. All of the activities of the DMP in Senegal will be conducted at the level of the rural community, but with strong linkages with the higher administrative levels, which are municipalities (either *arrondissements* or *communes*), departments, and regions, as well as with a network of resource persons (rural extension agents and scientists). A rural community can include various villages. As prescribed by the Law on Decentralization, rural communities must conduct and follow up local development plans.

## Materials and Methods

The Senegalese component of the DMP is focused, for the first 2-year phase, in four regions of the country—Kaolak, Diourbel, Fatik, and Thiès. In each region, it will work in about four rural communities, which are therefore the pilot communities for the case studies on planning as a rural development tool. At present, because the program has only recently begun in Senegal, we have only established links with the rural communities and other partners, through visits and workshops in the regional capitals and rural communities.

## Results

The highlights of our activities in Senegal for this year are:

- An agreement was made with ISRA for CIAT to contribute to the Senegalese component of the DMP through the out-posting of Nathalie Beaulieu at ISRA in Dakar, starting September 2003.
- Several meetings were conducted with regional and local partners to discuss study sites and methodologies used for common outputs on local stakeholder participation, capacity building, and monitoring of land degradation. Study sites were visited.
- Four Regional Development Council (CRD, the French acronym) meetings were held in the “*gouvernance*” (regional parliament) of the studied regions, with the participation of regional, departmental, and local authorities.
- We developed French version of a participatory planning guide for local communities.
- With the Information Systems unit, we developed a preliminary French version of the Expertise software.

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## Methods and Information Tools Developed for Rural Planning

A series of tools and methods were “launched” this year as a result of the 1999-2003 Agreement with the Colombian Ministry of Agriculture and Rural Development. The preliminary development of most of these tools was reported in previous annual reports of CIAT’s Land Use project. We expect to continue adapting and co-developing them with partners through extensive training and follow-up in Colombia, and through our work in the various case studies mentioned above. We detail below the function of each tool, and explain what has been achieved this year.

### *Participatory systems approach to planning and Herramienta de Planificación Participativa (HePP)*

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In 2000, we had presented a participatory planning method that could be used for municipal planning, and to articulate municipal plans into departmental ones (Beaulieu et al, 2000). In 2001, we elaborated a computerized tool that allowed users to store their results in a database, and use them as a “draft” for discussion with the Intelligent Team Decision Assistant (ITDEA) discussion support tool (Leclerc and Narvaez, 2001). This tool was “launched” as a prototype this year, along with the other, hoping to further improve it with partners. We realized that this method, although complete in its consideration of the steps of the planning process, was too long and complicated to use for many municipalities. In 2001, we tried to derive its essence, and came out with a simplified version, entitled “visions, actions and requests across administrative levels”, which we tested in Puerto Lopez for the elaboration of the municipal development plan (Beaulieu et al., 2002b).

This year, we presented a more general systems approach to planning in Beaulieu et al. (2004), and in didactic form and in Spanish for rural communities in Beaulieu et al. (2003). We continue to promote the visions-actions-requests as part of this general approach. The systems approach to planning encourages players to acknowledge the systematic nature of society and its environment, to realize how the groups they are part of are part of larger groups, and for leaders to understand which other systems are components that they are coordinating. It encourages players to reflect on their long-term goals (or desired future conditions), how they fit in with the goals of the systems of which they are part, and, if they are leaders, how the goals of the components contribute to the goals of the level they coordinate. It aims at:

- Encouraging a greater sense of responsibility in citizens as well as leaders, through the concept of 360° responsibility, by acknowledging that coordinators of each level have responsibilities towards the levels below, the levels above, the other systems of the same level, in addition to ensuring the perpetuation (and eventually the growth) of the system they represent.
- Improving interactions between players by finding complementarity between their actions, matching the actions of some players with the requests of others.
- Reinforcing self-correction and learning through continuous planning, monitoring, and evaluation, rather than perceiving the latter as mechanisms of control from above.
- Improving communication and the use of information by identifying the different feedback loops needed to effectively monitor and evaluate as well as to make decisions, and by identifying desired future conditions to use as a reference in diagnostics.

The obstacles to planning are often not so much methodological, but related to counterproductive mindsets. A logic of “winners and losers” often underlies political activities, where the goal of winning the election overthrows development goals. Other counter-productive mindsets include the obsession for maintenance and growth, which also overthrows development goals, as well as the culture of quick and easy gain. These can be moderated by an increased sense of responsibility (in the 360° directions), and by a longer-term vision of where we want our system to go, which can be encouraged by the use of vision-based planning methods.

***CUFRUCOL (Cultivos y Frutas para Colombia)***

**Contributors:** Adriana Fajardo, Maria Fernanda Jiménez, Genner Narvaez, Nathalie Beaulieu; Libardo Rivas (BP-1)

The CUFUCOL database was developed and reported in the PE-4 2001 Annual Report. It stores information on botanical characteristics of crops, their biophysical requirements, and production costs. It allows input of data into GIS DSTs, such as CLIMCROP, and it allows the printing of illustrated and informative cards for participatory discussion of crop options with farmers. Since 2001, it has been improved, and data have been added.

Data about botanical characteristics, biophysical requirements, and production costs were compiled for 120 crops of interest for Colombia, including grains, forages, fruits, and vegetables. These data were stored in a database in the Microsoft Access format. When possible, the data were taken from Colombian sources, and when unavailable, the biophysical requirements were taken from the ECOCROP database developed by FAO. Users can also input their own data into the database, if they dispose of local data or data relative to specific varieties. They can also add new entries on crops not yet considered, or on combined production systems.

This database was designed to be flexible and useful for a variety of users. If adequately distributed, farmers could consult it at UMATAs. It could be used by UMATA agents themselves to help farmers plan production projects that combine a variety of crops, and to make economic evaluations of different scenarios. This will help farmers plan more sustainable production projects, and will help them present well-documented projects for credits or for anticipated purchase contracts. Through the use of this tool, we aim at increasing the capacity of municipal institutions to provide technical assistance to farmers, and of farmers to access information. The distribution of this tool will be accompanied by training and notes on the importance of using this information for preliminary indications only, giving priority to local information and common sense in planning agricultural projects.

### ***GEOSOIL***

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GEOSOIL is a database tool that allows the storage of soil information for soil profiles or for soils represented in a soil map. For each new entry, it allows the user to enter the physical and chemical data that are available, without obliging the user to fill in all the fields. For soil characteristics that are not numerical, for example for texture or landforms, it allows the user to choose from a range of options, coding the choices in the process. For a number of soil properties that can be used as indicators of soil quality, it produces a report of a diagnosis, using criteria established for the Colombian llanos. It allows the comparison of soil characteristics with the requirements of a given crop, and when the necessary chemical information is available, can produce a report of fertilization recommendations. The soil requirements can be imported from the CUFUCOL database or be specified by the user. It allows the export of soil data and corresponding geographic coordinates to GIS programs for their mapping, or to geostatistical programs for an analysis of spatial variability and interpolation. The preliminary developments of this tool were presented in the 2002 PE-4 Annual Report.

This year, the application of this database was completed with 1:100 000-scale soil map data for the municipality of Puerto Lopez, generously provided by IGAC for research purposes, extracted from the detailed agrological study for the department of Meta (IGAC, 2000). More detailed data was stored for a portion of this area, resulting from field measurements and characterization of soil samples in a portion of the municipalities, around the villages of El Turpial, Humapo, La Victoria and Puerto Guadalupe. A geostatistical analysis was made with these point data, and raster maps of a number of soil characteristics were derived by interpolation with a kriging approach. Figure 1 a) shows the result of this analysis for soil penetrability. The application for Puerto Lopez was shared with CORPOICA, but an empty structured database (which can be filled with data from other sites) is made available to the public through the CIAT Web page. A users' manual and a help module were also developed this year. Figure 2 a) and b) shows two of the displays of the database tool, regarding the comparison of soil characteristics with specific crop requirements.

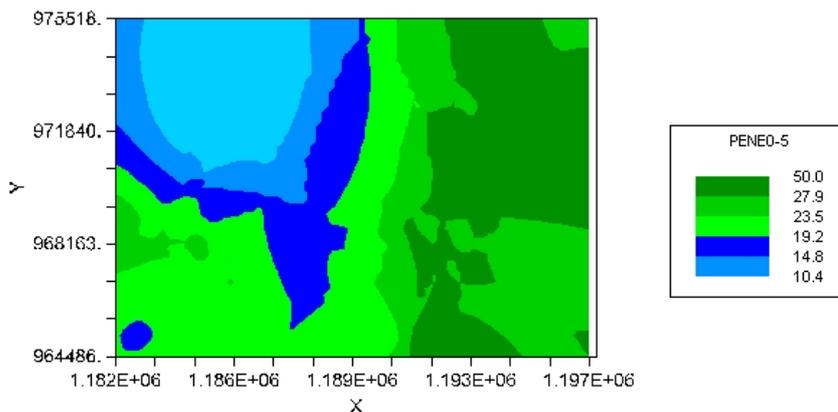


Figure 1: Map of soil penetrability isolines obtained with the GS+ geostatistical software, using field measurements in a portion of the municipality of Puerto Lopez

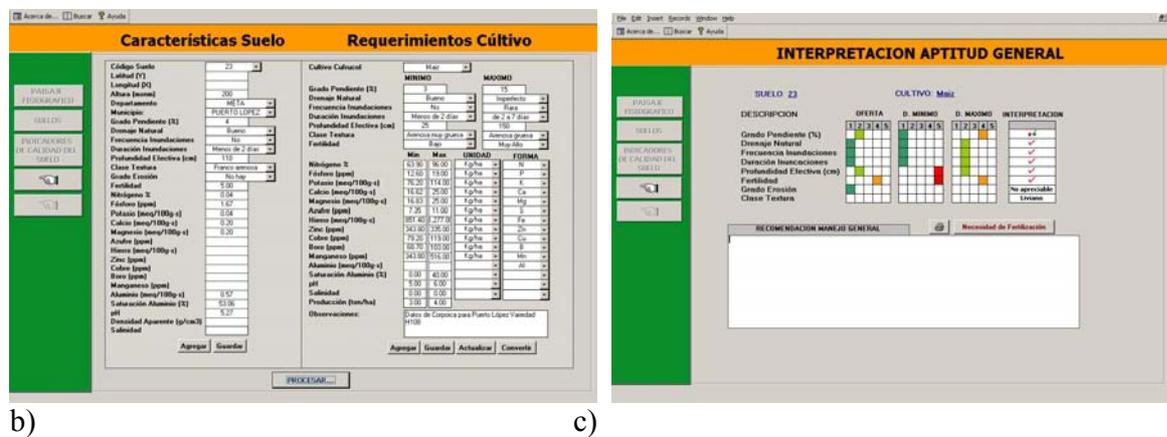


Figure 2: a) comparison of soil characteristics for a given soil, with the requirements of a given crop. b) interpretation of this comparison through a graphic display of where the coded soil characteristics stand with respect to the minimum and maximum characteristics specified in the soil requirements

### ***ARBOLES***

**Contributors:** Marcela Quintero, Yolanda Rubiano, Edgar Amézquita, Phanor Hoyos (PE-2), Nathalie Beaulieu

ARBOLES is a DST that indicates land use alternatives that are most appropriate or sustainable regarding soil and topography characteristics, based on a decision tree constructed from technical and local knowledge in a given locality. It has been elaborated with the Microsoft Access 2000 database software, with which the decision rules were programmed in Visual Basic. Decision rules can be applied on soil and topography characteristics specified by the user for a given location, or on the characteristics stored in a table corresponding to the polygons in a soil map. In our application for the municipality of Puerto Lopez, we used the decision tree elaborated by Hoyos et al. (2001), and digital soil coverage elaborated by combining 1:100 000 scale soil maps from IGAC (1978) and IGAC (2000).

If the user specifies the soil and topography characteristics, the application presents a menu of soil textures and ranges of slope and effective soil depth from which to choose. As a result of the application of the decision tree, the tool proposes a range of possible land uses, the number of options increasing as soil depth increases and slope decreases. Practices for the generation of an arable layer are proposed in cases where the soil depth is low. To use a soil map and then spatialize the results in GIS software, soil and slope characteristics were coded according to the values used in the decision tree. The polygons in soil maps generally correspond to groups of soils that can have different characteristics. The percentage that each soil represents in the polygon is indicated in the tables accompanying the maps. Because there is a range of different land uses suitable for each soil type, the results of the analysis are best displayed through a series of maps, one for each land use option, where the polygons are colored according to the percentage of soil which is suitable for that option. We linked the ARBOLES application for Puerto Lopez to both the SPRING and MapMaker Popular GIS packages. We elaborated a customized application of MapMaker for Puerto Lopez Popular with all the maps resulting from the analysis of the soil maps, for each of the 13 land use options considered. Figure 3 shows one of the displays of this customized application for Puerto López.

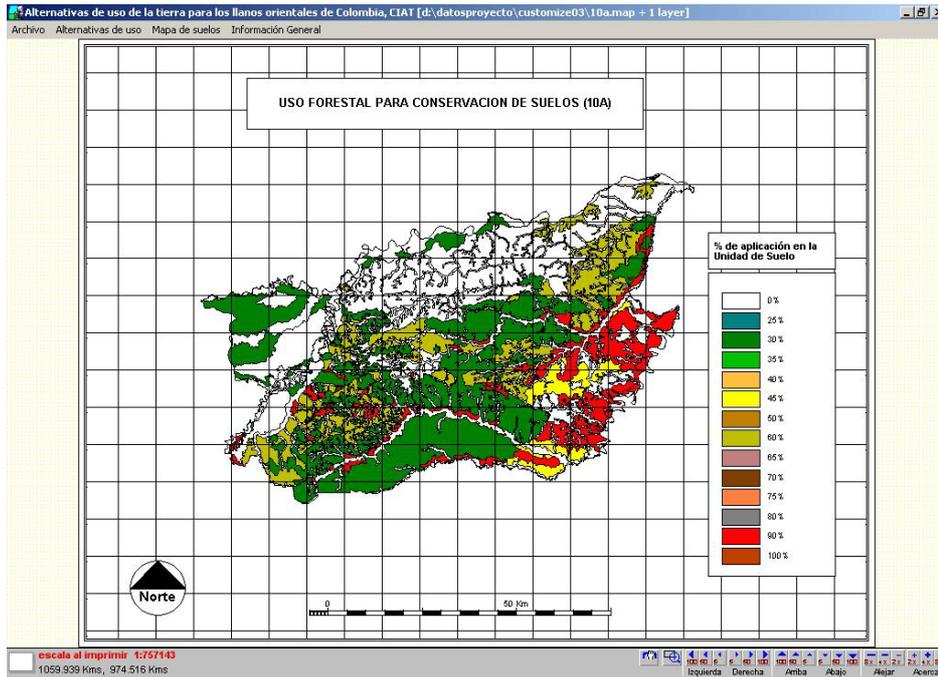


Figure 3: mapping of areas recommended for forest use and soil conservation in function of the percentage of area of each polygon having severe soil limitations for any type of agriculture. Additionally to these soil limitations, the Código Nacional de Recursos Naturales obliges natural vegetation to be conserved along streams.

The database tool was designed to allow a modification of the decision tree to adapt it to other localities, or simply to allow experts to revise their decision rules with time. It allows the inclusion of criteria other than simply soil and topography. It could be adapted to a completely different problematic than land use. We predict that through the use and adaptation of this tool with partners, users can combine their knowledge into decision trees, work out how local stakeholders can use these, and then adjust the decision rules through monitoring of the results of the adoption of the proposed options.

Preliminary developments of this tool were presented in the 2002 PE-4 Annual Report. This year, the tool was completed, a users' manual and a help module elaborated, and the tool was presented in October to potential partners and users.

## **SEGUIMIENTO**

**Contributors:** Jaime Jaramillo, Maria Fernanda Jiménez; Diana Maria Pino (Secretary of Planning, municipality of Puerto López)

SEGUIMIENTO is a simple tool, developed this year in Microsoft Access 2000, which can be used for the follow-up of actions planned in territorial or development plans. It can be adapted to any plan at any level, through a detailed definition of policies, programs, and projects, indicating milestones and final goals, and indicators used for evaluating progress. The monitoring of many plans is made difficult by the absence of clear milestones, goals, and indicators. A tool such as

SEGUIMIENTO can help municipalities and other institutions structure their plans to make monitoring and evaluation more straightforward.

This tool is now being validated with the Secretariat of Planning of the Municipality of Puerto Lopez, for the follow up of the activities planned in the PBOT and PMD. Difficulties lie mostly in the collection of information from the numerous municipal offices and partners involved in these plans, about the progress of their activities.

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## **Organization of Seminars and Training Activities**

### ***National workshop on use of DSTs and GIS for territorial planning***

**Contributors:** Yolanda Rubiano, Marcela Quintero, Ovidio Muñoz

Between 2000 and 2002, CIAT conducted various training activities with the support of MADR in various departments of Colombia to teach methods and GIS tools for the elaboration of territorial plans. To date, 220 public servants have been trained in Colombia.

With the objective of following up on the trainees and the activities they developed with the skills they acquired, we organized a workshop, “El Encuentro Nacional de Usuarios de Herramientas SIG para la Toma de Decisiones en Planificación Rural y Ordenamiento Territorial”, at CIAT headquarters in Palmira from 13<sup>th</sup> to 15<sup>th</sup> November 2002. Fifty participants attended. The event included oral presentations, discussion sessions, a poster session, and an evaluation of needs in planning approaches, legislation, information tools, and coordination between different administrative levels.

One of the results of this seminar was the formation of a network with the workshop participants, and the other beneficiaries of training events organized on rural planning, to discuss various issues of development planning in general. This network is open to new members, and new subscriptions should be sent to Ovidio Muñoz at [o.munoz@cgiar.org](mailto:o.munoz@cgiar.org)

### ***The Latin American workshop on territory and sustainable development***

**Contributors:** Jaime Jaramillo; Hubert Mazurek (IRD); Paolo Groppo, Federica Ravera (Land tenure service, FAO); International Land Coalition; CIAT rural planning team; CIAT training unit

From June 17<sup>th</sup> to 20<sup>th</sup>, CIAT-Headquarters hosted the workshop entitled “*Taller latinoamericano Territorio y desarrollo sostenible*”, funded by the Food and agriculture Organization (FAO), International Fund for Agricultural Development (IFAD), IRD and CIAT. This workshop was organized to form a network of professionals on the themes of territory and sustainable development, to exchange experiences, and to evaluate processes and methods of participatory and negotiated territorial planning, aiming to explore implementation channels related to rural development and the management of natural resources in Latin America.

The 53 participants contributed their experience in applications or research related to land tenure and the management of natural resources, territorial planning, rural institutions, and participation. This event had representatives from academia, public administrations, international institutions, grassroots organizations, and NGOs. A CD-ROM was prepared with materials from the workshop.



Figure XX: Participants in the *Taller latinoamericano "Territorio y desarrollo sostenible"*

### ***Launch of tools***

**Contributors:** Rogelio Pineda, Ovidio Muñoz, Jaime Gomez, Yolanda Rubiano, Adriana Fajardo, Maria Fernanda Jiménez, Marcela Quintero; CIAT training unit

On the 16<sup>th</sup> and 17<sup>th</sup> October 2003, at the Hotel Villavicencio Plaza, we organized a workshop for the socialization of methods and DSTs for land use planning developed during the last 5 years of the agreement between CIAT and MADR. We benefited from the participation of representatives of farmer associations and unions, the private sector, academia, regional environmental corporations, NGOs, research institutes, municipal administrations, departmental administrations, UMATAs, and other institutions involved in environmental management. There were 43 participants from 22 institutions. This has allowed us to develop partnerships with users of these methods and tools, with whom we can further co-develop and adapt them to user needs.

### ***Training in remote sensing***

In the context of the agreement between MADR and CIAT, we organized training on basic concepts of remote sensing, using the (free) GIS and image processing software, SPRING, developed by INPE in Brazil. This course was organized jointly with CORPOICA Regional 8, and was conducted at the Universidad de los Llanos from 21<sup>st</sup> to 25<sup>th</sup> October 2002. There were 15 participants, from institutions such as the Institut de Estudios Ambientales (IDEAM), CORPOICA, Instituto Nacional de Adecuación de Tierras (INAT), División Municipal de Aguas (DIMA), Corporación para el desarrollo sostenible del area de manejo especial la Macarena (CORMACARENA), CIAT-Santa Rosa, Universidad de los Llanos (UNILLANOS), Policía Nacional del departamento del Meta, Gerencia Ambiental y Secretaría de Planeación de la Gobernación del Meta, and Instituto Técnico Industrial.

A training course was given by Nathalie Beaulieu at the Geography Department of the University of Uberlândia, Brazil, from May 10 to 13, 2003, on Monitoring of land use/cover and land degradation with temporal series of satellite imagery. This course was taken by students from the Masters in Geography.

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\*Arrived in 2003

## 1. Participation in workshops and seminars

Taller latinoamericano Territorio y desarrollo sostenible, June 17-20, 2003, CIAT-Headquarters

El Encuentro Nacional de Usuarios de Herramientas SIG para la Toma de Decisiones en Planificación Rural y Ordenamiento Territorial”, November 13-15 2002, CIAT headquarters

2<sup>nd</sup> triennial conference of the Global Forum for Agricultural Research (GFAR), May 22-24, Dakar, Senegal.

CIAT-CIO meeting, May 26-28, Montpellier, France

51 International Congress of Americanists, Santiago de Chile, 14-18 July 2003: Seminar “Desarrollo local versus desarrollo global”

50 años de reforma agraria, seminario “Actores, Territorio y Desarrollo Local”, 29-30 de of September 2003, organized by CEPLAG, IESE, PROMEC, CIAT/IRD

Taller “Metodologías para la Identificación y Priorización de Demandas para la Innovación Tecnológica en Bolivia”, proyecto FOCAM – CIAT, Cochabamba, Octubre 8 y 9 de 2003

Bases para la Formulación de Planes de Ordenamiento Territorial. Seminar-workshop, September 8<sup>th</sup> - 14<sup>th</sup> 2003, Arequipa, Peru.

Planes de Ordenamiento Territorial como herramienta de gestión del espacio en Arequipa. Seminar/workshop, September 16<sup>th</sup> 2003, Arequipa, Peru.

## **2. Publications**

### **Book chapters**

Beaulieu, N.; Jaramillo, J.; Fajardo, A.; Rubiano, Y.; Munoz, O.; Quintero, M.; Pineda, R.; Rodriguez, M.; León, J.G.; Jiménez, M.F. 2004. Planning of territorial organizations as an entry point for agricultural research towards rural development and innovation. *In*: Pachico, D. (ed.). Scaling up and out: Achieving widespread impact through agricultural research. Centro Internacional de Agricultura Tropical (CIAT), Cali, Colombia. (In Press)

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### **Working documents and other reports**

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Beaulieu, N. et groupe de planification pour le développement rural 2003b. Guide pour la planification, le suivi et l'évaluation participatifs avec une approche systémique . Rapport interne, CIAT/ISRA, Dakar, Sénégal. 16 p.

### **3. Collaborators**

Internationally: IRD-UMR 151, ICRISAT, TSBF, CIRAD-EMVT, CIRAD-TERA

In Colombia: MADR, CORPOICA, Alcaldia de Puerto Lopez, UMATA de Puerto Lopez,

In Bolivia: Vice Ministerio de planificación y desarrollo sostenible (Dirección de Ordenamiento territorial y CODEPO) IESE and CEPLAG (Universidad de San Simon), INE – Instituto Nacional de Estadística, Municipal offices of Calamarca, Ayo Ayo, Patacamaya, Umala, Asociación de municipios de Pando;

In Peru: GTZ, CIP, CONDESAN, Municipal office of Pampacocla

In Senegal: ISRA-CDH, ISRA-CNRF, ISRA-BAME, ISRA-LNERV, ANCAR (regional offices in Thiès, Diourbel, Fatik, Kaolak), PAFD2, Direction des Eaux et Forêts, Direction de l'agriculture

In Brazil (although we have no case studies there yet): Universidad Federal de Uberlândia, EMBRAPA-CPAC, INPE, Vice Ministerio de Agricultura Familiar, Universidad de Santa Catarina do Sul.

### **4. Donors**

Colombian Ministry of Agriculture and Rural Development (MADR)

Global Environment Fund (GEF)

GTZ

Viceministerio de planificación y desarrollo sostenible (CODEPO y FNUAP)

### **Appendix 1: Accronyms**

ANCAR : Agence nationale de conseil agricole et rural (Sénégal)

BPS : Bureau de pédologie et de sols du Ministère de l'agriculture (Sénégal)

CDH : Centre de développement de l'horticulture(Sénégal)

CEPLAG: Centro de planificación y de gestión (UMSS, Bolivia)

CODEPO: Consejo de población (Vice ministerio de planificación, Bolivia)

CNRF : Centre national de recherche sur la foresterie (Sénégal)

CRD : Conseil régional de développement (Sénégal)

CSE : Centre de suivi écologique (Sénégal)

FAO: Food and agriculture organization (United Nations)  
GEF : Global Enviroment Fund (United Nations)  
IESE: Instituto de Estudios Socio-Económicos (UMSS, Bolivia)  
INE : Instituto Nacional de Estadística (Bolivia)  
ISRA : Institut sénégalais de recherche agricole (Sénégal)  
MADR: Ministerio de Agricultura y Desarrollo Rural (Colombia)  
PRD : Président de communauté rurale (Sénégal)  
NGO: Non-governmental organization  
SIBTA: Sistema Boliviano de Transferencia Agropecuaria (Bolivia)  
UMATA: Unidad Municipal de Asistencia Técnica Agropecuaria (Colombia)  
UMSS: Universidad Mayor de San Simón, Cochabamba, Bolivia