DISCUSSION

Chairman :

I would like to invite questions on Dr. Jones' paper.

Mr. Williams :

Mr. Chairman, most people agree that the cost of production of tropical root crops throughout the world (from figures quoted by economists) is fairly high and here in Trinidad at the Texaco Farm it was shown that the large proportion of this high cost of production was due to high labour input. The developing countries have the problem of rationalising their agriculture in the face of a lot of employment . Would you kindly explain how this adjustment to be made is made?

Dr. Jones :

In the first place I think that the evidence is pretty clear that for the tropical root crop with which I am concerned and about which I know a little bit, that the costs of production are remarkably low. And I tried to argue this without trying to bring together data from field study and farm management studies because it is terribly difficult to fit together. I tried to argue this essentially from a price standpoint. That is, if the commodity is selling at a very low cost per thousand calories, then it must be relatively inexpensive to produce and this is consistent, I think, with some of the other data I have.

Now, I think there was another part of your remark to which I would like to respond, although I think probably Bruce Johnston, or some of the others would want to say more about this this afternoon. This is a whole question of having commodities which require high labour inputs and it could be produced with much lower labour inputs if you introduce mechanisation. Certainly this is an appropriate policy in a certain stage in the development process, but that stage is only reached when the demand for labour is so strong in the non-agricultural sectors that the people who are displaced by the introduction of mechanical equipment will have little difficulty in finding employment, but for a large part of the under-developed world, this stage has not yet been reached. This causes me and Dr. Johnston and others to be extremely cautious in our recommendation of labour displacing interventions even though it may reduce the cost in terms of man hours, because what we are concerned about is cost in terms of economic units. It doesn't do any good to reduce your man hour cost if you throw a thousand people out of work and they have to go on welfare. As far as the States is concerned the cost is still being met. Does that explain your question?

Dr. Rogers :

Dr. Jones, in your paper you say "at least the large amount of agronomic research in manioc culture seems not to have resulted in economically important advances". First, I would like to ask where this large amount of agronomic research has been done and how you got the idea that it is not justified.

Dr. Jones :

Well, maybe I should not have said that. Actually there has been quite a lot of agronomic research on manioc done in Indonesia, Brazil and in various parts of Africa. What I was trying to embrace under agronomic research was a lot of work about the length of the cutting and whether to hill or not to hill, and whether the plant is at a 45° angle or 60° angle, and others of this sort, and there has been a lot of it and as far as I have seen it's unproductive. But I will correct that in the text so that it would not be quite so offensive.

Dr. Johnson :

I would like to ask Dr. Jones a question on the first part of that same sentence. "It is not clear that changes in farm practices can significantly alter a ton per acre per man day." Now, I am not quite sure, I think as an aside he did

say that he was less certain at that stage than he was before. Now I think it is known that many of the practices in the production of food crops are so behind and are not existent at all, that even by adopting these practices we can get significant changes in returns per acre and per man on the farm — at least that is from our experience. So I would like to hear Dr. Jones comment further on this point.

Dr. Jones :

Well, again I am not a qualified expert here, and again I'm reasoning from knowledge about manioc. I have not seen evidence that changes in farm management produce enough increase in manioc production to justify the change. The reason I qualified the remark when I was reading in the paper was because I had not realised until a couple of days ago 'that it might not be economic to stake yams. I always assumed that you had to stake yams to get a decent yield.

Mr. James :

I am rather interested in Dr. Jones' statement where he singles out the physical effort of clearing land for agriculture as the major cost of food production in agriculture. This interests me because I am engaged now in the development of small farm units in a particular area in Trinidad, where when before we started my great fear was that this same problem of clearing the land would have been the major obstacle to development. As it emerged this is not at all the limiting factor. In fact nobody has shown very much interest in mechanical clearing of land, whereas almost immediately as herbicides were introduced it was accepted. So that it seems to me at this point that after cultivation practices, there seems to be a much more limiting factor in terms of labour input and therefore a cost item in production of food crops and root crops than the physical effort in clearing land — and this is land from virgin forest.

Dr. Jones :

I am very handicapped on these questions. What I guess I meant there, was that land costs in many part of Africa is still essentially zero. The cost of land is the cost of clearing. This is rapidly becoming not true, but it is still true in large areas. The other question about the potential possibility of substituting mechanical processed for clearing the land as against the mechanical process for field operations. I just have a hunch that you find mechanisation is more efficient in field operations than it is in clearing on the cost basis. The cost advantages is clearer in field operations than it is in clearing. I do not know your situation here, but certainly the kind of clearing costs that we run up in certain parts of the tropics, Africa, especially the forested areas and the bush area in Tanzania, were fantastically high, much higher run in labour costs I think than the mechanised field operations.

Mr. Sandys :

I would like to refer to the question of the cost of clearing land. I was in the country now called Malawi for quite a few years and we had experience there clearing bush (from light to heavy bush) and we tried just about every method, from people chopping away with axes to blasting with gun powedr, and big D-8's heaving behind them. And we found that unless you were in a particular hurry to clear an acreage of land, the cheapest way was to put out the clearing to contract. Usually you would find some locals who would get together a gang of people and between them they would clear at a contract price per acre, and this proved to be the most economical way of doing it.

Mr. Pilgrim :

Just a general comment on the paper in general. These papers naturally tend to make statements of what is at the present moment comparing root crops with cereals, giving trends that have occurred in the movement from root crops to cereals, etc. in other countries. This worries me to some extent because I somehow feel that it gives us an unnecessarily gloomy picture of the future for root crops. Is it not true that cereal crops have received over the past years, very very much more input in research work than the root crops? Is it not true, particularly in the

West Indies, that the system has been built up in which a lot of capital has been put into processing, marketing of crops produced elsewhere, cereal crops from temperate areas for introduction into the West Indies in direct competition with our local food crops? Is it not true that the money put into the advertising of cornflakes is far way above anything that is put into the advertising of banana chips, or in producing cornflakes versus banana chips? On this statement in Mr. Rees' paper that "findings indicate that greater scope exists for mechanising the production of cereals and starchy roots". Is it not true that the machines being used have been developed for cereal production in temperate countries and that no serious and sustained effort has been made to produce machines for the cultivating and harvesting of root crops? Isn't it true that our very International Symposium on Tropical Root Crops is the first? Think of the number of symposia that have been held on other types of crops. So taking all these things into consideration, isn't there a case for very much more work to be done on tropical root crops and might it not be that if this work were pursued, the situation of tropical root crops versus cereal crops would be greatly altered. I am just wondering on these matters, because there seems to be undue pessimism over the future of root crops.

I am just trying to get this thing in the correct perspective. Is it not true that the main issue is that we really have not put into our root crops any of these inputs in brains, time and money which have been put into these other crops? And should we not set about finding ways and means of doing this?

Dr. Steppler:

I would just like to make a comment, Mr. Chairman, on this question of mechanisation, particularly in answer to what Mr. Pilgrim has said and the suggestions that there has been a lot of brains, money, etc. that has gone into mechanisation of temperate crops. I hope that the same kind of development that took place in mechanisation in many temperate crops is not the pattern that is followed here, because in many instances these machines were forced upon the farmer — I say forced upon the farmer in the sense that they were not developed in full co-operation with the other segments of agricultural research. The harvesting machines for grain, for example, were largely developed independent of the agronomist dealing with gain production. I think that the situation that faces the tropics in root crops and in many other crops is very exciting, because I believe that they have an opportunity to have an agricultural engineer, an agronomist and a plant breeder sit down together (and I might even put the economist with them to sit down together) and develop ways and means which maximise the production, the efficiency of the man, the efficiency of the use of land, of the machines and the capital input. I think we have a very exciting potential here. There have been just suggestions of these in the work that has been done in the United States. I thing particularly with tomato harvesting, where an agricultural engineer and a plant breeder sat down together and between the two of them they designed a plant and they designed a machine. I think this is the future that we have here.

Mr. Ball:

I would like to takeup the point mentioned about the designing of machines for root crops. While it is true that much of the equipment on the market has been designed for climates possibly not typical of areas where tropical root crops are grown, it should be said that any failure to apply these machines in areas where tropical root crops are grown is probably due to a failure to appreciate that a system of production is required than to a failure in the designing of machines. This may be a sweeping statement to make, but it is our experience that if it is understood that the application of machines requires a logical system of preparation of land right through to harvest that the machines can be very, very much more successful. This has been amply demonstrated in the case of sugar cane, but in root crops we are finding this in the case of sweet potatoes, and I am sure that if you examine the question the logic of it will be apparent. Just a final comment. The equipment that has been designed in the United States and Europe, owes much of its success to the fact that the people who use it appreciate what it is designed to do and are prepared to make allowances in their production systems to suit the equipment. From our experience of root crops and other tropical crops this is not the case. People expect the machines to do very much more in the actual system

they are using than the machines can. Indeed, there is the need of changing the system to suit the machines, as well as designing machines to suit the system ourselves.

Dr. Jones :

I should like to reply to this. I do not want what I said before to be misunderstood. I think that we can quite likely develop mechanical harvesting later on for most of the tropical roots just as we harvest the temperate zone roots. We harvest sugar beet mechanically now. It looks as a difficult problem but we changed the system, we changed our product. But I argued in my remarks that the real need for mechanised production of tropical roots is probably some place in the distant future, but they have already arrived in a wealthy country like this one, but in the poorer countries where the tropical root crops constitute a very large part of the diet, the advantages to be got in this type of labour saving activity are apt to be negative. So that, of course the research has not gone into the tropical roots that has gone into cereals and I think that we are all agreed that it 's highly desirable that a great deal more research be done on these crops, just as we are now getting from cereals, like sorghum. This should be done.

On the final remark, I do not think that I could agree with you. I think that the reason that the poor people eat what they do is because it is cheap. And the reason why I am interested in the tropical roots is that they are already cheap, and they show great potential for continuing to be among the very lowest cost providers of food energy, and this is what is important and this is what needs to be in front of everybody when talking about tropical roots.

Dr. Edwards :

I wonder if I might comment very briefly that the West Indies is in some way a peculiar part of the tropics and I think this may be one example.

Mr. Cacho :

I would like to offer a comment on what Mr. Pilgrim has said. Seeing that he is an agronomist, he has dealt with the production side of it, and I think that the point he is making is that if more research is poured into the production of root crops, productivity will go up, price will go down, and therefore the demand is likely to increase. This all sounds very good. But I think that he has been dealing with the supply. On the demand side, this is where our problem really lies, particularly when we look at the demand curve forward as Dr. Alexander and other people have been trying to do. I think that it is reasonably clear, although there is still a certain amount of conflict on this, that the income elasticity of demand for these root crops is low. As people's incomes go up (I'm talking about the Caribbean), they tend to go away from the starchy roots on to Irish potatoes and rice. We also know that the class elasticity of demand is low as you move up from one income bracket to another. Therefore, as people move up they tend to move away from these.

Then there is the peculiarity of which Dr. Edwards spoke. You know, this sort of outward look rather than inward look, particularly in the urban areas. And when you move from the rural to the urban areas, in Jamaica for example, you are going to have people changing their pattern of consumption, which is again a move away from the roots. I think that this needs to be emphasised, particularly when we have a number of agronomists here, because here we are, talking in terms of supply and demand, and what we do not want to happen is for a research to be made. We produce more efficiently and we flood the market, and as we get more and more of this stuff on, less and less of it is perhaps bought.

I think that we are also pretty clear that the demand curve for these starchy crops is a backward sloping one. So that if you can produce more, and reduce the price it means that perhaps the producers will suffer. Now, I agree with Mr. Pilgrim that perhaps much can be done to stimulate demand and therefore I am looking at the situation as it exists at the present time. I agree that on the supply side we want to reduce price so that there is a little more competition, but on the demand side we want to take steps which will change these social, cultural or other factors,

which are responsible for the income elasticity of demand, the class elasticity of demand and the classification of these things as inferior goods. These are the things we want to work on.

Mrs. Rawlins :

Mr. Chairman, first I should like to thank Dr. Jones for his very clear exposition of the secular and economic trend that might be expected in root crop production. But I would rather more to turn my comments to Dr. Alexander's paper because this comes down to 'brass tacks' about a situation with which I, too, am familiar. Dr. Alexander's description of the pattern of supplying demand in Trinidad, I think, is very clear and very true. However, perhaps it has two limitations. One is that his consumer survey, I rather feel may be limited to a study of the purchasing patterns amongst the urban middle class groups, the rural groups. It is probably true that these latter still follow the trend of consuming root crops that they have produced themselves rather than going to the supermarket to buy rice and Irish potatoes. That is one limitation. The other is that the pessimistic description of a decline in demand for root crops to which Mr. Pilgrim referred does not seem to me to take account of population growth. At least for some time to come, it seems to me that there would be room for increasing demand, at the national level, for root crops due simply to the increase in population; increasing particularly at that low level of income where the consumption would continue to be directed towards these low value root crops and not to the specialised supermarket products. So that, these two limitations, I hope, will balance off the otherwise very vivid description of the situation in Trinidad.

Mr. Francis :

I want to follow up this question of demand for starchy food crops a bit. I think it is important to note that the price of starchy root crops particularly in Trinidad and Tobago is an important limiting factor in the amount that is being sold or disposed of. From my own experience, I know that I would consume quite a lot more sweet potato, tannias, etc. if the prices were not in the region of 20c. per pound, as it so often is.

I see Dr. Alexander's Table 3 indicates that sweet potatoes (and I think that he has a downward bias in a number of his prices because I pay the prices and I know that they are above what he has here) are more expensive than Irish potatoes. And if Irish potatoes are brought from abroad and landed here and sold at a profit at 12c., I keep wondering whether or not, if we are to compete fairly with Irish potatoes, we shouldn't sell our sweet potatoes at less than 12c. But if we cannot produce it efficiently, certainly we will not be able to sell it at a more competitive price. So I think that price is an important factor in the amount that we are able to sell regardless of whether or not there is a backward bend in demand curve.

I want to follow up a point made by Dr. Jones which I think he emphasised by repeating. He pointed out that if we mechanised the root crop farming then we are likely to make labour redunant in a number of tropical areas. If, as appears to be the case in Trinidad and Tobago, root crops are produced mostly by peasant farmers who depend to a large extent on the supply of labour of their own families, and who do not in fact hire labour, then apparently what we are aiming at doing is increasing efficiency and the total volume of production, and perhaps improving their own economic status rather than in any way, make labour redundant by so doing. Apparently the only way we can make labour redundant is, if by improving efficiency and total production we satisfy the demand with fewer peasants being involved in agriculture, and therefore we drive some people out of agriculture. Again, if we reduce the price, and demand actually increases, then certainly we might be able to sustain more peasant farmers by perhaps a more efficient method of production.

Mr. Ferrer :

I think a good bit of the answer to this Irish potato business could be obtained if we multiply what Dr. Alexander said about the availability of Irish potatoes throughout the year, by what Mr. Francis had to say about the price. The point is, that Irish potatoes are available throughout the year. At some time of the year you

get some from Canada, and when they are out of season we switch to Holland, Madeira and the Canary Islands. So from January to December you can go to any supermarket and you will get Irish potatoes.

It is not the same situation with these other root crops. As we know, they are all seasonable. Right at this moment you can probably get all the root crops that we want in the market, but in July, August, September and October, in the wet season, these things become very scarce and the price, of course, rises tremendously. And it is unfortunate that there is so little difference between the climatic factors in the Caribbean territories, that it is impossible to get, for instance, eddoes and tannia at periods other than the seasons when it is also plentiful in Trinidad. If that were possible, I have no doubt that the consumption of these root crops would probably show a better picture than it does show from those tables that we have here.

But I think that the great point is that these Irish potatoes are available throughout the year. So that, obviously, a housewife who goes to the market in August or September will hardly pay the price of sweet potatoes, which are out of season at the time when she can get Irish potatoes at a very cheap price. And she can do it all the year round. And that is a very important reason why the consumption of Irish potatoes is at that level.

I may mention that the Trinidad Government is looking at this problem, and for the last two years we have been regulating the import of Irish potatoes into the country so as to give these other crops a little room to manoeuvre, and we hope that people will be stimulated to try to produce these crops a little out of season. If they find the methods of bringing yams and sweet potatoes in July - August - September you may possibly find that the consumption of these items will increase.

Dr. Royes :

I am speaking specifically on a point that Mr. Ferrer made. I am more or less involved in turning up what these gentlemen want — out of season production and various and sundry things. There is little doubt in my mind that if you want yams or tannias all year round you can get them. We just have to find out how to break dormancy and induce dormancy. This is not impossible but it will take some time. This is the turning, as you say of brains, money and resources on to root crops to make them what you want.

Dr. Johnston :

I want, first of all, to express my appreciation to Dr. Alexander for the extremely interesting and original research that he reported in his paper. I have one or two minor points to raise on that, and that is with regard to this difficult but very important question of trying to obtain understanding of consumer preferences for crops. It is difficult to get an indication of preference that is uninfluenced by difference in relative price. I have a hunch, e.g. that the very low position of tannia compared with dasheen may reflect the fact that consumers have in mind that tannia was half as expensive as dasheen, whereas in terms of preference what we are really interested in is relative strength of demand and equal prices.

Also, comparisons of Tables 1 and 2 and some of the discussions which we had this morning point to the great importance of seasonal variations in root crops. And in this regard I was very much concerned with the remarks which Dr. Royes just made about doing no work on cassava, because, at least in West Africa, one of the great advantages of cassava is not only that it is available in the processed form but even the fresh roots are available in relatively uniform quantities throughout the year, because possibilities of spreading out both the planting and harvesting periods. I am very interested to know whether this is not the case in Trinidad or the West Indies.

And finally, I just want to comment on the extremely interesting contrast which is pointed out by Dr. Alexander's work in the pattern of staple food prices here in the West Indies as compared to tropical Africa, where e.g. as Dr. Jones emphasised root crops, particularly cassava, are so much less expensive than rice and some of the other commodities that appear to be either on a calorie basis as well. And

when I say that they are much less expensive than rice, I am speaking in terms of equal quantities of calories, price per thousand calories, whereas Dr. Jones mentioned they seemed to be very much more expensive than rice, or even white potatoes here. We have extremely interesting questions to enquire into the reasons for this. My guess would be that part of it is, as has been suggested, in urban areas the starchy roots have essentially become a vegetable and not a staple root.

Another factor that might be relevant, but I do not know the facts, is simply that yields, particularly in the case of cassava, may be lower than the average yields in West Africa. And finally, it may reflect in part a difference in the purchasing power of current seasons in this area. And certainly the values of the export earnings for the islands of the West Indies relative to the population is very much larger than the economies of West Africa. This factor of the purchasing power of other currency probably influences the fact that the local price of the imported produce compares very much more favourably with the locally produced product.

Mr. Gooding :

I have a general comment to make on Dr. Alexander's paper and a short question. The general comment concerns the effects of research on root crops production and there were some doubts as to just how research might affect the situation of root crops in the general economy. Well, in certain areas we have limited land as in Barbados. The way I visualise it, is the increased production of root crops is not going to increase consumption, but it is going to free land which is now in production of these root crops for growing other crops. One I can think of is Irish potatoes, which is increasing in demand and I can honestly say we have reached a situation in Barbados, where if the knowledge we now have were applied tomorrow, we could reduce our acreage under tropical root crops by probably 1000 to 1500, that would more than supply our potato need assuming that we could grow them on that land that freed Irish potatoes.

Secondly, I really wonder whether Dr. Alexander was referring to the marketing situation in Barbados and Trinidad when he wrote his paper because he described almost exactly the same situation that existed in Barbados and it is just as bad in Trinidad as it is in Barbados. In respect of the home produced tropical root crops, you have the same absurdity but the root crops are harvested miles away from the town, taken into the town and then if they are not sold in the town they may be redistributed from the town to the country. The situation in Barbados is that you can very seldom buy local root crops in the country but you can go into any village shop and buy imported canned foods and if you can see anything more absurd than that, I don't know what it is.

And just one short question please. The prices of yams and sweet potatoes which you quote as 12c. and 14c. respectively, I presume that these are retail prices. What are the field prices the farmer receives for these commodities ?

Dr. Alexander :

These prices were average prices obtained, that were used in the national accounts. The margin between the retail price and the farm price for yam is, I think, about 4c. per pound. Mr. Ferrer can bear me out on that. And the sweet potatoes — I cannot say offhand — Mr. Ferrer is the man who has worked on margins.

Mr. Ferrer :

There is a guaranteed minimum price on yam offered by the Government. For yams it is 9c. per pound ex-farm and for sweet potatoes it is 5c. per pound ex-farm. There are, in addition to government agents who go around and collect, depots in different parts of the country where the farmer can take his produce and get a guaranteed price.

Dr. Alexander :

I might add the farm price depends to a great degree on the farmer's ability to market his merchandise in many areas, even though we have guaranteed prices

of 5½ for sweet potatoes and 9 for yams and the farm price in many instances today may be substantially higher.

Mr. John :

I would just like to call attention to the last paragraph of Dr. Alexander's excellent paper in which he mentions the necessity for increasing the variety of uses for starchy roots. He makes mention of the inclusion of these roots in preparing snacks, of course, and he talks about the potential for their use in livestock feed formulations. He, however, does not mention the wonderful potential for these starchy roots in the housewife's kitchen. I believe if you look on page 5 you will see that dasheen, yams and sweet potatoes win hands down in taste, whereas Irish potatoes win in the varieties of ways in which it can be prepared, and I would like to point out that if we could greatly increase the ways in which these starchy roots can be prepared and presented in the lunch table, this would be one of the factors which could increase their demand.

Dr. Alexander :

I do not disagree with that statement and I think a lot of these territories have been thinking along those lines and talking about food technology laboratories. So far the situation is all talk. My view is that if we were to present yams in particular, in modified forms (say in french fried form the consumer could pick up the supermarket, or in flakes or instant form), I think we will see consumption in demand of these, but the other shortcomings of the products mitigate against their use.