PROPOSALS FOR INTERNATIONAL CO-OPERATION IN THE COLLECTION OF PLANTING MATERIAL AND IN COMPARATIVE TRIALS OF COCONUT HYBRIDS

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1. INTRODUCTION

The genetic improvement of coconut is clifficult and costly for numerous reasons of which the chief ones are related to its biology the length of the unproductive phase and the interval between generations, the low multiplication rate and the lack of an asexual mode of reproduction, the size and weight of its seed and the absence of dormancy, the bulk of the tree and low planting density. In most countries, the means provided to researchers were and still are very limited, partly perhaps because coconut has remained essentially a smallholding tree and the private plantation sector has taken relatively little interest in it.

It will surprise no-one, therefore, that until recently the results of cocorlut improvement research have been very meagre, with rare exceptions. The efforts made in the last 15-20 years have led to significant progress, but the want of co-ordination between research centres has hampered the work considerably and reduced its impact on development. The FAO, APCC and certain governments are trying to remedy the situation by favouring visits, training courses and exchanges of planting material, but these measures have proved insufficient and too episodic. More ample co-operation involving teams of researchers appears desirable in order to unite the means and increase their effectiveness. To begin with it could be confined to the creation and preservation of planting material collections and the setting up of networks of comparative trials of hybrids.

II. ADVANTAGES OF INTERNATIONAL CO-OPERATION FOR THE GENETIC IMPROVEMENT OF COCONUT

More often than not the coconut research centres are fairly isolated from one another intenationally. This situation has serious drawbacks as regards the spread of information and methods. Close co-operation would allow the enrichment and maintenance of coconut collections and the setting up of multisite trials comparing hybrids (or cultivars), as well as making it easier to create a structure for the reception of international financial aid.

(a) Information and Methods

Contacts between coconut specialists are rare and limited. The chief, indeed almost sole sources of information are scientific journals and annual reports, but these reach the researchers several yeras after the event and only provide fragmentary and edited information. Very often the methods are not described or not fully described, which deprives the published results of most of their interest.

Methods of work and observation techniques differ from one country to another, which is detrimental both to the intrinsic value of the results (when the technique is unsatisfactory) and to their value for the purposes of comparison. For instance, hand pollination techniques vary a great deal between research centres; some of thern used (or still do) techniques of which it has been proved that they give no guarantee of good legitimacy, thus throwing doubts on the validity of their results. Vegetative and yield characteristics are affected to different degrees by the environment, so

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systems of observation of varieties in a collection or hybrids in a trial must be standardized, otherwise the results cannot be compared and may even be practically valueless.

(b) Planting Material CoHections

Collections are essential to the breeder, who must have a gene bank at his disposal on which he can draw in function of his aims. Most coconut collections are comparatively poor, because exchanges of material are restricted. Furthermore, for reasons both financial and technical, prospections up to now have not produced more than a very limited inventory of coconut resources around the world. Maintenance and preservation of vast collections cannot be assured for an acceptable cost without international collaboration.

(c) Comparative Trials of Hybrids

While the hybrids recommended by the IRHO are tested in a very wide range of ecological conditions and can be used in regions to which they have proved themselves to be well adapted, the same cannot be said for those of other research bodies, which have frequently been tested in their native land only, if not in just one ecological zone.

The cost of researching coconut improvement in high, but it is possible that collaboration in.specific operations might attract new donor countries wishing to make the big-gest impact possible.

III. PROPOSALS FOR SETTING UP INTERNATIONAL COOPERATION

(a) **Develop Contacts**

Undoubtedly the distance between the different research centres does not facilitate encounters and the exchange of ideas and information. International meetings gather together too few coconut improvement specialists and do not leave enough time for discussion and field visits. In our opinion, the success of real co-operation will be achieved through the organization of working meetings grouping specialized researchers and held at regular intervals and by rotation on the main research centres of the collaborating organizations.

Such meetings would provide an opportunity for mutual information, the study of methods used and an effort to harmonize, the working out of the technical details of co-operative projects (exchanges of planting material, prospections, comparative trials of hybrids),

Between meetings, contacts would be kept up by circular letters giving the latest information and research results.

As regards training, courses and exchange of researchers will be kept up and developed; the implantation of multisite trials could be the occasion for such courses.

(b) Harmonize Research Methods and Techniques

One of the tasks to which the participants in the early meetings should apply themselves is the harmonization of methods and techniques of work and observation. This implies that all techniques used will be presented in detail, analyzed and discussed. If necessary, extra experiments will be set up in some countries to confirm the value of established techniques or test new proposals. The outcome of this procedure should be the production of documents giving exact details of the techniques which all the partners would adopt.

(c) Enlarge and Preserve the Plant CoHections

Harmonization of methods and techniques used in the creation and preservation of coconut collections would make co-operation in this field easier. Operations could proceed as follows :

- Description of varieties

Each research centre taking part in the network will describe as exactly as possible the varieties in its collection : origin, number of trees, vegetative and yield characters, co-efficients of variability; these data will be transmitted to the other centres.

- Exchanges of planting material

These exchanges could consist in nuts (or embryos when the method of 'in vitro' culture has been perfected) and pollen.

Nuts will be obtained by open pollination when the original population is isolated or sufficiently large, and by hand pollination otherwise. The trees of the collection will be grown from them.

Pollen will be used to renew collections and increase intra-variety variability when a variety has to be replanted because it can no longer be used for research owing to the height of its trees.

Organized co-operation could help to overcome certain technico-administrative obstacles to the development of exchanges, in particular :

- government measures taken to preserve the genetic heritage;
- quarantine regulations;
- financial problems.

The intervention of bodies such as the IBGR and the care and attention given to phytosanitary conditions should also make their contribution.

- Preservation

For financial and practical reasons it is impossible for one centre alone to gather together and maintain all the varieties or origins known throughout the world. Each centre could :

- make a speciality of local varieties or origins, all of which would be represented there;
- procure:

exotic varieties with known good general combining ability;

* exotic varieties with characters likely to interest the breeder, in particular the ones whose characters complement those of the local varieties.

* Exchange agreements between members of the network would guaranteee each of them free access to the genetic resources of the other centres.

Concerted action would ensure that all origins or varieties are adequately represented and secure from disappear ance. It would allow adaptation and the use of new techniques : freeze-drying of pollen, tissue culture, etc

- Renewal of the collection

When they reach 20-25 years of age, the trees are so tall that it is difficult to check the research work (hand pollinations and pollen harvest); there is little point in keeping them in the collection. It is necessary, therefore, to plan replanting of the various Tall coconut varieties every 15 or 20 years or so. Research centres situated in the zone of origin of the varieties concerned could help in this renewal by encouraging either an increase in variability or breeding for a sought-after character.

Coconut prospections are obviously one of the prime fields for co-operation between research centres, one for which the techniques of realization and interpretation have still to be defined.

(d) Co-ordination and Specialization of Research Programmes Multisite Trials

Constraints of funding and space restrict the research centres' programmes. The organization of a network of collaborating, specialized centres would allow expansion of the range of varieties or hybrids studied and the testing of promising material in a whole series of ecological conditions.

Many countries, especially in Asia and the Pacific, have coconut genetic resources of considerable variety and virtually unexploited; others have excellent collections. Each could make a speciality of its own resources or even, to this end, collaborate with another country, less richly endowed genetically but having more extensive means of research. It is evident that 'specialization' does not mean that exclusive use will be made of materials of narrow genetic origin, as that would lead to a measure of inbreeding, but simply that exploration of the combining aptitudes of locally available varieties with each other or with exotic origins will be priviledged.

Once the value of one or more hybrids has been demonstrated in some of the centres, using methods approved by all and in known conditions, it only remains for the other members of the network to agree on the setting up of multisite tests of adaptation to certain ecological zones. Membership of the network should provide a solution to most problems of co-ordination, methods and exchanges of material which up to now have wrecked all international co-operation in multisite trials. The steps to be taken are as follows : research for hybrids of good permance, multisite trials of the best hybrids in the network, supply of basic material for reproduction of the ones best adapted to each zone, use in development programmes.

Co-operation between the network members would also apply to improvement of the best hybrids. Each centre improving its own best crosses could provide centres interested by one or other of thern with *pollen* to create then test the progenies and *selfed seed* of the pollen parents.

Obviously, these, supplies or exchanges of planting material would be subject to the approval of the governments concerned and, when their aim is seed or plant production, they could be covered by financial agreements allowing the creator organization to dispose of extra funds to develop its research.

IV. AN ATTEMPT TO DEFINE THE TERMS AND CONDITIONS OF CO-OPERATION

It is not our intention to go into details here about the terms and conditions of co-operation between research centres such as we have outlined in this article. They should be concerted between the organizations concerned. We merely want to make a few concrete proposals for an approach to joint action.

In the first place, it appears essential to limit the number of participant bodies to three or four during the organizational phase. Once this is over, the network could be thrown open to all coconut research centres which wish to join and are willing to submit to a minimum number of rules. Meetings could take place every two years on one of the centres, and last 10-15 days; the Marc Delorme Station in the Ivory Coast could be asked to host the first meeting, to take Dlace in 1986. Each member would be represented by one or, better still. two breeders.

There would be a secretariat to ensure co-ordination and exchanges between meetings anda for technical back-up of requests for funding presented to international organizations or governments by members in order to carry out certain operations entering into this framework. The IBRD, FAO, CGIAR and IBPGR would be consulted, of course, and associated with dicisions concerning technical choices and requests for finance.

V. CONCLUSION

Research on coconut improvement is still weak, partly because it lacks ways and means but also because it does not make the most of the ones it has. If the different research bodies developed close co-operation based on regular contacts between breeders, the speedy circulation of information and the harmonization of techniques, their effectiveness would be strongly enhanced, to the great benefit of the planters. Financial organisms interested by research and development often see the research centres which they have helped to create or reinforced sink into a certain lethargy afterwards for lack of means and contacts. The inclusion of such centres in a dynamic network allowing all available means to be used to the best advantage and attracting aid, would probably give value to the initial investment.

Difficulties will inevitably arise when we come to establish this co-operation, but the benefits it can be expected to bring arc so enormous that it is worth attempting. For its part, the IRHO is willing to animate this effort if other coconut research organizations arc interested.