INTRODUCTION TO THE ICRISAT SORGHUM WORKSHOP - MARCH 6-13, 1977 - H. DOGGETT

May I, as a former member of ICRISAT, add my welcome to this workshop, in which we hope to thrash out the most effective way of together tackling the problems of creating and teaching a modern agriculture which will be profitable and beneficial for the sorghum growers of the developing world.

There are two key questions; firstly, what is likely to be the most effective way of developing this new agriculture, in a form which will be readily adopted by the farmers? secondly, what are the relative roles of the national research programmes and ICRISAT in achieving our common purpose?

(a) HOW MAY WE BEST ACHIEVE OUR AIM?

There are objective studies becoming available from both IRRI and CIMMYT, which give us some guidance on approaches which have been proved to work. I would draw your attention particularly to Donald L. Winkelmann's paper to the World Food Conference on "Promoting the adoption of new plant technology". This is obtainable from CIMMYT, and gives references to other papers. I would also draw your attention to the paper by Perrin & Winkelmann, "Impediments to technical progress on small versus large farms", and to the paper by Randolph Barker "Changes in rice production technology in selected areas of Asia." The latter is available from IRRI.

In two of the areas studied, namely, Turkey, and Kenya, it was the improved cultivar, the HYV, which was rapidly adopted, by 90 to 95% of the farmers in zones where it performed well. The adoption of better fertiliser use, higher plant population, and other simple farming practices, followed more slowly. It was the HYV's which were the essential vehicle that carried the better farming practices. Winkelmann emphasises that the HYV was not universally useful in either of these countries, the highland maize hybrids were not generally adopted in the lowland areas, and the wheats which did so well in the Mediterranean areas

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of Turkey were not a success further inland, often because of susceptibility to frost and cold. Among Winkelmann's conclusions are the following; "Farmers quickly take up varieties which suit their purposes; fertilisers (and in the context of the studies made, this would include simple farming practices such as plant population density)" are taken up less quickly, and tend to be used in lesser amounts than recommended". "In the main, the differences in adoption rates result from the relative suitability of the technologies. Getting the technology right is the critical step in promoting technological change". "Our impression from these studies is that the most pervasive explanation of why some farmers don't adopt new varieties and fertiliser while others do, is that the expected increase in view for some farmers is small or nil, while for others it is significant, due to differences, sometimes subtle, in soils, climate, water availability, and other biological factors. Agricultural technology is more site specific than we were led to believe by some of the early successes with wheat and rice varieties". I shall return to this last point.

In the case of Mexico the HYV's available were inferior to the local maize types, and the problem of the adoption of better fertiliser use, and change of plant population, again proved to be location specific, and the element of risk was important, the practices which gave the best results in a bad year were preferred over those which gave the best results in a good year, because the farmer has no system of insurance, and a bad harvest in a bad year brings disaster.

Following the adoption of improved farming practices as the result of availability of a truly adapted HYV, the next step will be to develop farming systems which make better use of moisture, which minimise soil loss, and which build fertility. You will be visiting the ICRISAT farming systems programme later on. Those of us met here must concentrate on the first step, to produce the really suitable HYV, and then the second step, to use that HYV as the carrier

for better simple farming practices. Let me end by comments on this first question with another quotation from Donald Winkelmann; "Research must be organised so that farmers' circumstances play a more essential role in developing and evaluating alternative technologies".

(b) WHAT ARE THE ROLES OF THE NATIONAL PROGRAMMES AND ICRISAT?

Our reply to the first question guides us in answering the second. New technology can be very location specific, much more farmer participation is necessary in doing the applied research to develop the new technology; and surely, the only people who are going to have sufficiently close relationships with the farmer for extension activities to be effectiye are the nationals of his own country. In plain words, it is the national programme which is vitally important; you are the people who are going to identify the improved cultivars; you are the people who are going to work out the simple fertiliser, weeding, and spacing practices which make the HYV even more rewarding. This is not going to be done by any IARC, not even by ICRISAT, it is going to be done by you. I am particularly glad that you will have the opportunity of visiting a strong, well established national programme.

The two first IARC's, IRRI and CIMMYT, both grew out of national programmes, because it was realised that there is a tremendous need to strengthen the national programmes in their research. I like the title which has been suggested for a new international forestry centre; a "support centre". This is where we stand; you are the research workers who are going to achieve the results; ICRISAT is here to offer you support; as God helps us, all the support that we know how to give. We cannot do this effectively unless we know what support you need. That is why we have asked you to come here for this workshop, and why we burdened you with a long questionaire. I believe that you are in the position stated by a famous British Prime Minister, "Give us the tools and we will finish the job". Gentlemen, we have invited you here to find out what tools you need, and to encourage you all we can in the task you are determined to do.

THE ICRISAT PROGRAMME

When planning the ICRISAT sorghum programme, my colleagues and I, many of whom had worked for a considerable time in the developing world, tried to devise a programme which would have given us the kind of support which we would like to have had when we were working in exactly your kind of situation.

The first need was for the widest possible range of useful variability. Ideally, that variability needed to be constantly regenerating and improving; we therefore developed the procedures for recurrent selection in random mating populations. This methodology is capable of using many more parents from the germplasm collection than are traditional practices, although we also continued to use traditional procedures. Clearly, an expanding and well managed germplasm collection is the basic requirement for all this work.

The variability also needed to contain stability of yield across locations, which is associated with stability of yield across seasons: in view of the importance to the farmer of risk, it was essential to breed for this, and so we developed multilocation breeding. Although no sorghum breeders had attempted this previously, there are such big differences within sorghum in yield stability across locations that we know we shall make important advances through using this methodology. You will note that we insisted on including low fertility locations: HYV's must be good under farmers' conditions, though responsive to inputs. We realise that you will be developing a better level of local adaptation in the material as your programmes continue.

We knew that we must include resistances to the yield reducers; the pests, the diseases, and the witchweeds (striga). We realised the importance of grain quality, especially mould and weathering resistances, and improved cooking and eating quality. We saw that plant physiological studies might help in breeding for drought endurance, and in identifying more efficient plants, that would give more grain and utilise plant nutrients more effectively. Some of the new

microbiological studies are of great interest here. We then looked at some of the more distant possibilities; the potential value of relatively untested plant types, such as grain-grass sorghums, the possible value of tetraploidy in making available to us germplasm from the successful tetraploid wild sorghums.

Together we developed this programme, and we then invited a group of consultants, scientists of wide knowledge and high reputation, to look at what we were doing, so that we were sure that we have a technically sound programme. We then continued to develop and expand our capability until we were ready for the next step: to invite you in as consultants to work out together how our programme can best be fashioned to give you the support that you need. Hence this workshop, which could also be called a consultancy.

I shall leave Dr. Davies, leader of the ICRISAT Cereals group, and his colleagues, to expound their programmes to you. I would ask you to note the underlying themes; the germplasm collection which makes available thousands of tried and tested cultivars, developed under adversity. The utilisation of that variability through both composite populations, and simple populations from crosses between few parents; the testing of the material across a wide range of locations, to identify consistency of performance; the provision to you of nurseries of valuable cultivars with resistances to pests, diseases, to striga, to grain mould, with better quality characters, with better physiological characters and better micro-biological characters. The aim of ICRISAT is to make available to you a wealth of practically useful variability within which you can identify what you need in your programme to serve your farmers and your people.

The second great need of those who work in isolated places is for information. What are the other people doing? How are they doing it? Who are they? I believe that a periodic workshop of this kind can do much to help, especially because we come to know our fellow workers. However, an information service screening the literature is very essential, and you will be glad to

have learnt that such a service is being developed, supported by IDRC. I believe that by making available a wealth of material, and of information on what other scientists are doing, we shall be undergirding you with the kind of support which will be valuable. We are going to need from you a lot of help in filling in your more detailed requirements.

The third area of support is that of training: in so many countries it is not shortage of money, but shortage of trained staff which makes difficult the rapid development of that truly indigenous research and extension service which alone can meet the country's needs. We shall never have the capacity to offer all the training and training courses which we would like to make available. Nevertheless, we do hope to be able to train many trainers, and we are surely needing to discuss with you the kind of training and the training priorities which you see as being most necessary for the successful development of your programmes.

Finally, I would draw your attention to the other breeding programmes at ICRISAT; the Millet, the Pigeon Pea, the Chick Pea and the Groundnuts. To the Cropping Systems and Farming Systems research; and to the work of the Economists. I would also like to pay a tribute to the Farm Management, the Library and Laboratory Services, the Workshops, Plant Protection, Stores, Travel, Visitor service, Finance and Administration groups, who have made it possible for the scientist to develop and present the programmes which you will be seeing this week.

Gentlemen, we must always have clearly in mind the small farmer whom we are endeavouring to serve; we must always remember that our success depends upon offering him improved cultivars and technology which best combine minimum risk with maximum profitability.

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