

# **COMPLEMENTING FARMERS' GENETIC KNOWLEDGE: FARMER BREEDING WORKSHOP TURIPANÁ, COLOMBIA. 29 OCT-1 NOV, 2001 \***

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## **INTRODUCTION**

Genetic conservation and improvement depends (among other things) on the action of local people (CBD, 1994). We know that farmers are extremely knowledgeable about their crops and that they continuously experiment with them and with new materials arriving from various sources (Richards, 1989). Certain farmers are locally recognised as having “expert” knowledge about agro-biodiversity. They are the farmers who stand out during participatory breeding and conservation exercises for their knowledge, experience, interest and dedication to plant genetic resources. One way of ensuring that agrobiodiversity is not lost is to encourage these local experts to continue experimenting with, conserving and enhancing their genetic resources. There are many ways of going about this. This workshop explored the feasibility and methods for complementing farmer experts’ knowledge and skills in the enhancement and conservation of agrobiodiversity. The idea of using skill enhancement as a way of encouraging local people to conserve and enhance biodiversity is not new (McGuire et al. 1999; Pelegrina 2000), but it is one that has not been studied systematically or in-depth.

This workshop was planned as part of a project called "Participatory Plant Breeding with Women and Small Farmers in Africa and Latin America," funded by DfID and backstopped by CIAT and the PRGA Program. During the first phases of this project in the Latin American site – the North Coast Region of Colombia, farmers evaluated 32 cassava clones, of which they selected 5. During the final phase of the project a select group of the participating farmers attended the workshop in order to learn how to make crosses with these five clones. The specific objectives of the workshop were: to show the farmer participants the origins of experimental varieties (including those that they had been evaluating during the project); to explore the farmers’ knowledge about genetics and breeding; to find out if the participants consider it useful to know how to make crosses and about heredity; to enhance the participants’ skills in making crosses, obtaining seed, (and selecting in populations); to reaffirm the farmers’ varietal selection skills; and to motivate the participants to develop an action plan to follow-up the workshop in their communities. This article is a brief account of the workshop – the participants, the methodology and the lessons that we learned in this first attempt at enhancing farmer-breeders skills in the North Coast Region of Colombia.

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## **FARMER BREEDERS' WORKSHOP**

### **Participants**

The selection of participants was done by the field technicians of the project based on the following criteria:

- involvement in the cassava varietal selection project
- interest in breeding
- desire to continue the breeding process on their farms
- experimenter quality (the person has made selections or experiments on his/her farms by his/her own initiative)
- leadership, organizer and/or communicator quality

In addition to these criteria we sought a gender balance within the group, and a representative variety of production objectives.

The workshop was conducted with 13 resource-poor farmers (6 women, 7 men) from several communities in the North Coast region of Colombia. All the participants have been involved in the varietal selection project for varying numbers of years. Apart from cassava they cultivate various cross-pollinated crops, and around 50% of them breed fighting roosters and other animals. All the participants are literate with the exception of two of the women who got help from the other participants and the facilitators of the workshop.

### **Content and Methodology**

The content of the workshop included modules on the following themes: methods of plant reproduction, basic genetics – heredity, flowering and pollination, botanical seed and seedlings, variability and segregation, varietal evaluation and selection. Each module began with an exploration of participants' knowledge so as to start from what they already know. Activities and exercises were planned around their experiences and small group learning was emphasised. There were practical field sessions on flower identification and manual pollination and many visual didactic materials were used.

Different methods were used to address, and to explain different topics. At the beginning of the workshop “ice-breaking” activities helped the participants to get to know each other and to learn one another's names. The facilitators also used these activities to introduce an element of the topic of the workshop by adding two questions to the introductions of each of the participants: Which of your parents do you look like? and What are the main problems you face with your crops at the moment? The participants' answers to these questions later helped to contextualise discussions on heredity and breeding objectives.

Brainstorming was used quite frequently during the workshop. It was used in different ways for deciding among the participants the ground rules of the workshop and for exploring the participants' expectations. Brainstorms were also useful in the exploration

of the participants' knowledge about what breeding is, what the different types of plant reproduction are and their respective advantages and limitations, and at the end of the workshop what is needed for successful breeding. While on some occasions brainstorming worked nicely for pooling the participants' thoughts on a particular subject, the success of this method depended greatly on how and if the question was understood by the participants, and also, naturally, on the degree of confidence that each participant felt in speaking out.

An activity that was particularly successful was one in which the participants worked in small groups drawing (or otherwise explaining) their own experiences of crossing animals and plants. They were asked to discuss their experiences in their groups and to select one to share with all the participants. Each group explained which two parents were crossed and why? and what was the outcome and why? This was an important activity because it further contextualised the content of the workshop and enlightened the facilitators as to the degree and areas of knowledge (and knowledge gaps) of the participants.

One of the participants, Don Ignacio's experience crossing a fighting rooster with a wild variety of the same species was particularly interesting to the group and to the facilitators because he thought that it had been unsuccessful as all the offspring were, in his words, "cowards". He had thought that a cross between these two parents would result in "tigers" – figuratively meaning strong, aggressive and brave fighting animals. Needless to say he was very disappointed to see that they did not win any cock fights. During the discussion, two other participants opposed Ignacio's view. One woman, Doña Elcy told him that his roosters were not "cowards" unless they refused to fight. On the contrary, she explained that since they did not flee but rather remained in the ring almost until they were killed by their opponents, they were very valuable animals and should be used to make further crosses. In this way their remarkable bravery could be passed on to the next generation and perhaps be combined with better fighting qualities. Another participant, Don Pedro said that what was important in breeding is *seguimiento* or follow-up explaining that it was important that Ignacio doesn't give up after the first cross because some traits are not manifested in the first generation. This example and others were used throughout the workshop by both the participants and the facilitators to talk about different heredity concepts.

A similar activity that was conducted near the end of the workshop was one in which, the participants were given drawings of cassava plants to use as hypothetical progenitors. They were asked to draw the offspring of two generations of crosses and to show which plants they would discard and why. This served to review different types of heredity using specific cassava traits, and to discuss selection pressures within first generation populations.

Various practical sessions were important in the workshop. The first was one in which each farmer was handed a branch of a cassava plant with male flowers and one with female flowers. In pairs they were asked to compare and note the differences in structure and characteristics. Important components here were identifying which flowers were

ready for pollination and which were not, and later, practice making crosses – both essential for breeding and not immediately obvious to the farmers. This was repeated by a field visit during which each farmer could practice identifying flowers and making crosses in the field. As a complement to this activity, two large model flowers made of cardboard were used to show and practice identifying the essential parts of both masculine and feminine flowers. Different parts of the flower were removable from the base of the model flowers to allow farmers to place them appropriately and explain their functions. Another practical activity was one in which small groups of farmers were given packets of cassava botanical seeds to note and discuss their characteristics and differences. During this session seed selection, viability, storage and germination were addressed. Practical sessions were essential to the farmers and extremely effective in explaining the manual aspects of the workshop.

Several of the modules of the workshop, particularly the one on basic heredity and on flowering and making crosses, were greatly enhanced by the use of slides (for example with photos of different varieties and different crop reproduction methods, of cassava flowers and fruit in different stages of development, and of the process of hybridisation). These sessions were accompanied by basic explanations given by the breeder-facilitator and were essential complements to the practical sessions and the activities.

#### **PRELIMINARY RESULTS OF WORKSHOP**

We learned from this workshop that although the participant farmers had substantial knowledge about heredity due to their experience breeding animals, much of the content on cassava breeding (crosses and work with early generations) was in fact new and very relevant to them. In spite of being new, the concepts were not too complex for the participant farmers as some of our colleagues had warned. As a result of the workshop, the participants can now implement a full cassava breeding cycle understanding phenotype, genotype, dominant and recessive traits, variability and segregation. They can identify feminine and masculine cassava flowers (and their main organs) and know when they are ready for crossing and how to make a cross, protect a pollinated flower and harvest and plant botanical seeds. A workshop facilitators' guide as well as a farmer-breeders' guide will be developed from this experience.

#### **CONCLUSION**

One of the objectives of the workshop was to explore the farmers' knowledge about breeding and heredity. As a result of our exploration we discovered that the participants did indeed have considerable knowledge about heredity and breeding mostly from their experiences breeding animals. This was extremely useful during the explanations of concepts because the main challenge was to make sure that all the participants had the same level of knowledge (those that knew more could explain to the others) and to make the link from animals to plants. What none of the farmers in this workshop knew before hand was that crosses could be made in cassava, that this crop can be planted from true

seed, and that like this, traits from one variety can be “transferred” to another variety. Some of the participants had harvested “volunteer” plants but had not given them too much importance nor thought. As a result of the workshop the participants have developed action plans to follow-up on the workshop in their communities. These action plans include crossing some of their own materials, and passing on the knowledge they acquired to other members of their communities.

In reflecting on this workshop it is important to ask what we can expect to be the broader and longer term outcomes of farmer-breeder skill building and in what ways we can ensure that these are positive and sustained. Firstly, we must be realistic and cautious about the possible genetic gains and dangers. We know that genetic variability can be a serious limiting factor for farmer breeders (McGuire et al, 1999). Does enhancing farmer-breeders skills really solve this problem? In some cases it could be, in others not. Much depends on what is already in the field, what other materials are accessible to farmers through formal and informal channels, and what ultimately are the objectives of farmer-breeders and of their communities.

The dangers of enhancing farmer-breeders skills can be noted by conservationists who could worry about farmers losing traits and perhaps varieties by out crossing them “away”. Although this is possible, it is not likely to happen very quickly nor on a very broad scale. If participant farmers are carefully selected to be those who are already conscientious of the value of their varieties and of specific traits it is unlikely that a too many crosses among varieties could dissipate local varieties. A more realistic danger is that farmers’ expectations are held too high and that they lose much time and resources trying to attain short term and unrealistic gains. The management of expectations is an essential component of farmer-breeding workshops.

Secondly, we know that farmer skill building is an “empowering” approach. One that enhances farmers’ skills, knowledge, awareness, control, independence etc. This is an important objective in many participatory plant breeding projects as well as in numerous development projects. It is essential however to note who is being empowered and at the possible expense of who? Social relations are extremely important in rural communities and in farmers’ agrobiodiversity strategies. The empowerment of one or two or a handful of expert farmers in a community, can change social relations and can deepen inequities. It is important to keep this in mind when selecting participants and planning a workshop.

Thirdly, farmer breeder skill building is not the only type of encouragement for biological conservation and enhancement. Other incentives include a) identifying niche markets and developing specific marketing strategies for local produce (Wasik 1996); b) raising awareness of the existence and importance of genetic diversity (often done through local “diversity fairs”); and c) developing policy measures that include intellectual property protection for local varieties (Brush 2000). It is important that farmer breeding workshops are not held in a vacuum and that they are related or linked to other activities related to local varieties that are taking place in the locality.

Finally, although farmer-breeder skill building has been proposed as an approach (or an element of an approach) to genetic conservation and enhancement, it has not yet been elaborated nor tested as such. This workshop is one of the first attempts at implementing a farmer-breeding workshop and the broader, longer term outcomes have yet to be seen.

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