

INTER DISCIPLINARY APPROACH IN PLANTATION CROPS RESEARCH

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I shall be failing in my duty if I do not record in brief the sentiments which prompted me to accept this assignment. As one who spent the entire professional career to the cause of plantation crops industry, late Dr. C. S. Venkata Ram had endeared himself to all closely associated with the plantation crops research and industry. I had the privilege of having been associated with him in this common cause of ours and in seeing him unanimously elected to the high office of the President of the Indian Society for Plantation Crops, the first president outside CPCRI. We had indeed high hopes that under Dr. Venkata Ram's dynamic leadership, the Society entering the second decade of its existence was poised for greater achievements. It is nothing but irony of fate that the responsibility which Dr. Venkata Ram should have shouldered has come back to me.

The Indian Society for Plantation Crops which was formed during the year 1971 had initially membership mostly confined to the CPCRI. Through the efforts made for organising a National Symposium on Plantation Crops in the year 1972, a beginning had been made to bring together scientists working on

all plantation crops. However, it should be admitted that only after the idea of organising Annual Plantation Crops Symposium-'PLACROSYM' that came into actual implementation during 1978, that a common platform, and closer co-operation between the research workers in all the plantation crops research institutes became a reality. Late Dr. Venkata Ram had been the main moving spirit in forging this idea ahead. He spared no pains in his usual pleasant way to strengthen the bondage among the scientific community working for the cause of plantation crops for which contribution alone, the research workers in plantation crops will remember him for ever. While dedicating this article to the memory of late Dr. Venkata Ram I am indeed overwhelmed that the Indian Society for Plantation Crops has today in its sphere of activity the entire plantation crops and any research contribution that we discuss in this forum has indeed application in all areas of this vital industry.

Research on tea, coffee and rubber which in the traditional sense constitute plantation crops, has been by and large for the large estate owners who managed

a large labour force to run their estates. These owners were not farmers who tilled their own land to eke out a livelihood but were indeed land lords. This situation had its own advantage in that research results could be effectively transferred to the fields which helped to substantially increase the production. However, this picture has undergone considerable change in the recent past. As against this, crops such as coconut, cocoa, pepper, cardamom, clove, arecanut etc. have been inherently small holder's crops. Table 1 summarises the distribution of holding by size for tea, rubber, cardamom, coffee and coconut.

From the above, it will be seen that with the exception of tea, in all the other crops, small holdings (<4 ha) constitute sizeable proportions (85-100%). The area cultivated by this group of farmers compared to the total area under each crop also is sizeable (27-100%). It is thus evident that plantation crops are no longer the monopoly of owners of large area of land. There is also every possibility that in the years to come there will be further fragmentation due to the increase in population and consequent pressure on land. It is therefore, essential that the problems that these small holders have to face in cultivating small pieces of land with plantation crops should receive priority attention.

In general, the research methodology that was being adopted to meet the needs of larger plantation holdings may not be amenable for application to the small holder situations. Unlike in tea, coffee and rubber, crops such as coconut, arecanut, cashew, cocoa etc., which are traditionally are small holders'

crops, have been researched upon with a view to meet the needs of farmers with small holdings. The Central Plantation Crops Research Institute has generated some data in this area and newer ideas are being tested. An inter-institutional collaboration between CPCRI and the other institutes working on plantation crops such as coffee, tea and rubber to work on this area can be highly rewarding.

While monocrops have their own advantages in terms of specialised cultivation, processing and other management practices, in the context of utilising the small parcels of land committed to these crops, mixed cropping and crop diversification will have to come in so that the productivity of land per unit area, time and inputs are enhanced. Plantation crops being perennials having varying canopy shapes and rooting pattern can be accommodated in higher densities over unit areas with considerable increases in the overall productivity. Choice of crops having varying canopy shapes, their correct placement in appropriate positions in the mixed cropping stand for obtaining maximum use of air space, optimum interception of solar energy at different strata of the crop canopies and maximum use of soil both on horizontal and vertical planes are vital for maximising the production of bio-mass. If such high density crop communities could be developed as self sustaining systems with low input and high output of energy, a very high production efficiency can be expected of them.

In order to recommend specific crop combinations to suit varying soil

Table I. *Distribution of holdings by size*

| Size of holdings (in ha) | Holdings | | Area | |
|----------------------------------|---------------|---------------|---------------|---------------|
| | No. | Percentage | ha | Percentage |
| Tea (1979-'80) | | | | |
| >400 | 275 | 2.31 | 158015 | 42.76 |
| 200-400 | 449 | 3.77 | 133681 | 36.16 |
| 100-200 | 315 | 2.64 | 46288 | 12.52 |
| 50-100 | 188 | 1.58 | 13912 | 3.76 |
| 0-50 | 10888 | 89.70 | 17701 | 4.80 |
| Total | 11915 | 100.00 | 369564 | 100.00 |
| Rubber (1978-'79) | | | | |
| >400 | 42 | 0.03 | 33265 | 14.10 |
| 200-400 | 25 | 0.02 | 7493 | 3.17 |
| 40-200 | 241 | 0.17 | 19619 | 8.32 |
| 4-40 | 6542 | 4.52 | 54258 | 23.00 |
| 2-4 | 11377 | 7.87 | 30021 | 12.73 |
| <2 | 126367 | 87.39 | 91257 | 38.68 |
| Total | 144594 | 100.00 | 235910 | 100.00 |
| Cardamom (1979-'80) | | | | |
| <40 | 187 | 0.64 | 19443 | 22.64 |
| 20-40 | 255 | 0.87 | 6526 | 7.60 |
| 8-20 | 1108 | 3.78 | 12982 | 15.00 |
| 4-8 | 2754 | 9.41 | 14872 | 17.32 |
| 2-4 | 8049 | 17.24 | 13940 | 16.23 |
| <2 | 19929 | 68.06 | 18216 | 21.21 |
| | 29282 | 100.00 | 85879 | 100.00 |
| Coffee (1973-'74) | | | | |
| >100 | 196 | 0.4 | 30000 | 21.1 |
| 40-100 | 387 | 0.9 | 22000 | 15.5 |
| 20-40 | 440 | 1.0 | 12000 | 8.4 |
| 4-20 | 5057 | 11.4 | 39000 | 27.6 |
| 2-4 | 5646 | 12.7 | 15000 | 10.6 |
| <2 | 32653 | 73.6 | 24000 | 16.8 |
| Coconut (Kerala) 1970-'71 | | | | |
| | | % of holdings | | % of area |
| >2 | | 2.2 | | 23.0 |
| 1-2 | | 7.9 | | 22.0 |
| <1 | | 89.9 | | 55.0 |

and agroclimatic conditions, social backgrounds of the family etc., a variety of crop combinations will have to be raised under varying conditions and their relative efficiency evaluated. Since this is time consuming and also extremely costly, if basic data on root and canopy architecture of different crop species, their rate of growth, nutritional, microbiological and moisture dynamics of soil and microclimatic changes under different crops mixes, the PAR profile of the system, the energy input and output of the system, pest and disease problems, cost benefit ratio etc. could be generated even from a few models, other mix cropping models could be developed on much more scientific basis. This calls for a highly inter-disciplinary approach and co-ordinated effort so that useful interpretations are made. Well planned inter-disciplinary and inter-institutional co-ordinated experiments are therefore to be thought of in this vital sector of small and marginal planters.