

PLANT BREEDING AND LOCAL PARTICIPATION. AN EXPERIENCE IN CUBA

Lucy Martin[✉], H. Ríos, Gladys Verde, M. Ponce, R. Ortiz, Sandra Miranda and Rosa Acosta

ABSTRACT. This paper studies, from a social prospect, the work experiences of a multidisciplinary team of INCA in three agricultural production cooperatives in South Havana and one service and credit cooperative of “La Palma”, Pinar del Río, with the aim of finding other formal plant breeding ways through a participatory approach. Firstly, it is notable to observe how producers involved into a plant breeding experience are submitted to technical and social changes, which in turn demand some motion towards two directions: participation and decentralization. This experience enables to build a new knowledge by breaking myths through a knowledge dialogue among producers meanwhile there are technical changes within seed and varietal environment, but also social ones. Secondly, it shows the possibility of such kind of experience, as a sustainable development objective and as a way of reconstruction from the basis of our social project, since it is feasible for strengthening producers and coordinating main roles at the seed system and community life centered around common interests.

RESUMEN: Este artículo examina, desde una perspectiva social, las experiencias de trabajo que un equipo multidisciplinario del INCA lleva a cabo en tres cooperativas de producción agropecuaria (CPA) del sur de La Habana y en una cooperativa de créditos y servicios (CCS) de La Palma, Pinar del Río, con el objetivo de encontrar vías complementarias del fitomejoramiento formal por la vía participativa, se pretende destacar cómo en una experiencia de fitomejoramiento con la participación de los productores, se va operando una movilización de cambio no solo técnico sino también social, pero que a su vez reclama, para su éxito, de un movimiento en dos direcciones: participación y descentralización. Importantes lecturas de esta experiencia son, en primer lugar, la posibilidad de construcción de conocimiento nuevo rompiendo mitos, a través de un diálogo de saberes y con la participación de los productores al tiempo que se producen cambios no solo de alcance técnico, en el ámbito de las semillas y las variedades, sino también de carácter social. En segundo lugar, revela las posibilidades de una experiencia de esta naturaleza, como vertiente del desarrollo sostenible y como vía de reconstrucción desde la base de nuestro proyecto social, al posibilitar el fortalecimiento de los productores y la articulación entre actores sociales protagónicos en el sistema de semilla y en la vida comunitaria en torno a intereses comunes.

Key words: plant breeding, community involvement, Cuba, rural development

Palabras clave: fitomejoramiento, participación comunitaria, Cuba, desarrollo rural

INTRODUCTION

This paper pretends to test the main ideas and research advances about a work experience, which was aimed at diversifying and strengthening the management and supply system of bean and maize seeds in three farmer communities of Cuba. Such experience has become a community action with wide possibilities, not only as a way of farmers' empowerment but also to reconstruct the manners of joining social roles together at the seed system and community life.

Participation is a prospect of growing presence to improve agronomic techniques. So far, it is difficult to find someone who rejects the significance of participation as well as involvement of social actors interested in any change proposal. However, from our own point of view, breeding environment constitutes one of the last redoubts of specialized knowledge and academic task; therefore, there are less possibilities to introduce participatory approaches.

Consequently, proving how to construct new information and break myths is suggested through a dialogue of knowledge and farmers' participation.

THE PROPOSED PROBLEM

The formal plant breeding system, conceived within a high-input agricultural pattern and based on the technological transference as a lineal process of

Lucy Martin, Researcher from the Psychological and Sociological Research Center, calle B # 352, Vedado; Dr. H. Ríos, Senior Research Assistant; M.Sc. M. Ponce, Junior Researcher; Dr. R. Ortiz, Senior Researcher; Sandra Miranda and Rosa Acosta, Junior Research Assistants from the Participatory Plant Breeding Group, pertaining to Crop Genetics and Breeding Department, National Institute of Agricultural Sciences, PO Box 1; M.Sc. Gladys Verde, Professor from the Agrarian University of Havana, PO Box 18-19, San José de las Lajas, Havana, Cuba.

✉ lucy@cips.cu

development and spreading of improved varieties from the institutional to the local system, makes some evidence of serious economic, social and cultural limitations through a sustainable development idea.

Independently of the adverse economic conditions of Cuba, which restrain the effectiveness of formal seed breeding system as a consequence of serious limitations on input supplies, such system makes evident a poor capacity of response to farmers' demands in every part of the world (1). Providing improved varieties to farmers does not fully satisfy their needs, due to economic reasons and their incapacity to have in mind diversity of agroecological conditions, farmers' necessities and preferences since experimental conditions are very different from target environment.

In turn, the informal non-institutional system, made up of farmer and community productive systems, which develops crops and produces seeds on the basis of a local and traditional knowledge, proved its strength as a mechanism to guarantee varietal preservation and spreading. Nevertheless, the system is quite ignored or undervalued by institutional actors, which have them as producers or reproducers of improved seeds released by formal system, as it happens in Cuba.

The questions -challenges for plant breeders who pretend to encourage a sustainable development or reach every producer, particularly those with lower resources- are stated about the possibility of combining crop breeding (an almost exclusive monopoly from research centers and the academic world) and maintaining genetic diversity (so far a possibility confirmed to farm producers) and how to make the institutional system-local system relationship effective in a proposal as well as an action promoting advantages and reducing limitations of each one (1, 3).

To find some ways for strengthening relationships of collaboration and complementation between both systems of seed preservation and development constitutes one of the basic goals of PPB project (14) of INCA. Some institutional approaches to enhance the relationship between agricultural investigation and actual conditions of different productive systems in Cuba (either private or cooperativist) have come from the theoretical supposition of how much superior the formal system is when compared to the system based on local, traditional farmer knowledge. Consequently, this formal system is in charge of meeting all farmers' needs.

Under these conditions, the project faces the challenge of validating the capacity of farmer and community systems in the breeding activity through farmers' participation and local actors in a mobilization towards decentralizing formal seed system (4, 5).

However, once this changing mobilization started, it can not be limited to seed management, but it is widening to agronomic (soil, nutrients, water, pests and diseases), economic (market, inputs), social and community (ways of organizing and planning actions as well as activities involving farmers, settlers and local actors, institutional

support, woman appearance) areas, which became experiences surpassing plant breeding proposals and in turn guarantee its success, from our point of view, given the multiple social determinations of the technological phenomenon.

A successful technology or technological change process does not depend on its «inherent kindness» but on the disposition and capacity for implementing it to practice (2). Social groups and their relations are precisely the stage where changing processes are carried out and definitively decide its success.

Following this experience gives an interesting contribution to processes of other nature, such as the empowerment of farmer communities by means of exchanging knowledge, developing investigation capacities, organization, etc, towards reaching a process each time more participatory, horizontal and self-transformational. This work pretends to focus on this point.

METHODOLOGICAL ASPECTS

Concerning methodological aspects, the first element to be taken into account refers to the tested areas where these changing experiences are verified: three agricultural production cooperatives (APC) in south Havana and a service and credit cooperative (CSC) of La Palma, Pinar del Río (Table I).

Table I. Project cooperatives

Province	Town	Cooperative	Partners
Pinar del Río	La Palma	CCS "Pedro Lantigua"	40
La Habana	Batabanó	CPA "28 de Septiembre"	68
	San Antonio de los Baños	CPA "Jorge Dimitrov"	67
		CPA "Gilberto León"	109

The presence of provinces, towns, different ways of work arrangement and agroecosystems determines stage diversity for proposal performance and consequently the reach of results, interpretations and analysis derived from them. Even though this research study does not consider differences and comparisons per zone or cooperative (a goal claiming for another paper), it is evident that it is superior at CSC with regard to social changes and community mobilization, since the participation of farmers and other local actors have reached its maturity levels, as an expression of self-action participation and establishment of horizontal relations.

As an essential background, APCs of Havana have presented a high-input agriculture in very homogeneous and productive lands, where varietal diversity is reduced, whereas CSCs of Pinar del Río have had irregular land conditions, so that the technological packages of green agriculture have not been target to them. In general, at present, they are genetically variable, almost unfertile lands with traditional crop management under low-input conditions.

Another interesting characteristic is that farmers' membership to different kinds of productive organization

(CSC or APC) with several relations of property, work and distribution, determines many ways of productive and social behavior. Shares from a CSC member and his family are less predetermined by collective decisions and is more autonomous than those from APC farmers. Likewise, CSC farmers' relationships assume neighbor and family ties better than APC, making up a community life with adequate personal bands and social cohesion among its members, not only with regard to productive and working interests but also to family and neighbors who encourage community mobilizations.

As concrete techniques to make up empirical evidences, they use observation, individual interviews to farmers and other actors related to seed system and individual quiz applied to a small sample of farmers attending a diversity fair, aimed to know their expectations and satisfactions with this activity.

On the other hand, two elements or key processes sustain the experience of changing to local level: participation and decentralization.

In various texts on participation, there is a paradigmatic acknowledgement to self-action, self-arranged and self-transformed participation of social actors constituting a main tool to perform breeding processes related to life quality and systematic widening of personal capacities. The fact is: how to attain such a top-quality participation? (7, 8).

Essentially understood as a linking process between different social groups and individuals (with their needs, interests and specific points of view) to decision making on the economic and political activity at different levels of the society (9, 10, 11, 12, 13), the following important traits are attributed to participation:

- * it is a way for directly involving social individuals to decision making referred to a specific dimension of their lives
- * it implies power transference to popular sectors for systematically influencing society development
- * it is a mechanism of power socialization and means for strengthening collective and individual capacities
- * it helps to a higher implication of individuals with their membership
- * it constitutes a bridge between an increasing organization effectiveness and individual growth
- * it enables individuals to take part, perceive their success and be recognized among results.

According to PPB experience, participatory dimension is shown by local actors¹, mainly farmers, state their interests and needs, outline some actions focused on transforming for individual and collective profits, controlling and evaluating the running and results of changing actions implemented, in such a way that they turn from mere information recorders to experimenters and

¹Local actors are referred to individuals, groups and institutions defining their daily practices (economic, social, political, cultural and domestic) in the community with the aim of the community and they make up the local society (14).

decision makers supplying specialized knowledge about varietal production, preservation, multiplication and delivery.

Having this concept of participation constitutes the center of attention, so that farmers' mobilization is not restrained to perform actions decided or outlined by plant breeders and technicians in general.

Facing the prospect of change promoted and oriented from outer decision spaces, which has characterized the history of agricultural extensionism, the concept of social actors (in this case, local ones) recognizes their (real or potential) ability to design and perform changing actions, with problem making, evaluative, critical and self-critical capacity to produce valuable knowledge about themselves, their practices and environment (14).

With regard to the participatory concept of the project, another important element is its opposition to homogenizing and undifferentiated vision of the community. Local actors are diverse, each one with his role, interests and perceptions that certainly show coincidences and contradictions, so demanding to establish negotiated community agendas of local development, superimposing rural development integrating-formulae to common sectorial approaches (health, education, culture, etc) to community life.

Now, this process of individuals and groups involved or implied in social processes by means of strengthening collective and individual capacities at the community level, implies a movement towards decentralization².

Essentially, decentralization is understood as a transference process of competitions as well as financial, human and material resources from the state center to local community (15, 16, 17); also, it is considered an important mechanism to:

- * promote local development by means of strengthening community capacities to identify their own problems and priorities
- * democratize social processes by rising popular participation
- * reduce injustice and social inequality at the communities involved
- * enable development political coordination
- * make up spaces of political action, so that basic authorities are more powerful when coordinating to meet their requirements.

In this manner, potentialities of decentralization are notable to strengthen participation and empowerment processes of local communities, without losing sight of attribute and resource transference towards intermediate or basic authorities, which necessarily imply changes of institutional and regulation aspects, also demands transformations in more complex elements, such as the

²Decentralization is a necessary condition for higher levels of participation; however, it is not a sufficient condition to analyze the potentialities of decentralizing processes. Historical and political elements have to be evaluated. Many decentralized experiences in Latin America have served to neutralize the activity of popular movements and favor private and power interests (15).

mentality of different social actors and political culture in general (17).

In case of the Cuban agrarian pattern, however it substantially changed over the 90's, it still has high degrees of centralization (18, 19), which do not favor the establishment of horizontal relations among local institutions. Agriculture has to face decentralizing and participatory processes under adverse conditions of available resources, high-input agricultural practices and entrenched work styles and direction with a concept of change "from outside".

Tension is shown by the necessary balance between centralized planning and self-management, in such a way of creating conditions to enhance initiative, interest, social actors' implication, without falling into anarchy, ungovernability and impossibility of sustaining and developing highly significant goals on the socialist strategy (9, 20).

The supplying system of inputs and resources for agriculture, constrained by the lack of materials, grant a privilege to delivery of materials for the most socialized forms of production (statal enterprises and cooperatives), to producers with the best productive results (among other reasons because they have better conditions for this purpose) and to those developing prioritized productions. The productive and social rationality substitutes the free market of offer-demand.

On one hand, seed system shows a high concentration of functions at the formal system. The entire agricultural investigation, seed importation, breeding and delivery, as well as productive resources, in general, and regulations on released varieties, the regime of evaluation and certification, and price politics are exclusively in charge of statal institutions.

Nevertheless, the effectiveness of evaluating, breeding and certifying areas and seeds of such institutions, are seriously affected by the growing lack of material resources (fuel, cars, spare parts, agrochemicals, etc), which makes difficult the adequate attention of seed producers.

According to a study on seed flow of bean and maize in Cuba, there are only three points of contact between formal system and farmer-community system; the latter is considered a provider of genetic material to research center, also it is buyer of released (improved and certificate) seeds from seed territorial enterprises of agriculture (hort crops, tobacco, citrus, etc) and it is a reproducer or multiplier of the varieties released by formal system (specialized producers).

Those specialized producers are selected by municipal enterprises of agriculture, according to its soil productivity and the experience and results of applying technological packages.

By means of a producer-enterprise contract, a purchase-sale of seed and necessary inputs agreement is established for production, so that the specialized producer becomes an approach to get into lacking resources, which in fact are also employed to help other crops, including those devoted to self-consumption³.

What happens when producers need a determinate input to efficiently close the productive cycle which is not within his reach under this rationality or because even the logic previously described corresponds to it, or there is a slow and inefficient service offered by the centrally created structures?, or when do you want to experiment with other products or technologies coming from investigation (not only seeds but micorriza or rhizobium?).

These and many other troubles emerge from several studies and investigations dealing with the real agrarian pattern and they are focused on a higher decentralization of functions and resources, strengthening of local and territorial spaces for self-management and horizontal integration. Fortunately, some progress have been made not only by preparing diagnosis but also proposals in diverse areas which would enable to outline and implement experimental alternatives favoring an efficient agricultural system.

DEVELOPMENT: HOW TO EXPRESS PARTICIPATION AND DECENTRALIZATION IN OUR EXPERIENCE

It refers to the way participation and decentralization constitute processes which reciprocally determine a technological change experience from the most important times of project expression.

Initial and basic actions, the time to develop the further PPB process, constitute the seed fair, where farmers may select by following their own patterns and selection criteria a determinate number of bean and maize varieties offered by project organizers (including improved varieties and others derived from local systems) for their future incorporation to the respective crop systems. From this moment on, farmers are in charge of agricultural investigations influencing the community and researchers'.

Farmers cultivate selected varieties in their productive areas, observe and compare the performance of each one in their specific conditions following the significant indicators. They replicate seedings at different seasons and make up their own criteria about each variety cultivated. Afterwards, they attend workshops (so far exclusively organized by project technicians), where they present their own experiences, results and exchange knowledge (also seeds in the latest workshops).

Technicians' role is practically limited to facilitators in these cases, so creating the conditions to celebrate the workshop, besides proposing discussion items and enabling exchanges with working group techniques.

³This seed-input producer link determines producers and farmer leaders with a generalized perception that seed is about to disappear (every time there are less resources). It consists of a narrow sight reducing the maintenance and reproduction of species and varieties to available chemical inputs, so that the possibilities of farmers managing varieties are minimized or canceled.

Although economic benefits are not so concrete, because wastes are not reduced by chemical inputs⁴, not even production volumes in this season guarantee high incomes as a result of market sales of bean and maize⁵, farmers are satisfied by rising genetic diversity in their plantations with adapted varieties which are stress resistant to such conditions.

These producers are every time more involved to research activity through their own productive practice, observation, experimentation and participation with their experiences in spaces of reflection, discussion and exchange with others.

Frequently, PPB practices and almost every practice pretending to be participatory involve local actors verified prior to decision making and, to a lesser extent, to let perform determined goals and outlined tasks by external actors in advance, so that they are rarely involved in making decision. The recorded experience at plant breeding area with a few amount of farmers participating in this project shows *in situ* evaluations and seed multiplication as well as delivery (21).

To illustrate the characteristics of farmer participation in plant breeding practices with bean, there are some phrases stated by farmers in a meeting:

"El Velasco in La Palma is a wonder and look at this! how this furrow is left with a few pods".

"Sometimes we are fond of one kind of seed, but it depends on the territory and specific conditions".

"Climate is different from La Palma to San Antonio. It is wetter in La Palma, because there is more vegetation".

"Early sowing is not the same as late sowing. Pests and diseases are removed in early sowing".

"Farmers arrive like curious persons and find the way for producers' autonomy".

A second time revealing a higher status at the levels of producers' participation and involvement to plant breeding activity is when they are encouraged by results and decide to promote a biodiversity fair in their own areas.

The first experience was a maize fair, which was celebrated in "Gilberto León" APC with 92 varieties, followed by three fairs in smallholders' lands. Biodiversity fairs are multiplied not only in research centers or promoted by plant breeders, but in farmers' lands and promoted, outlined, arranged and conducted by farmers themselves. Although the project has so far supported them, every time this help decreases. Some interesting elements have to be highlighted.

⁴The centralized assignment of poor resources for agricultural production and, particularly, fertilizers and herbicides determines savings as a result of less inputs when gaining access to varieties with higher adaptation and yields in producers' specific agroecosystems, which is not materialized under farmers' production conditions.

⁵However, it revealed a differentiated reach of this experience in other production contexts (cooperatives), differently from private farmers, with some variation of incomes per market sale of bean

These diversity fairs arranged by farmers overflow agricultural purposes (varietal selection and production) to become community parties (although with different levels of community involvement and participation, according to the zone or productive arrangement of the producer's)⁶.

Even the people outlines fair activities, including those deeply rooted in their own culture, such as hen raffle, farmer controversy and competition of maize or bean-made dishes by farm women.

In this way, relationships are being constructed and joined together within the people by organizing common activities, which are significant to them.

It is interesting that when farmers attending the fair of La Palma answered some written questions about their expectations, they centered their responses in productive aspects, such as to know new varieties, guarantee seeds, obtain more productive varieties or observe the results achieved without resources (Figure 1).

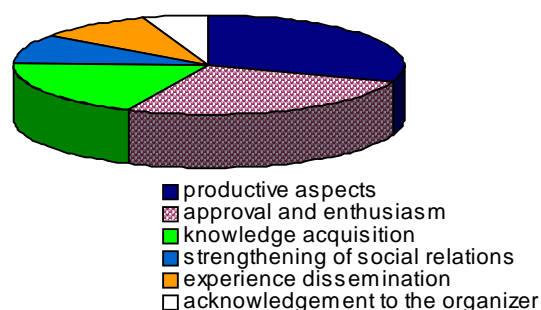


Figure 1. Farmers' main expectations at the diversity fair

However, such elements were displaced by fair quality (organization, manufactured dishes, enthusiasm and efforts of the organizers) and relationships established among farmers, technicians, leaders and farmers from other zones (Figura 2).

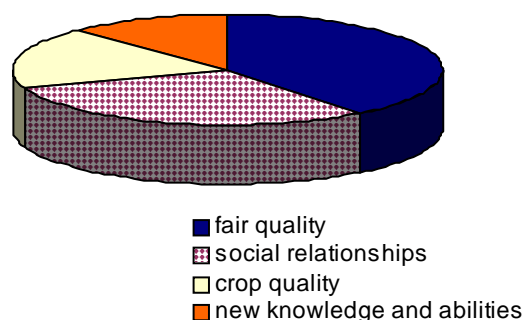


Figure 2. Farmers' favorite aspects at the diversity fair

⁶For instance, at the APC fair, two or three farmers were in charge of seeding and cultural practices, whereas cooperative director supported food supply and manufacture to be further delivered during the fair; meanwhile producers' fair of La Palma mobilized the neighborhood to perform some activities related to the crop and to other times of the fair in general.

Although this information was not recorded, farmers from other three CSCs and two APCs attended this activity, since it is really interesting for farmers.

Among the negative elements or possible criticism are the need to add some other activities showing farmers' habits and strengthen their culture and identity (music, controversy, tape tournament), which show its potentialities to construct spaces made up by knowledge and productive practices along with culture and local practices to build horizontal and community relationships.

Another notable element due to its implication on sustainability and maintenance is the interests resulting from establishing relationships with other producers and technicians, so that results and experiences are spread to other zones, towns and the entire country, as well as the need of farmer organization and leaders to encourage these activities, support them and enable their multiplication.

ANAP, an organization which is in charge of the economic and social progress of Cuban farmers and representative of their interests before the group of organisms and society institutions, has a very important role to accomplish for extending practices and knowledge about sustainable agriculture, where the farmer plays an active role in experimentation and spreading of his own experience; an example is this fair, conceived, arranged and celebrated by producers themselves.

Consequently, after strengthening interests, the experimental capacity and power of PPB producers, towards increasing participation and autonomy in plant breeding activity, other knotty points are identified about social and institutional relation system, to which the change experience is inserted and decentralization starts to play an important role.

What happens when Felo (research farmer from "Gilberto León" APC) reaches a variety by crossing two different lines after several years selecting as many as thousands plants per year? What to do with seeds produced and reproduced by farmers? How can these seeds be certified or patented? How can farmers and the community receiving improved seeds by PPB be economically benefited? How can the material resources from the project be kept in biodiversity fairs as well as relationships to exchange seeds and knowledge? How can fairs be economically and socially sustainable? On the other hand, seed system constitutes just a piece of the entire agricultural system, since producers and communities have problems with soil improvement, fertility, irrigation, pest and disease control as well as means of communication, water supply, social services, etc. In short, an endless chain of their living and working conditions, needs and interests. How to start opening the circle of elements by means of this participating concept, where the same people may design, plan, perform, evaluate and manage results?.

There are many proposals but all of them should necessarily strengthen the role of localities to territorial planning and to establish agendas or community development platform derived from local actors' interests.

Finally, it is a process of individual or group learning, a hard way which claims for power spaces to localities and change of actors' mind.

CONCLUSIONS

Even though two working years are not enough to measure impact or evaluate changes, it is important to highlight how producers attending a plant breeding experience start a changing motion which is not only technical but social, that in turn claims for a movement in two directions: participation and decentralization.

In this sense, two ideas should be highlighted: firstly, the actual potentialities of a PPB project as an experience of local mobilization, a slope from sustainable development and a way for reconstructing our social project from its base.

It preserves and regenerates natural resources as well as popular knowledge and local participation, which constitutes an important slope of sustainable development, encouraging participatory organization and self-management of producers at the community regarding essential problems, such as genetic diversity and crop quality. A changing motion of this nature is stating the emergence of new ways of community organization and development of management capacity and agreement among actors. It implies to rebuild social relationships from the base, concerning interests and common objectives.

A second element to be highlighted is when implementing the project, as any movement leading to the active participation of local actors in our country, two kinds of movement come together: 1) since the state was institutionalized by expressing government political will for encouraging a sustainable development towards satisfying most needs which necessarily implies decentralization processes enabling local development, self-management and self-transformative participation of local actors together with social individuals' initiatives and capacities; 2) the microlevel, where local actors having community identity and a high social commitment undertake changing mobilizations to transform their environment starting from their own resources and establishing complementing and collaborative relationships with other localities or territories.

Research and teaching centers can play an important role to potentiate a fruitful relationship between technology and development enabling to perform sustainable development changes.

REFERENCES

1. Almekinder, C. and Boef, W. de. "The challenge of collaboration in the management of crop genetic diversity". *Boletín de ILEIA*, 2000, no. 4.
2. Conde, R. /et al./ "Las políticas de promoción de la ciencia y la tecnología: el caso de la biotecnología". In: *La biotecnología y sus repercusiones sociales y políticas*. C. México : UAM-UNAM, 1992.
3. Almekinder, C. "Management of crop genetic diversity by community level". Deutsche : Gesellschaft für Technische Zusammenarbeit", 2001.
4. Ríos, H. /et al./ "Reporte técnico del proyecto Fitomejoramiento Participativo como estrategia complementaria en Cuba". Instituto Nacional de Ciencias Agrícolas (INCA), 2001.
5. Ríos, H. /et al./ "La experiencia campesina como vía de empoderamiento de los agricultores en Cuba". Reporte técnico del Proyecto. ". Instituto Nacional de Ciencias Agrícolas, 2001.
6. Almekinder, C. and Boef, W. de. "Discouraging or encouraging diversity". In: "Encouraging Diversity". London : Intermediate Technology Publications, 2000.
7. Valdés, J. "Notas sobre el modelo agrario cubano en los 90. In: Niurka Pérez y cols.(Edit) "Participación y formas organizativas de la agricultura". La Habana : Universidad de La Habana, 2000.
8. Humphries, S. /et al./ "Lecciones de un programa de investigación participativa con agricultores de laderas". Proyecto de investigación participativa en Centro América. Honduras, 2002.
9. Limia, M. Las UBPC como forma embrionaria de un nuevo colectivo laboral. In: Resúmenes de Investigación sobre UBPC. Programa FLACSO. La Habana : Universidad de La Habana.
10. Arenas, B. P."La participación desde un ángulo psicosocial". In: *La participación en Cuba y los retos del futuro*. La Habana : Centro de Estudios de América, 1996.
11. Fernández, R. O. "Participación popular y sociedad". In: *La participación en Cuba y los retos del futuro*. La Habana:Centro de Estudios de América, 1996
12. García, P. C. "Participación y descentralización en el planeamiento territorial". In: *La participación en Cuba y los retos del futuro*. La Habana:Centro de Estudios de América, 1996.
13. Fernández, S. and Otazo, R. "Comunidad, autogestión, participación y medio ambiente". In: *La participación en Cuba y los retos del futuro*. La Habana:Centro de Estudios de América. 1996.
14. Núñez, L. /et al./ "Percepciones ambientales y cotidianidad. Estudios de caso: Nuevitas y Ciénaga de Zapata". La Habana:Centro de Investigaciones Psicológicas y Sociológicas (CIPS), 2001.
15. Dávalos, R. "La descentralización: Una propuesta favorable para las ciudades en América Latina". In: *Sociología y sociedad en el contexto de la reestructuración internacional*. La Habana : Universidad de La Habana, 1995.
16. Mattos, C. A. de. "La descentralización, una nueva panacea para impulsar el desarrollo local. *Revista ES de Estudios de la Comunidad de Madrid*, 1990, no. 3.
17. Dilla, H. "Comunidad, participación y sociedad: Reinterpretando el dilema cubano. In: *La participación en Cuba y los retos del futuro*. La Habana : Centro de Estudios de América, 1996.
18. Enríquez, L. "Cuba's new agricultural revolution": Institute for Food and Development Policy, 2000.
19. Sinclair, M. and Thompson, M. "Going against the grain: Agricultural crisis and transformation". Edit by Oxfam América, 2001.
20. Martín, J. L. and Suero, A. "La competencia decisional en las UBPC". En: "Agroecología y desarrollo sostenible". Curso para diplomado de postgrado. Módulo 3. CLADES-ISCAH. Cuba, 1997.
21. Sperling, L. /et al./ "A framework for analyzing participatory plant breeding approaches and results. *Euphytica Review*, 2001, no. 122, p. 439-450.

Received: March 18, 2003

Accepted: October 21, 2003