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COCONUT RESEARCH

(Agenda Item 4(d))

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RECOMMENDATIONS OF THE
INTERNATIONAL SYMPOSIUM ON COCONUT RESEARCH AND DEVELOPMENT

A four-day International Symposium was held from 28th to 31st December, 1976 at the Central Plantation Crops Research Institute, Kasaragod, on Coconut Research and Development. This was attended by 302 scientists drawn from 8 countries of whom 20 were from outside India. A total of 81 papers were presented in 9 different sessions in the fields of Genetics and Breeding, Physiology and Biochemistry, Agronomy and Soil Science, Technology, Basic Studies, Diseases, Pests, Diseases of uncertain etiology and Development Programmes. Two popular lectures were delivered, one on "Some reflections on Production Physiology of the Coconut Palm" by Prof. R.D. Asana, and the other on "Plant Tissue Culture - some applications" by Prof. H.Y. Mohan Ram.

In his inaugural address, Dr. M.S. Swaminathan emphasised the urgent need for raising the current ceiling to yield in coconut. The decline of the position in the edible oil industry is due to: (a) failure to replant old plantations with superior types, (b) inadequate use of fertilizers, (c) ravages caused by diseases of uncertain etiology, such as root (wilt) in India, (d) advent of petroleum and synthetic substitutes in detergent manufacture, and (e) advent of alternative oil crops like oil palm and soya. Referring to the cooonut palm as an excellent solar energy harvesting machine, Dr. Swaminathan stressed the need for coconut research and extension workers undertaking a Gap Analysis along the following lines:

Gap I: The gap between the yield possible on theoretical considerations and the best yields so far achieved can be referred to as Gap I. This is a research gap which can be filled only through intensive inter-disciplinary research effort, using all tools science can offer.

Gap II: The gap between the best yield obtained in a research farm and by a good farmer can be referred to as Gap II. This gap can be filled only by identifying the factors which render the reproduction of research results in farmers' fields difficult. Management factors as well as soil fertility, water and pest management will need attention. Thus gap II is a Research-cum-Management Gap and will have to be studied jointly by research and extension workers.

Gap III: The gap between the best average yield realised by a farmer in a State and the Stage average can be referred to as Gap III. This is the gap which can be filled immediately provided there is a concerted effort by developmental, extension and research agencies. For understanding the reasons for Gap III and for developing strategies for overcoming the gap in different areas we need a critical analysis of the constraints causing the gap. This will help to bridge Gap III, which can be referred as an Extension Gap. The extension gap can also be measured by the ratio between record and average yields in farmers' fields.

The available data indicate the following approximate dimensions of the different gaps:

Nature of Gap	Minimum potential (Nuts per hectare per year)	Potential reached so far (Nuts per hectare per year)	Ratio Potential Realised
I. Research Gap	90,000	30,000	3
II. Research-cum-Management Gap	30,000	20,000	1.5
III. Extension Gap with regard to Kerala in India	20,000	5,000	4

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Dr. Swaminathan stressed the need for briding the extension gap as early as possible and suggested a Constraints Analysis by a multi-disciplinary team to identify the precise constraints operating in each area.

Referring to the so called 'root wilt' of Kerala, Dr. Swaminathan suggested that until the diagnostic pathology of the malady is clearly established, it may be advisable to refer to it as "Coconut decline" rather than "Coconut root wilt". He also called for establishment of a global grid of genetic resource centres and for more intensive research on post-harvest technology, particularly drying of copra and extraction of oil through a wet process.

In addition to the regular sessions, study groups were organised on the following 5 identified areas (1) Genetic Resources, (2) Vegetative Propagation, (3) Production Physiology, (4) Diseases of uncertain etiology, and (5) Post-harvest technology during the symposium.

Also, a post-symposium 2-day Travelling Seminar was organised to make an on-the-spot study of the Kerala root wilt disease, on 1st and 2nd January, 1977.

The following were the major recommendations arising out of the Symposium:

I. Genetics and Breeding:

(a) Collection, conservation and mobilisation of coconut germplasm should be given a high priority and each country should make a national collection. Adequate support should be given for bilateral and multilateral exchange of seednuts or pollen and for a survey of coconut growing areas in island populations. Since coconut is a monotypic genus and since replanting schemes have been taken up on a large scale in several countries, a sample of existing variability should be collected and preserved in each major coconut growing country.

(b) A collector's handbook for coconut germplasm identification should be prepared by a competent team of scientists. The Indian Council of Agricultural Research will initiate this work.

II. Vegetative Propagation of elite palms:

(a) Experimental approaches of conventional propagation using the least destructive methods should be studied further.

(b) Tissue culture should be organised in different laboratories, each concentrating on one particular area, like root tissues in one laboratory, floral tissues in another, induction of mutations or haploids by others, so that the problem can be examined from various angles.

(c) Once tissue culture methods are standardized in Prof. Schwabe's laboratory, a training course could be organised for interested scientists from other countries.

(d) There is need and scope for intensifying basic research studies in coconut, in collaboration with appropriate universities. For example, the relation between male flowers and fruit set needs critical analysis.

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III. Production Physiology of Coconut:

The present low level of production calls for the following lines of investigation:

(a) Basic studies on seedling physiology to locate suitable parameters for identifying high yielders in the nursery.

(b) Evolving non-destructive or least-destructive methods of estimating production and partitioning of dry matter for estimating harvest index.

(c) Evolving suitable ideotypes for mixed cropping through a critical study of canopy structure in relation to leaf geometry and effective light interception.

(d) Nutritional studies in relation to translocation efficiency in diverse genotypes and under different levels of management and cropping systems.

(e) Root growth studies.

IV. Diseases of Uncertain Etiology:

From the papers presented at the Symposium on the world's coconut diseases whose etiology has evaded precise definition so far, causal agents like mycoplasma in the case of lethal yellowing and viroids in Cadang-Cadang, seem to be important. Serological tests for the early detection of root (wilt) of Kerala holds promise for screening re-planting material as well as new germplasm for resistance. The following recommendations emerged from the discussions:

(a) The general consensus on the mode of disease spread through human agencies calls for a total ban on movement of seednuts and seedlings from disease-affected regions.

(b) Equal emphasis should be given for etiology and management studies in the research programmes on root (wilt) through suitable research-cum-demonstration plots, in view of the marked improvement of diseased palms under good management and with suitable inter-and mixed cropping.

(c) Diseased palms appearing in healthy gardens should be systematically uprooted and burnt after spraying with 0.05% Carbaryl to kill possible vectors. Suitable rewards and compensation may be given to farmers who help in the enforcement of this practice. The ecological conditions favouring the incidence of disease in isolated pockets should be studied.

(d) A systematic testing of germplasm, varieties as well as hybrids, in order to locate resistant/tolerant types should be done in different agro-climatic regions.

(e) A newsletter and directory of scientists working on such diseases should be made and an authoritative illustrated catalogue prepared at the International level in order to have a close follow-up of research on these maladies.

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V. Post-harvest Technology:

The following suggestions were made:

(a) For the efficient drying of copra so as to ensure complete freedom from mycotoxins, an economical drier using solar energy or other indirect heat should be developed.

(b) Improved methods including chemical method of rotting coconut husk should be developed in order to avoid pollution of backwaters, and to improve the quality of coir products.

(c) The 'solvol' process of oil extraction through wet processing of coconut should be perfected.

VI. International Collaboration:

The following areas for international collaboration were identified:

(a) Exchange of research expertise for solving specific problems particularly with regard to diseases of unknown etiology.

(b) Germplasm collection and supply.

(c) Communication Centre for indexing current work in different areas and the setting up of an International Data Bank on Coconut Problems; and

(d) Product processing and market intelligence.

VII. Centre for Coconut Genetic Resources in India:

The Central Plantation Crops Research Institute at Kasaragod has already the world's largest germplasm collection in coconut. It was decided to strengthen this collection further and establish a Coconut Genetic Garden in a suitable island in the Lakshadweep Group of Islands. In case IBPGR is able to render any assistance in such work, discussions may be held with the IBPGR Secretariat.