

INTERNATIONAL CASHEW SYMPOSIUM,
12-15 MARCH, 1979, COCHIN (KERALA, INDIA):
SUMMARY REPORT AND RECOMMENDATIONS*

H. HAMEED KHAN, E. V. V. BHASKARA RAO, AND N. M. NAYAR

*Central Plantation Crops Research Institute,
Kasaragod-670 124, Kerala, India*

ABSTRACT

This first International Symposium on Cashew was organised jointly by the Indian Council of Agricultural Research, New Delhi, International Society of Horticultural Sciences, The Hague, and the Indian Society for Plantation Crops, Kasaragod. In addition to the Symposium, the following programmes were also arranged: an exhibition with accent on cashew entitled "CASHEW 79"; release of a 12 min long colour film Cashew, which was specially produced for the and occasion; four special slogan cancellations; release of two books "Cashew" and "Bibliography on Cashew". In addition, seven technical and agricultural journals had also brought out special numbers to mark the occasion. In the Symposium, 75 papers were presented, 49 orally and 26 as poster demonstrations, covering all aspects of cultivation, management, technology, and marketing.

The highlight of the Symposium was a special discussion on vegetative propagation. In this, the work done so far in the various centres was reviewed and suitable recommendations were made for developing the work further. The other recommendations include: setting up of an international cashew germplasm collection centre; developing methodology for enhancement of root growth through growth regulators, rhizobial cultures, etc., developing meristem culture technique for large scale multiplication of elite trees; standardisation of sampling technique for soil and tissue analysis; identifying natural enemies of *Helopeltis*; studying the pest complex infesting the inflorescence; introducing small devices for processing cashew; studying the possibility of using CNSL for developing unconventional products like plant protection chemicals, drugs and food additives; and using aluminised paper for packing cashew to reduce the cost of cashew.

1. Tree nuts have been one of the oldest sources of food for man. Cashew (*Anacardium occidentale* L.: Anacardiaceae) leads them in world production with 4,50,000 tonnes raw nuts annually and ranks third in international trade with 20% of market after hazel nuts (29%), and almonds (21%).

Of late, this important nut crop has attracted the attention of several tropical countries.

2. This was the first time that an International Symposium was organised on cashew anywhere in the world. In late 1976, Mr. JG Ohler (Royal Tropical Institute,

* Publication No. 167, Central Plantation Crops Research Institute, Kasaragod.

Amsterdam), representing the International Society of Horticultural Sciences, The Hague, suggested to Dr. MS Swaminathan, Director-General, Indian Council of Agricultural Research, New Delhi, if the ICAR could organize an international symposium on cashew in India. Dr. Swaminathan readily accepted the suggestions and entrusted the work to the Central Plantation Crops Research Institute, Kasaragod (Kerala, India). Accordingly, the Indian Council of Agricultural Research, in collaboration with the International Society of Horticultural Science, The Hague, and Indian Society for Plantation Crops, Kasaragod, organised the Symposium in Cochin during 12-15 March, 1979 in the premises of the CIFT, Wellington Island. The Symposium was attended by 216 delegates and large number of visitors from 14 countries including India.

3. Mr. AL Jacob, Minister of Agriculture, Government of Kerala, inaugurated the Symposium on 12 March, 1979 at 10.00 AM in the Fine Arts Hall, Ernakulam. In his inaugural speech, the Minister made the following observations:

(i) The industry, trade, and employment sectors of the economy should come forward in a big way to stand by the cashew cultivator to extend to him generous assistance to produce more nuts from cashew plants.

(ii) There is an immediate need for providing modern innovations in research, generous input assistance, and technological support to cashew cultivators for making cashew cultivation more scientific, intensive, and profitable. (Action: CPCRI, Agricultural Universities, State Agriculture/Horticulture Departments, Directorate of Cashew Development).

(iii) Cashew apple produced in Kerala State (six lakh tonnes annually), which is being wasted now, could be profitably utilised for production of alcoholic beverages (*feni*), jams, and jellies. (Action: Kerala

Agricultural University; Kerala Agriculture Department).

(iv) Since growing cashew alone may not be remunerative, mixed cropping in cashew gardens should receive the attention of scientists. (Action: CPCRI, Agricultural Universities).

4. Dr. MS Swaminathan, Director General, ICAR, presided over the function. He gave the following suggestions:

(i) The delegates may please try to identify areas where joint international action programme would lead to mutual advantage. (Action: CPCRI).

(ii) A small task force should be appointed to work out the strategy for establishing a 'global genetic garden' for cashew to prevent gene erosion (Action: CPCRI).

(iii) Cashew may be introduced in the social forestry programme because of its nutritive value (Action: Inspector General of Forests; State Forest Departments; Agricultural Universities).

5. Dr. MV Pylee, Vice Chancellor, Cochin University released the Souvenir and the books, Bibliography on Cashew and Cashew.

6. Mr. AR Seshadri, Mayor, Cochin Corporation received from Mr. Babu Raj, Senior Superintendent of Post Offices, Ernakulam a set of four special postal covers brought out by the organizers and bearing the special postal slogan cancellations. The four slogans, one for each day of the Symposium, are given below:

(i) 12 March 1979:

"Improved Cashew Clones Increase your Income"

(ii) 13 March 1979:

"Manure your Cashew Regularly, Reap higher Harvests Annually"

(iii) 14 March 1979:

"Cashew-King of Kernals and Common Man's Apple"

(iv) 15 March 1979:

"Healthy Cashew-Wealthy Farmer"

7. Mr. AL Jacob, Kerala Agriculture Minister inaugurated in the premises of the Pelagic Fisheries Unit an exhibition entitled **CASHEW '79**. Twenty-three agencies including private organisations participated in the Exhibition.

8. The Films Division of the Government of India had brought out a special film **Cashew** (12 min., colour) to commemorate the first International Cashew Symposium. This was screened for the benefit of the delegates at Menaka Theatre, Ernakulam after the inaugural function.

9. Dr. MS Swaminathan, Director General, Indian Council of Agricultural Research inaugurated with a key-note address the scientific sessions in the afternoon of 12 March 1979 at the Central Institute of Fisheries Technology Auditorium. In his address, Dr. Swaminathan made the following observations:

(i) The first and foremost gap in cashew yields is between the average yield obtained in Kerala and the average yields in other States. It would be possible to double the production of raw cashew in India, if this gap alone is bridged. (Action: DCD; State Agriculture/Horticulture Departments).

(ii) An interdisciplinary team may look into the various aspects to compute the maximum biological potential. Attempts may also be made to compute cashew (kernal) equivalent similar to the grain equivalents worked out for cereal crops (Action: CPCRI).

(iii) The input-output energy conversion efficiency needs to be studied by an interdisciplinary research team (Action: CPCRI).

(iv) There is a need at the international level for establishing a germplasm garden in cashew which will also serve as an international cashew hybridisation centre. Kerala is ideally suited for establishing a global germplasm centre (Action: CPCRI).

(v) A general awareness should be brought about among the farmers about the import-

ance of plant protection measures in cashew, including the need for aerial spraying for the control of tea mosquito on a community basis. (Action: DCD; State Agriculture/Horticulture Departments).

(vi) Necessary technology should be evolved for the better utilisation of cashew apple which is at present profitably utilised only in Goa. (Action: CFTRI; RRLT; Agricultural Universities).

(vii) Three dimensional crop canopy studies may be undertaken for optimum utilisation of solar energy and horizontal and vertical agricultural space (Action: CPCRI; AICCSIP; Agricultural Universities).

(viii) Mixed cropping of cashew, casuarina, and coconuts may be popularised in sandy tracts (Action: DCD; State Agriculture/Horticulture Departments).

10. The keynote address was followed by the Scientific Session I on Botany, Physiology, and Crop Improvement (Chairman: Dr. NM Nayar; Rapporteur: Mr. KN Murthy). Six papers were orally presented, while seven papers were presented as posters. The papers dealt with morphogenesis and anatomy, genetics and breeding, microbiology, cytology, and biochemistry. The following recommendations were made.

(i) Investigations on genetical and suitable environmental factors controlling expression and development of sex organs in cashew have to be intensified (Action: CPCRI; AICCSIP; Agricultural Universities).

(ii) For exploiting heterosis in cashew, the range of existing variability may be determined (Action: CPCRI; AICCSIP; Agricultural Universities).

(iii) Systematic studies may be initiated in cytogenetic aspects (Action: CPCRI; Agricultural Universities).

11. Dr. MS Swaminathan convened a group meeting of cashew breeders in the evening to discuss the problems relating to cashew germplasm. The following decisions were taken in the meeting.

(i) The regions of natural *Anacardium* should be surveyed by NM Nayar, CPCRI convenor for this work ICAR; Participant co

(ii) The information collection of cashew countries may be done among the delegates Symposium.

(iii) There is an establishing an international centre for cashew ICAR).

(iv) The quarantine cashew may be for exchange of cashew. The possibility of excursions may also be look Protection Adviser to India; NBPGR; CPC

(v) A set of described cashew germplasm accessioned (Action: CPC

12. The Session II propagation, (Chairman: I Rapporteur: Mr. M on 13 March. This was point of the Symposium orally presented and up as poster demonstration scientists from various their experiences on ve The following points discussions.

(i) As no single propagation is suitable ecological conditions grown, location-specific methods of propagation may have to be developed (Action: CPCRI; Agricultural Universities).

(ii) Appropriate technology developed for maximum fi

January						
M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

February						
M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12*	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

March			
M	T	W	
3	4	5	6
10	11	12	13*
17	18	19	20
24	25	26	27
31			

(i) The regions of the world where the natural *Anacardium* species are endangered should be surveyed on a priority basis. Dr. NM Nayar, CPCRI was identified as the convenor for this work (Action: CPCRI; ICAR; Participant countries).

(ii) The information available on existing collection of cashew germplasm in various countries may be documented and circulated among the delegates before the close of the Symposium.

(iii) There is an immediate need for establishing an international collection centre for cashew germplasm (Action: ICAR).

(iv) The quarantine procedure suitable for cashew may be formulated to facilitate exchange of cashew germplasm material. The possibility of exchanging meristem cultures may also be looked into (Action: Plant Protection Adviser to the Government of India; NBPGR; CPCRI).

(v) A set of descriptors for describing cashew germplasm accessions may be standardised (Action: CPCRI).

12. The Session II, on Vegetative Propagation, (Chairman: Dr. VN Madhava Rao; Rapporteur: Mr. MC Nambiar) was held on 13 March. This was arranged as the high-point of the Symposium. Nine papers were orally presented and seven more were put up as poster demonstrations. In addition, scientists from various countries presented their experiences on vegetative propagation. The following points emerged out of the discussions.

(i) As no single method of vegetative propagation is suitable for all the agro-ecological conditions under which cashew is grown, location-specific methods or combination of methods of vegetative propagation may have to be developed for different areas (Action: CPCRI; AICCSIP; Agricultural Universities).

(ii) Appropriate technology may be developed for maximum field establishment of

seedlings (Action: CPCRI; AICCSIP; Agricultural Universities).

(iii) Methodology may be developed for enhancement of root growth through treatments with growth regulators, rhizobial cultures, etc. (Action: CPCRI; AICCSIP; Agricultural Universities).

(iv) The possibility for extending to other suitable areas the side grafting technique presently employed in Orissa and budding used in Goa may be looked into (Action: CPCRI; AICCSIP; State Forest Development Corporations; Agricultural Universities).

(v) Training programmes may be organised to familiarise the research workers with location-specific vegetative propagation methods in cashew (Action: CPCRI; AICCSIP; Agricultural Universities).

(vi) Studies may be taken up on side grafting on young seedlings, starting from 3-5 months old stock and scion material using succulent terminal stem and leaf cuttings with and without mist, and substituting polythene covers for air layering with other materials like aluminium foils. (Action: CPCRI; AICCSIP; Agricultural Universities; State Forest/Cashew Plantation Corporations).

(vii) Seed orchards may be raised for distribution of seeds until acceptable vegetative propagation techniques are identified. For this, clonal progenies of trees identified on the basis of progeny performance for at least 4-5 years may be used (Action: CPCRI; AICCSIP; State Horticulture/Agriculture Departments; Agricultural Universities).

(viii) Meristem culture should be attempted for large scale multiplication of elite cashew trees on priority basis (Action: CPCRI; Agricultural Universities).

(ix) Investigation may be taken up on rootstock effect in cashew (Action: CPCRI; AICCSIP; Agricultural Universities).

13. Session III, on Agronomy and Plant Nutrition, was held in the afternoon of 13

March (Cahirman: Mr. EV Nelliatt; Rap-
porteur: Mr. K Shama Bhat). Three papers
were presented orally and six were presented
as poster demonstrations. The following
recommendations were made.

(i) All experimental stations may maintain
sizeable plots of cashew under high fertility
and irrigated conditions to find out the pro-
duction potential (Action: CPCRI;
AICCSIP; —Agricultural Universities).

(ii) Effect of nutrient treatments on yield
components and quality of kernel may be
assessed (Action: CPCRI; AICCSIP; Agri-
cultural Universities).

(iii) Rooting pattern of cashew may be
studied in different soil types using different
kinds of planting materials like air layers and
seedlings (Action: CPCRI; AICCSIP;
Agricultural Universities).

(iv) Studies may be undertaken on stand-
ardisation of sampling technique for soil and
tissue analysis (Action: CPCRI; AICCSIP;
Agricultural Universities).

(v) Studies may be initiated on determining
the relationships between nutrient status of
soil and tissue with yield performance
(Action: CPCRI; AICCSIP; Agricultural
Universities).

(vi) Inter and mixed cropping trials may
be undertaken in cashew stands (Action:
CPCRI; AICCSIP; Agricultural Univer-
sities).

(vii) The economics of all agronomic and
plant protection recommnedations may be
worked out (Action: CPCRI; AICCSIP;
Agricultural Universities).

(viii) The effect of weather factors on
growth and production may be studied
(Action: CPCRI; AICCSIP; Agricultural
Universities).

14. Session IV, on Entomology and Plant
Pathology, was held on the forenoon of 14
March (Chairman: Dr. MRGK Nair;
Rapporteur: Dr. KKN Nambiar). Of the
ten papers presented in this Session, seven
were on pests and three on diseases. Six

papers were presented as posters. The
recommendations of the Session were:

(i) Surveillance may be instituted for moni-
toring the appearance of *Helopeltis antonii*
in the field and application of insecticides
adjusted accordingly. Trials on the efficacy
of stem implantation of insecticides may also
be undertaken (Action: CPCRI; AICCSIP;
Agricultural Universities).

(ii) Studies may be undertaken to deter-
mine the differences in intensity of population
of *Helopeltis antonii* on different trees in the
same plantation even at peak periods of in-
festation. This may involve biochemical
and ecophysiological studies to find out the
factors responsible for this variation (Action:
CPCRI; AICCSIP; Agricultural Univer-
sities).

(iii) Priority is to be given for identifying
natural enemies of *Helopeltis*. These studies
may cover parasities, predators, and patho-
gens like entomogenous fungi (Action:
CPCRI; AICCSIP; Agricultural Univer-
sities).

(iv) Studies may be undertaken to deter-
mine the role of thrips as a pest of cashew
affecting foliage, flowers, and fruit set, and
control schedules worked out (Action:
CPCRI; AICCSIP; Agricultural Univer-
sities).

(v) Studies may be undertaken for evolving
suitable management practices for controlling
infestation by stem and root borers. An
integrated approach may be adopted in this
case (Action: CPCRI; AICCSIP; Agri-
cultural Universities).

(vi) Systematic studied in different regions
may be taken up on the pest complex infest-
ing inflorescence (Action: CPCRI;
AICCSIP; Agricultural Universities).

(vii) Screening of available germplasm
against *Helopeltis* may be taken up. The
nature of resistance/susceptibility, if any,
may also be studied (Action: CPCRI;
AICCSIP; Agricultural Universities).

(viii) Systematic studied may be initiated

on gummosis to study their nature, aetiology, nature of spread, varietal reaction, survival of pathogens, and control measures (Action: CPCRI; AICCSIP; Agricultural Universities).

(ix) Studies on other diseases such as those caused by nutritional deficiencies may be taken up. (Action: CPCRI).

15. Session V, on Processing and Technology, was held on the afternoon of 14 March (Chairman: Mr. CP Natarajan; Rapporteur: Dr. AG Mathew). Ten papers were presented on various aspects of cashew processing and technology. The following points were raised.

(i) A close rapport between agricultural scientists and post harvest technologists is called for (Action: CPCRI; RRLT; CFTRI; Agricultural Universities).

(ii) Studies may be initiated for better utilisation of the by-products of cashew. This could include studies on determining the proper stage of maturity for kernel, the range of variation in composition of fruits and kernels in different agroclimatic conditions; and developing methods for collection of fruits without microbial contamination, and transport of fruits to processing centres (Action: CPCRI; RRLT; AICCSIP; Agricultural Universities).

(iii) Pilot studies may be undertaken on consumer acceptability of various products of cashew apple (Action: CEPC; RRLT; CFTRI; DCD).

(iv) Increase in the productivity of cashew processing workers should be achieved by introducing small devices by which drudgery is reduced and working conditions are improved (Action: RRLT; ICDC; DCD; CPCRI).

(v) The possibility of using CNSL for developing unconventional products like plant protection chemicals, drugs and food additives, gum, etc. needs further study (Action: RRLH; CSIR; DCD).

(vi) Further studies may be taken up for

ensuring quality control in the manufacture of cashew kernel and products (Action: DAM; DCD; CEPC; ISI).

16. Session VI, on Developmental Programmes and Marketing, was held on the forenoon of 15 March (Chairman: Dr. KVA Bavappa; Rapporteur: Dr. L Krishnaswamy). Eleven papers were presented in this Session. The recommendations of the Session were:

(i) Consumer resistance has already brought down the price of cashew (320 counts) from US \$ 2.40/lb to US \$ 1.72/lb. To bring down the cost of processed nuts, proper cost accounting should be carried out on all the important operations like raw nut production, marketing, and processing. Appropriate steps should then be taken to reduce the costs of productions and processing (Action: DCD; CEPC; ICDC).

(ii) Proper utilisation of cashew apple is suggested for increasing the income of the farmer (Action: ICDC; DCD).

(iii) Introduction of *Anacardium giganteum*, which produces better quality apple, may be done for supporting apple industry (Action: CPCRI).

(iv) For reducing the cost of processed nuts, packing in cheaper containers like aluminised paper, use of high kernel recovery varieties, and reduction in number of grades may be considered (Action: CEPC; DCD; DAM; RRLT).

(v) Large-scale commercial cultivation of cashew may be taken up under the aegis of corporations and cooperatives for increasing production of cashew (Action: DCD; State Governments; State Forest/Plantation/Cashew Corporations; State Co-operative Departments; State Forest Departments).

(vi) For using submarginal and marginal lands for planting cashew, the system followed in rubber cultivation in Malaysia, which involves blasting of hard strata, may be tried (Action: State Forest/Plantation/Cashew

Corporations; DCD; State Horticulture Departments).

(vii) Initial high density planting and subsequent thinning are suggested for maximum utilisation of land (Action: CPCRI; AICCSIP; Agricultural Universities).

(viii) The potential for growing intercrops in cashew plantations may be studied in depth (Action: CPCRI; AICCSIP; Agricultural Universities).

(ix) An international agency may be set up for ensuring effective cooperation of research, development and marketing activities in cashew (Action: FAO; Department of Agriculture, Government of India).

17. Session VII, Plenary Session, was held on 15 March forenoon (Chairman: Mr. N Kaleeswaran; Rapporteur: Dr. NM Nayar). The Chairman of the various Sessions presented the summary reports and recommendations emanating from their respective sessions. In the ensuing discussions, the following additional points emerged out.

(i) Efforts should be made to organize a second International Cashew Symposium after four years. The venue may be Kenya. The house requested Mr. JG Ohler to find out the possibility of the ISHS or the RTI approaching the Kenya Government for the same.

(ii) A Standing Committee is formed with Dr. NM Nayar as the Convenor for surveying the areas of natural distribution of cashew and ascertain the areas where it is endanger-

ed. He was requested to initiate correspondence with various agencies for this purpose.

18. The International Cashew Symposium concluded with a vote of thanks by Dr. JP Singh.

Abbreviations used:

1. AICCSIP : All India Coordinated Cashew & Spices Improvement Project, Kasaragod.
2. CEPC : Cashew Export Promotion Council, Ernakulam.
3. CFTRI : Central Food Technological Research Institute, Mysore.
4. CPCRI : Central Plantation Crops Research Institute, Kasaragod.
5. CIFT : Central Institute for Fisheries, Technology, Cochin.
6. DAM : Directorate of Agricultural Marketing, Nagpur.
7. DCD : Directorate of Cashew Development, Cochin.
8. ICAR : Indian Council of Agricultural Research, New Delhi.
9. ICDC : Indian Cashew Development Council, Cochin.
10. ISI : Indian Standards Institution, New Delhi.
11. RRL (H) : Regional Research Laboratory, Hyderabad.
12. RRL (T) : Regional Research Laboratory, Trivandrum.