

PLANTATION CROPS INDUSTRY*

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The establishment of the Central Plantation Crops Research Institute in 1970 was a landmark in the history of agricultural research in the country in that a central agency to conduct and co-ordinate research on these important crops came into existence. When research efforts on several of these crops were brought under the control of a single organisation, the scientists working in different disciplines on these crops felt the need to form a professional society to provide a common forum for interaction. The Indian Society for Plantation Crops which was thus organised in 1971 has completed five years of service in the cause of these crops. As a founder member and President, I have been associated with the various activities of the Society during these initial years. On this occasion, when I am relinquishing the office of the President, I would like to place before you some thoughts on the future of these crops in the hope that it will stimulate some discussion and initiate appropriate action.

2. The title of this talk may require some special explanation because of the context in which the term "plantation crops" is now used. In the traditional sense, what constituted plantation crops in our country were those which were cultivated on an extensive

scale like tea, coffee, and rubber. The terms "estate" and "plantation" were synonymous and meant a large-scale agricultural unit, usually of a single crop. The term often evokes memories of European settlements or colonies employing servile labour in underdeveloped countries. When we talked of estates or plantations of tea, coffee or rubber, we visualised a large contiguous area under the crop owned and managed by an individual or a company. These owners were not farmers who tilled their own land to eke out a livelihood but were land lords who managed a labour force. Plantations were in all sense an industry as much as they were production-oriented and constituted an investment venture. These industries had their own special features and characteristics.

3. I mean differently when I talk of plantation crops industry. I am using the term in a different connotation. At CPCRI and in our Society meetings and writings, we have come to use this term to mean a variety of crops like coconut, arecanut, cacao, and oil palm besides the conventional tea, coffee, and rubber. It is difficult to define the term, and its scope is at best vague; but again these crops have certain common characteristics. In this talk my intention is to focus your attention on the future of these

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Table I. Plantation Crops in India—Area, production, imports, and exports

Crop	Area ('000 ha)	Production ('000 tonnes)	Average yield (kg/ha)	Export (Million Rs.)	Import	Leading states in India and their share (%) of area	Major producers in the world and their share (%) of areas		
Tea	361.4	487.4	1360	1530.9	Nil	Assam	51.8	India	24
						West Bengal	24.4	China	20
						Kerala	10.1	Sri Lanka	16
Coffee	156.1	92.5	590	584.4	Nil	Karnataka	59.2	Brazil	28
						Kerala	23.6	Columbia	6
						Tamil Nadu	16.2	Ghana	7
Rubber	225.0	138.0	760	Nil	Nil	Kerala	86.2	Malaysia	34
						Tamil Nadu	5.0	Indonesia	33
						Karnataka	2.6	Thailand	12
Coconut	1,115.5	5,961.3 million nuts	5,344 nuts/ha	177.1	2.7	Kerala	62.4	Philippines	26
						Tamil Nadu	16.6	Indonesia	19
						Karnataka	12.7	India	18
Arecanut	187.4	169.4	904	5.3	Nil	Karnataka	42.4	India	66
						Kerala	33.8	Sri Lanka	25
						Assam	18.9	Bangladesh	9
Cashewnut	418.1	184.7	442	1,196.2	366.0	Kerala	63.8	Mozambique	37
						Karnataka	18.1	India	26
						Andhra Pradesh	6.9	Tanzania	24
Cacao	3.6	NA	NA	4.6	3.8	Kerala	54.1	Ghana	27
						Karnataka	37.5	Nigeria	15
						Tamil Nadu	7.0	Brazil	13
Cardamom	91.5	2.9	32	133.2	Nil	Kerala	70.7	India	54
						Karnataka	19.0	Tanzania	24
						Tamil Nadu	10.3	Guatemala	16
Pepper	121.7	28.2	231	344.8	Nil	Kerala	96.5	Indonesia	21
								India	18
								Malaysia	16

crops and how the whole way of life revolving round these crops will change in years to come. I hope I have the right to do this because I have spent all my professional life in the cause of plantation crops and, at the risk of some criticism, I may claim that I have no loyalty to any crop other than to the so-called plantation crops.

4. The crops which we now describe as plantation crops are all restricted in geographical distribution to the tropics, mostly between 20°N and 20°S latitudes. These were crops of international trade long before essential food crops were. Efforts to introduce the crops to new areas were not often successful because the quality observed in

their natural habitats could not be obtained under new agroclimatic conditions.

5. The area under these crops is only a fraction of the total cultivated area in different countries but in the volume of international trade and their importance in the national economy, they compete with all other crops. In India these crops occupy less than 2% of the total cultivated area (Table 1) but earn a foreign exchange of over Rs. 3,700 million annually, which amounts for three-fourths of our earnings from exports of agricultural commodities and one-fourth of our earnings from all exports. We are among the leading producers in the world of tea (47% of world production), cashew (66%), arecanut (66%), cardamom (54%), coconut (18%), and pepper (18%). The leading export earning crops for India are tea (Rs. 1,531 million), cashewnut (Rs. 1,196 million), coffee (Rs. 584 million), pepper (Rs. 345 million), coconut (Rs. 187 million, mainly from coir and coir products), and cardamom (Rs. 133 million).

6. Large scale plantations of tea, coffee, and rubber were started only after the arrival of the Europeans but spices were cultivated from the very early days. Though there was no organised cultivation of these spice crops, there was regular and organised trade between India and the countries of the Middle East and the Mediterranean region. Coconut, arecanut, pepper, and cashew were cultivated by individual land owners who were not organised to the same extent as the plantation owners of tea, coffee, and rubber. We do not have very reliable statistics on ownership and size of individual holdings in relation to productivity of all these crops. Table II summarises available data on distribution of holdings by size for coconut, tea, coffee, and rubber. Coconut which is grown over 1.12 million hectares in the country is essentially owned by small cultivators who

own less than one hectare each. Nearly 90% of the holdings in Kerala, 95% in Tamil Nadu and Karnataka, and more than 98% in Andhra Pradesh are less than one ha in extent. In the case of rubber, nearly 86% of the holdings are less than 2 ha in extent accounting for nearly 36% of the total area. Nearly 74% of the coffee holdings in the country are less than 2 ha but the total share in area of these holdings is only 16%. The number of holdings less than 5 ha in extent in the case of tea is 11,292 but their share of the total area is only 2.9%; nearly 80% of the total area are in holdings of more than 200 ha. These figures establish the fact that plantation crops are no longer the monopoly of owners of large areas of land. It is my personal feeling that in the years to come there will be further fragmentation because of the increase in population and pressure on land. Large scale mechanisation of cultivation or a shift to cities of rural populations is unimaginable in our context.

7. A relevant question in this regard is the desirability of reconsideration of existing land ceiling limits in the case of some of these crops. Table III shows the land ceiling limits operating in different states. Tea, coffee, rubber, cardamom, cinnamon, and cacao are now exempt from land ceiling in most of the states. One favourite argument of those who advocate large-size holdings in plantation crops is that the small farmer is an inefficient producer. He is said to be outside the reach of the present news media of radios and newspapers and not responsive to modern scientific ideas of cultivation. There is not much truth in these arguments. I would prefer to contend that most of the small holdings are economically viable units of production. Were it not, most of the cultivators would have given up these crops in favour of some others. Unfortunately, productivity figures for individual crops by holding size is not available at present. I

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Table II

Distribution of holdings by size

Holding size (ha)	Number of holdings	Percentage	Area (ha)	Percentage
TEA				
>400	273	2.1	1,50,000	42.6
200-400	453	3.5	1,30,000	26.9
100-200	308	2.3	40,000	11.4
50-100	183	1.4	12,000	3.4
5-50	608	4.6	10,000	2.8
0-5	11,292	86.1	10,000	2.9
COFFEE				
>100	196	0.4	30,000	21.1
40-100	387	0.9	22,000	15.5
20-40	440	1.0	12,000	8.4
4-40	5,057	11.4	39,000	27.6
2-4	5,646	12.7	15,000	10.6
0-2	32,653	73.6	24,000	16.8
RUBBER				
>400	40	0.03	30,585	13.82
200-400	26	0.02	6,962	3.15
40-200	248	0.19	19,747	8.93
20-40	299	0.23	8,537	3.86
4-20	6,255	4.87	46,615	21.07
2-4	11,210	8.73	29,433	13.30
0-2	1,10,340	85.93	79,386	25.87

COCONUT

Holding size (ha)	Percentage of holdings of different sizes			
	Kerala	Tamil Nadu	Karnataka	Andhra Pradesh
<0.2	37.1	69.1	52.5	56.5
0.2-1.0	52.8	26.0	42.9	41.7
1.0-2.0	7.9	3.2	3.6	1.8
>2.0	2.2	1.7	1.0	—

Table III
Ceiling on land holdings in different States

State	Level of ceiling (hectares)
Andhra Pradesh	4.05-21.85
Assam	6.74
Bihar	6.07-18.21
Gujarat	4.05-21.85
Haryana	7.25-21.85
Himachal Pradesh	4.05-12.14
Jammu & Kashmir	3.68-7.77
Karnataka	4.86-21.85
Kerala	4.86- 6.07
Madhya Pradesh	4.05-21.85
Maharashtra	7.25-21.85
Manipur	10.12
Orissa	4.05-18.21
Punjab	7.00-21.80
Rajasthan	7.25-21.85
Tamil Nadu	4.86-24.28
Tripura	2.00- 7.20
Uttar Pradesh	2.75-18.21
West Bengal	5.00- 7.00

Table IV
Earnings from well managed single trees of plantation crops

Crop	Average annual yield	Income (Rs.)
Coconut	80-100 nuts	80-100
Arecanut	4-5 kg nuts	30-35
Pepper	2-3 kg berries	24-36
Cacao	0.8-1 kg seeds	12-15
Nutmeg	800-1,000 fruits	600-750
Clove	2-3 kg	500-750

hope in the future we shall have more statistics on this very vital aspect because many of the arguments for or against the desirability of large holdings are arbitrary

and difficult to verify. With my experience in arecanut, coconut, and spice crops like pepper, I am positive that individual holdings—homesteads—with a few trees can be as efficient as any large scale holding.

8. In this context, a point to be considered is the cost of production which is generally higher in this country as a whole than in some of the other countries which compete with us in the export market. For example, the international market price of coconut oil is much lower than our internal market price. Guatemala and Tanzania offer cardamom in the international market at prices much cheaper than ours and we have lost, in recent years, the Scandinavian, West European, and Swedish markets. Similar is the case with cashew whose cost of production is much lower in Brazil and Kenya than in India. The export price of cashew kernels (less than Rs. 20/kg) is much less than the prevailing price in the internal markets (up to Rs. 30/kg).

9. In the case of the crops we are discussing here, I don't anticipate a demand crisis or glut in the near future, except probably in the case of arecanut. Over the last 25 years, the increase in total production of different plantation crops has been substantial. Production of rubber increased by 700%, coffee by 260%, coconut by 77%, tea by 64%, and pepper by 10%. The only case where total production has declined is that of cardamom. During this period, the largest increase in area has been under rubber (nearly 400%) followed by coconut (77%), coffee (55%), pepper (50%), and cardamom (50%). We should be careful in interpreting the implications of these statistics. Our achievement in increasing the area under rubber and the productivity and total production has been substantial. The area under coconut is estimated to increase by 40,000 ha over the next 25 years and the

higher production is expected only to satisfy our requirements of nuts and oil. We have a very peculiar situation in cashew which is entirely different from that in other crops. The area under cashew today is only 3,63,800 ha which at current productivity (140,000 tonnes of raw nuts) meets only two-thirds of the requirement of our processing industry. We have been processing raw nuts imported from African countries and re-exporting the kernels and we have a processing industry whose installed capacity cannot be met by indigenous production alone. With decreasing availability of raw nuts for processing, cashew industry in the country which employs 1,25,000 workers is facing a supply crisis. The problem here is increasing the present indigenous production by nearly 200% immediately. Coffee, pepper, and cardamom are entirely export oriented crops whose demand and price are determined by the trade in international markets. The quality of the products which is a very important consideration in marketing is not a problem as far as India is concerned and there is no reason to doubt that any increase in productivity we can achieve will not be helpful in increasing foreign exchange earnings through exports. In the foreseeable future a glut in these crops is unlikely. We are now importing cacao, palm oil, and products of tree spices. Our most important considerations at the moment as far as these crops are concerned is the cultivation of these in new areas and acquiring the scientific knowhow of their cultivation and processing. Market demand is the last of our worries at present.

10. An exception in this regard probably is only arecanut where the demand is already what our production can meet. This situation arose because of the recent increase in production following the large scale planting and adoption of efficient management technology for this crop. The only other pro-

ducers of arecanut in the world are Bangla Desh and Sri Lanka. Unless we develop alternate uses for the nuts and other by-products, arecanut may be a dying crop. Recognising that further increase in production will further aggravate the glut in the market the Government has already banned the introduction of arecanut to new areas.

11. In the context of future demand for plantation crop products, I would like to stress the importance of a growing demand in the internal market. The per capita production in the country today is only 150 g coffee, 812 g tea, 308 g cashew, 4.5 g cardamom, and 48 g pepper annually and per capita consumption excluding export is 67 g coffee, 44.5 g tea, 188 g cashew, 2.0 g cardamom, and 4.5 g pepper. The standard of living and the per capita income in our country at present do not permit a large section of our population to indulge in the luxury of a greater consumption of these products. With increasing living standards in the future we should anticipate greater demands for these products and with one-sixth of the world's population there is no reason why we should not be able to control the world demand for most of these products.

12. Let us now consider our achievement in increasing the productivity and production of these crops. Over the last 25 years, the productivity of rubber has increased 250%, that of coffee by 50%, and that of tea by 20%. The other side of the story is that the yields of coconut, pepper, cardamom, ginger, turmeric, and other spices have remained static or shown a downward trend. Unlike in the case of annual food crops like wheat and rice, where new high yielding varieties have increased the productivity, any immediate increase in productivity of plantation crops will have to come through better management of existing plantations. Foremost among the reasons for the low

productivity is the poor genetic stock of existing plantations. Replacement of these inherently poor yielders with better cultivars, varieties or hybrids can only be a long term process. The initial investment in raising a new plantation is very high. Superior quality planting material is always in short supply in crops like cashew, coconut, and spices.

13. Many of the modern methods of plant breeding and crop improvement evolved in other crops cannot be directly adopted in plantation crops because of their long duration and many special features. However, in recent years, attempts have been made to adopt the conventional as well as the more advanced breeding techniques in plantation crops. One aspect which has not received the required attention till now is the collection of germplasm at research centres to preserve the naturally available variability. While limited germplasm collections are available in coffee, tea, coconut, and arecanut, the variability available to breeders at present is extremely narrow in the case of cashew, pepper, cardamom, and clove. We have already made a beginning in pepper, oil palm, clove, and cardamom to collect all types available in the country. It is also important that we introduce fresh collections of cashew from South American countries, clove from Indonesia, Zanzibar, and Malagasy Republic, and oil palm from Malaysia and Nigeria. One hurdle in this respect is the fact that germplasm exchange today is handicapped to a great extent by factors which are not entirely scientific. For example, taking clove out of Zanzibar in any form is a crime for which capital punishment is mandatory. I have been denied the opportunity of even looking at an allspice tree when I visited Jamaica last year. Unless the exchange of germplasm in these crops is co-ordinated at an international level on entirely scientific considerations, the improvement of these

crops through breeding of better varieties will be hampered.

14. What is lacking today in many plantation crops is a clear understanding of some of the diseases like root (wilt) disease of coconut, the yellow leaf disease of arecanut, katta disease of cardamom, and the wilt diseases of pepper. The economic loss caused by these diseases is severe. In spite of several years' research on these diseases, we have not been able to evolve effective control or preventive measures. Nor have we been successful in isolating resistant or tolerant cultivars or breeding new varieties. A lasting solution to these disease problems seems to be only the evolution of resistant or tolerant varieties.

15. Next to evolving better varieties, the most urgent need today is to develop efficient agrotechniques for the plantation crops. It is important that we evolve cultural and management practices for all crops with the objective of maximising productivity as well as net profits from cultivation. Today many of these crops, particularly spices are grown with very little management; especially, inputs in terms of fertiliser application, pest and disease control, and irrigation are negligible. One problem we will have to be careful about when intensive cultivation is resorted to in these crops will be the quality of the produce. In our anxiety to increase production we should be cautious about the effects of new production techniques on the quality of the final produce. For example, when we started growing cinnamon as a secondary crop in a coconut garden with irrigation and manuring, we obtained a thicker bark which was said to be of lower quality and we could not fetch a premium price for the produce.

16. From what I have said earlier it is clear that further fragmentation of the holdings of plantation crops will take place in

the future and the highest priority as far as the researcher is concerned will be the development of a management technology for very small holdings. This will definitely call for innovative approaches hitherto unattempted. When the holding size becomes small, the "small" cultivator will have to look for sources of additional income to make out a living. He may no longer be cultivating a single crop but may opt for a few more. The manoeuvrability of such systems is very wide. In this context, we should think not only of intercropping in coconut and arecanut gardens on which we have some limited experimental data and practical experience, but also of mixcropping different plantation crops to stabilise the income of individuals with small holdings. This is an area which requires special attention in terms of assessing the requirements of individual crops for natural resources like sunlight, soil and air space, pest management and disease control. What will be required then is to have a clear understanding of (1) the crop combinations that can be grown, and (2) the crop-animal-human ecosystem that can be developed to the best advantage of the farmer. Such a system should reduce the cost of production through maximum use of available natural resources, higher efficiency of applied inputs, and recycling of waste products so that we have an ecosystem as close to nature as possible and as efficient as can be.

17. It is essential that our efforts in increasing productivity be accompanied by critical economic analysis. When I say economic analysis I also mean the socio-economic implications. One important factor that should receive our attention in this regard is the potential for utilisation of (family) labour and availability of some income throughout the year. We should recognize that the average family size in a state like Kerala, where plantation crops are

the mainstay of the rural population, is 6-7 all of whom should be able to live off the income from a holding as small as 0.2 ha. A recent news item in a Kerala newspaper tells the story of a farmer who makes Rs. 7500 annually from a single nutmeg tree. Such stories may not be news-worthy in the future. Table IV shows the earnings a farmer in Kerala can make from single trees of some of the plantation crops. With a crop combination involving these trees and in addition some animal husbandry or poultry keeping, an agricultural family should be able to make a living from plantation crops in a much better way than from annual field crops or seasonal vegetables.

18. A factor that should receive special attention in the economic analysis is cost accounting. The plantation crops pose a very interesting situation in this regard. These crops require a relatively heavy investment in the initial pre-bearing years. Later when the maximum bearing stage is over, yields decline slowly. Theoretical calculations of appreciation during the early years and depreciation in the later years will be a new approach and considerable thought and deliberations should go into this. At present we do not have sufficient data on which such calculations can be based. Our research stations should therefore pay more attention in maintaining cost accounts, especially where new areas are being planted. Yields as well as cost of cultivation should be recorded in terms of labour units as well as material inputs and the current costs involved. The economic analysis becomes more of an intellectual exercise when we think of the whole production unit consisting of a small area of land, a few animals and birds, and a family.

19. When we talk of minimising the cost of production as well as increasing profits of the cultivator, we are forced to consider

all factors involved in the determination of the price of the final produce. It is essential that the farmer's interest be safeguarded but neither the farmer nor the middlemen should blackmail the ultimate consumer. Coconut oil price in Kerala is a case in point. When the price of the oil shot up in the open market recently—there was no shortage—the State stepped in and fixed the retail selling price of oil at Rs. 12/kg. Now there is an "apparent" shortage of the oil in the open market. It makes us think of the logistics of the problem. Can a mill owner make a profit if he sells oil at Rs. 12/kg when the raw nuts sell at prices above Re. 1 each? Or, should the farmer receive a lower price so that the consumer will get oil at Rs. 12/kg? In the case of rubber, the Kerala Government fixed the minimum price a farmer must be paid as long ago as in September 1970 but according to the State Planning Board most of the farmers with small holdings seldom receive this minimum price. To quote yet another example, restrictions in inter-district movement and price control on green and retted husks did not produce the desired effect of increasing the supply of husk to the spinning sector. Private entrepreneurs gave up husk retting after price control on husks and coir was introduced because they did not find retting remunerative enough to justify any investment. Co-operative societies set up with government assistance were not able to do the job private people did. In the marketing of cardamom, a series of middlemen—brokers, auctioners, commission agents, dealers, and exporters—reduce the margin of profits the farmers get. Even today, farmers are forced to forgo 1% of the weight of the produce as discount to the traders.

20. Co-operative societies have been thought of as a panacea to solve all the marketing problems of small farmers. This is often an oversimplification of facts. In

the case of crops where the produce requires special processing, the only way to ensure that the cultivator gets a fair share of the profits is to involve him in the processing. This is going to be an area where the government has to step in and bring in regulations to assist the small cultivator with credits to establish "small" processing units in each village or a group of villages. No controls operate in the processing of some of the plantation crop produce as in the case of, let us say, sugarcane where each sugarcane mill has a specified command area from where it receives the canes for processing. There have been suggestions that similar command areas should be delineated for each cashew factory so that the processing industry will be motivated to encourage the cultivators to increase the production through loans or other incentives like subsidy for new plantations. To a certain extent such geographic restrictions do operate where licence is issued to individual contractors to tap coconut palms for making toddy in Kerala or to purchase cashew apple juice for making fenny in Goa. In such cases the cultivators have to sell their produce to licenced buyers at control prices. Can we think of a similar situation in coconut, cocoa, or oil palm? In coconut, for example, the age-old "chakku"s are disappearing from the village scene but the smaller rotary units replacing them are not as efficient as the expeller units which require a higher investment. Most of the expeller units (130 out of a total number of 1661 milling units in the country) are not situated in rural areas where coconut is cultivated so that transportation of coconut/copra to the milling units costs a great deal to the mill owner, the net result being the denial of a larger profit margin to the farmer. The solution may be the setting up of smaller oil extraction units (mills, chemical extraction plants, or whatever that will do the job) in each village or group of villages. Then the farmer, who is

“under-employed”, can even think of selling only copra—not raw nuts—to the milling unit and sell the shells and husks separately, thus enhancing his profits.

21. Here the problem is not only of the initial investment but also of the technological know-how and feasibility. For example, in coconut, the TPI or Tennessee valley units are too large to suit our purpose; the present expeller units are not large or efficient enough. The scientists should, therefore, come up with viable technology and the government should provide the necessary financial incentives to set up milling units in each “command area” (of a size to be defined by technological feasibility) to process the farmer’s produce, ensuring him of a larger share in profits.

22. Under such a set up where processing units are controlled by cultivators as well, price controls can be effective because middlemen between cultivators and processors can be eliminated and artificial shortage of supply to the processing industry will not be created by hoarding of cultivator’s produce. Where processing industries are owned by non-cultivators, lack of interest in the welfare of the cultivators and increasing production/productivity of the crop is all too evident, as in the case of cashew. Whereas it is in the interest of the industry to set up the production of cashewnuts to meet the shortage in the supply of raw nuts to the factories, the processors have been unwilling to involve themselves directly in extending credit to cultivators to enhance the productivity of existing plantations or in subsidising establishment of new plantations. In the case of cacao and oil palm, the problem will manifest only when the area under the crop will increase substantially. Here we have the advantage(?) that we can develop and adopt a technology that will suit our conditions because we are starting from the very beginning.

23. Finally, I would like to remind you

that the so-called small holders require more attention than they receive at present from our extension workers. We will need very efficient outreach programmes to educate them of modern technological advances. Until they are appraised of the benefits of a scientific approach in the cultivation of crops—even when they are single trees—we cannot ensure an overall progress in the agricultural sector of states like Kerala.

24. The great advantage with plantation crops in the future will be that it will be a pollution-free industry away from congested urban areas, providing a nucleus for a leisurely life for individual families. With small holdings becoming economically viable units of production, the plantation crop industry should also fulfill the socio-economic requirement of an equitable distribution of income among the population of the country.

25. A very great responsibility is shared by us who are members of the Indian Society for Plantation Crops: the cultivators look to us for a better technology; the national planners expect advice from us on the future of plantation crop economy; and the financing agencies require assurances from us that our technology is economically viable. Most of us are directly involved in specialised research on different problems of plantation crops industry. While engaged in specific research projects, we should not forget our overall perspective. As the only professional society exclusively dedicated to the cause of plantation crops, we have a unique role to play in the progress of plantation crops industry. I have presented my thoughts to you in the hope of stimulating further thinking on some aspects of plantation crop industry that require our attention. I fervently hope that these suggestions will be critically analysed and we shall be able to suggest action programmes for the future on the basis of our discussions.