

INAUGURAL ADDRESS OF DR. K.L. CHADHA, DEPUTY DIRECTOR GENERAL (HORTICULTURE), I.C.A.R., NEW DELHI ON 2nd DECEMBER, 1992 AT THE TENTH PLACROSYM HELD AT CPCRI, KASARAGOD.

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## 1. INTRODUCTION

I feel happy to be here today morning to associate myself in this Xth PLACROSYM held at CPCRI, Kasaragod which is one of the pioneering Institute for Plantation Crops. These group of crops are high value commercial crops of great economic importance and play a vital role in the country's export trade. Though the total cropped area under plantation crops is only 3.2 million ha. (1.82% of total crop land) they generate an income of Rs.14,247 million (1988-89) or about 7.0% of export earnings of all commodities. These crops are largely restricted to the tropics and mostly between 20°N and 20°S of Equator. Almost all these crops are perennial in nature. In respect of crops handled by the Council, India is the leading producer of cashew, arecanut and cardamom, third in coconut while its position in pepper fluctuates from year to year. These crops are mostly cultivated by individual owners and not in an organised manner as that of coffee, tea and rubber. Tea, Coffee, and Rubber occupy first, tenth and fifth places respectively. In addition to the primary products from these crops which are largely exported, the by-products from many of these crops have considerable industrial and commercial importance and support a number of industries. These crops are confined mostly to small holdings.

## 2. TRENDS OF AREA, PRODUCTION AND PRODUCTIVITY

The area, production and productivity of plantation crops over a period of 3.5 decades shows that the area and production had increased tremendously over this period. The productivity increase is spectacular in arecanut, tea, coffee and rubber, marginal in cardamom and pepper and has declined in cashew and coconut.

Technological advances had made greater impact in the organised plantations of coffee, tea, rubber and areca.

### 3. FUTURE DEMAND

The plantation crops have restricted geographical distributions and so the possibility of area expansion in the traditional areas is limited. However, there is vast scope in areas like North Eastern Hill Region. The future requirements of these crops warrant both increasing the production and productivity through technological advances like developing high yielding varieties/hybrids, agro techniques including plant protection.

In addition, the domestic demand of tree spices like clove, nutmeg, cinnamon, mace and cassia is about 7000 tonnes while the production is only 2600 tonnes. Hence 4500 tonnes of these spices valued at Rs.25 crore are being imported annually. Hence there is urgent need for increasing the area, production and productivity of these crops.

Cocoa, pepper and tree spices production can be increased through effective utilisation of coconut and arecanut plantations in the country.

### 4. YIELD GAPS

Since many of the plantation crops are potential earners of foreign exchange for this country, the yield gap analysis between the best managed plantations and national average yield is of great concern. The yield gap is 78% in tea, 110% in coffee, 153% in cardamom, 340% in rubber and 372% in pepper. The yield gap in organised sector is comparatively lower than unorganised sector. There is, therefore, vast scope for improvement of productivity of plantation crops from the existing estimated yield of 5-10% of the maximum theoretical potential for which adequate fertilizer and other management practices are necessary besides high yielding varieties and water management.

## 5. RESEARCH INFRASTRUCTURE

I am happy that adequate infrastructure is now available to achieve the goals of increased productivity and production to meet the requirement of growing population. Many agencies are involved in these efforts. The Indian Council of Agricultural Research is the premier agency for the research on all plantation crops except coffee, tea and rubber. The Central Plantation Crops Research Institute and All India Coordinated Research Project on Palms and cocoa, National Research Centre for Spices and AICRP on Spices for Spices and NRC for Cashew and AICRP on Cashew for cashewnut under ICAR are primarily responsible for research. Besides the above, CARI, A & N Islands, ICAR Research Complex, Goa and NEH Complex, Shillong and a few Agricultural Universities are also involved in research in Plantation Crops. Coffee Research is carried out at the Central Coffee Research Institute of the Coffee Board, Balahannur (Karnataka); Tea Research by UPASI at Coonoor, Toklai Tea Research Institute (TRA) Assam and Rubber research by Indian Rubber Research Institute, Kottayam, Kerala.

The Central Food Technological Research Institute (CFTRI), Mysore, and the Regional Research Laboratory of CISR at Trivandrum are also engaged in some aspects of post-harvest technology of plantation crops.

## 6. MAJOR ACHIEVEMENTS MADE

Substantial achievements have been made in these groups of crops, in crop improvement, production, protection and post harvest technologies.

In tea, a total of 56 clones, 7 biclonal and polyclonal seed stocks were compared to national average of 1762 kg/ha. Some of these are capable of yielding 7500 kg/ha.

In coffee, 12 selections from Arabica and 3 selections from Robusta were evolved and released. Cauvery, primarily Arabica type with high yield potential is suited to high density. Some of the varieties are resistant to leaf rust and have desirable quality.

In rubber, varieties like RRIM 703, 803 may yield as high as 6000 kg/ha.

In cashew, 25 high yielding varieties have been developed which can give average yield of 8 to 10 kg/ha/year. Some of these are capable of yielding 14 to 16 kg/ha./year.

In coconut, three varieties and nine hybrids were released/recommended for release. These varieties/hybrids are capable of yielding 1.62 to 2.98 tonnes of oil/ha. annually.

In oilpalm, tenera hybrids viz. 65 d x 30.103 ;, 120 d x 30.103 p and 271 d x 30.433 p gave a calculated oil yield of 4.6, 4.5 & 4.1 tonnes of palm oil/ha/year. Indigenously the country is capable of producing tenera seeds to a tune of 3 lakhs per annum.

In arecanut, four varieties viz., Mangala, Sumangala, Sreemangala and Mohitnagar Selection have been released which can yield 11.2 to 17.2 kg/ha/year.

In pepper, Panniyur was the only variety available since 1976. Recently, eight varieties Pnniyur 2 to 4, Subhagara, Sreekare, Panchemi, Ottaplakkal and Ayprian are recommended for release. These are capable of yielding 1.2 to 2.5 kg dry pepper/tonne/year with a maximum potential upto 8.8 kg/dry pepper/year.

In cardamom, Mudigeri 1, PV1, CCS 1, ICRI 1 and 2 are recommended for release. Average yield of these varieties ranges from 275 to 409 kg dry capsules/ha. Maximum yield of 1100 kg/ha is also possible.

High production technologies for pepper for getting 1000 kg dry pepper/ha/year in the quick wilt affected area and the high production technology for producing 770 kg/dry capsule in the Katte affected cardamom areas are worth mentioning.

Perennial crop based inter/mixed/multi-storeyed/multi species cropping system and mixed farming system developed at CPCRI is worth mentioning. The efficient utilisation of horizontal and vertical space, available sunlight and atmospheric energy are best utilised. Coconut, cocoa and pepper system provide maximum return of Rs.23200/ha/year and mixed farming Rs.28800/ha. These systems also provide continuous employment.

Management of diseases like root wilt, ganoderma, crown choking of coconut, phytophthora of pepper, kätte of cardamom, bio-control against coconut pests have yielded fruitful results.

In the field of post harvest technology also some attempts have been made in developing and popularising copra dryers, multipurpose drier, small scale palm oil extraction plant, etc.

### CONSTRAINTS

In spite of the fact that the high yielding varieties and technologies are available on these group of crops, there are a few limitations at the adoption stage. Availability of quality planting material of released high yielding varieties is the major constraint. Adoption of plant protection schedules particularly in the non-industrial plantation crops is another constraint. Ever increasing cost of production due to labour as well as input costs is yet another constraint. Some of the diseases like root wilt, tatipaka and ganoderma wilt of coconut, yellow leaf of arecanut, phytophthora foot rot of pepper, kätte disease of cardamom, rhizome rot of ginger etc. always cause great concern in limiting the production. Similarly, some of the pests like tea mosquito bug in cashew and stem borer in cashew, tea, coffee, also cause considerable yield reduction. Though management strategies were developed, this warrants a critical look and attempt to solve the problems.

## THRUST AREAS

In the years to come, some of the aspects warrant intensive efforts to boost production through increased productivity.

1. Developing varieties/hybrids for high yield, export quality/resistant to biotic and abiotic factors.

Crops like tea, coffee, pepper, cardamom etc. are valued for their flavour/essential oil content. Attempts should be made to identify the clone/cultivar/hybrid through conventional and biotechnological means. The maximum yield potential of these crops are very high and definitely there is scope for increasing the productivity. For an example, if the theoretical yield potential of 9000 to 10000 kg/ha in rubber as indicated by Malaysian breeders could be realised through proper selection and intervarietal hybridisation it would be a real breakthrough. In the case of MLO caused diseases like root wilt of coconut and yellow leaf of arecanut, the solution lies only with developing resistant/tolerant varieties. So also is the case of katte of cardamom, Phytophore foot rot of pepper etc.

Drought seems to be a chronic problem and even summer irrigation is impossible in most of the plantation crops. To quote an example cardamom was severely affected by drought during last year and the production this year will be definitely low. In coconut and arecanut it takes three years to recoup. Hence this should be one of the important area in the breeding programme.

2. Biotechnology in plantation crops.

This tool can be used for crop improvement gene or genetic conservation and micropropagation. Attempts made so far in coconut and oilpalm led us to standardize a non-destructive method of tissue sampling and developing a few plantlets from the young leaf tissue. However, the micro pagation in black pepper is encouraging.

I am happy to know from the work of NRC Spices that it might be possible to go for mace production straightaway without undergoing the ordeal of field planting. Though we have developed and commercialised cardamom tissue culture, we should now try to work for developing 'Katte' resistant lines. I am happy to know that all Plantation Crops Research Institutes have developed/or are in the process of developing facilities for micropropagation through tissue culture. I am sure within a short span of time the techniques will be standardised and commercialised for large scale multiplication of quality planting materials.

### 3. Organic farming

Organic farming is the time old method of cultivation now gaining popularity. It was learnt that the export oriented crops like black pepper, cardamom, chillies are likely to get higher price incentive of these are produced through organic farming. Attempts made in the plantation crops in this direction which will help to get quality produce and also to eliminate the environmental pollution will be welcome.

### 4. Integrated Pest Management (IPM).

In recent years, considerable research efforts have been made on noninsecticidal control methods like attractants, repellants, juvenile and insect hormones or growth regulators, pheromones, insect sterility by radiation or haemosterilants, pesticides and predators etc. However, the chronical pesticides are being used on a large scale for control of most of the insects which leave residues in various living systems for a prolonged period. For example, use of monochrotophos in coconut and endosulphan in black pepper etc. Since it is anticipated that the residue problem in the end produce will definitely tell upon the export market of these group of crops hence it is proper to develop integrated plant protection measures in these crops.

## 5. Biological control (BC)

The biological control method was successfully demonstrated in coconut for leaf eating caterpillar and rhinoceros beetle. This approach should be extended to red palm weevil of coconut. Similarly research on biological control of other insect pests, diseases, nematodes should be attempted.

## 6. Perennial based cropping systems.

Considerable work has been made in coconut and arecanut based cropping systems as well as mixed farming systems. Land being the limiting factor and climate being uncontrollable natural phenomena, there is a need to diversify the monocrop system into a multicrop system. Taking the available lead at CPCRI the perennial based cropping system in a systematic way should be studied in identifying right type of crop combinations for coffee, tea and rubber plantations as well as orchards. Inclusion of coffee, tea as well as in cardamom estates is in the increasing trend in the recent past. It should be our endeavour to systematically study for developing a sustainable cropping system in the plantation crop sector.

## 7. MLO Diseases.

Having conclusively proved the MLO etiology in the case of root wilt of coconut and YLD of arecanut, and having known that the antibiotic therapy is not going to offer a complete recovery but can pose environmental hazards, the only alternative is to breed for disease resistance. Attempts should be made to incorporate polygenic resistance into improved varieties and hybrids.

## 8. Planting Material Generation.

In perennial plantation crops, rejuvenation of old plantations, consolidation of existing plantations through gap filling, replanting with the latest available high yielding varieties etc. should be a continuous process besides area expansion. This warrants large scale

production of quality planting materials of promising varieties. I made an attempt to review the situation in some of the plantation crops like coconut, cashew, and black pepper during 1986 and developed some strategies for increasing the quantity. Though considerable improvement have been made in the case of black pepper and to a small extent in coconut and cashew there is a long way to go in fulfilling the requirement of quality planting material. This aspect should be carefully looked into, and both long term and short term strategies need to be developed.

#### 9. Post Harvest Technologies.

Harvest and post harvest practices determine the quality of end products and bye products which directly influence the economy of the producer. Though considerable effort has been made in developing low cost technology like copra dryers, tree climber, dehusking of coconut and arecanut, copra moisture meter, small scale palm oil extracting unit, there is still large scope in developing technologies to manufacture value added from these plantation crops. Micro level processing at the farm level enabling the farmer to get a fair price is also necessary. I am sure that attempts will be made in this direction also. Technologies for bye-product utilisation and product diversification should receive immediate attention so that one can always compete with the other countries in the export market.

I am sure your three days stay at Kasaragod will pave the way for fruitful discussion and develop meaningful programmes which will be implemented in the years to come for increasing the productivity and production as well as export earnings from these crops. Wish you all good luck. Thank you.