INAUGURATION OF THE THIRD INTER-ASIAN MAIZE IMPROVEMENT WORKSHOP AS WELL AS THE DEDICATION OF THE CEREAL RESEARCH LABORATORY (I.A.R.I.) TO DR. RALPH W. CUMMINGS

(25th October, 1966)

SPEECH

by

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Friends,

It gives me great pleasure to be with you this morning and welcome you to this Asian Conference on a cereal which is the staple diet of several parts of the New World and has sustained many old civilizations there like the Maya and the Aztec. It is usually believed that maize was brought to Asia by the Spaniards and the Portuguese in the 16th Century. However, in recent years, very primitive types of maize have been found in the North-East Himalayan region which indicates that this plant has probably been in Asia much longer, perhaps for several centuries before the discovery of the New World. Rice and wheat being the major food grains of Asia, very little attention was paid to maize for a long time. But the success story of hybrid maize in the New World naturally attracted the attention of all countries faced with the problem of enhancing rapidly the supply of food and feeds. The presence of so many of you from Asian countries at this meeting is a testimony to the firm roots which maize has taken in the Asian soil and the hopes it offers towards solving the food problems of this region.

It is said that the development and spread of hybrid maize not only led to an enhancement in the output of maize in the United States but also caused revolutionary changes in the whole spectrum of agricultural activity in that country. This is because hybrid maize provided convincing proof of the possibility of achieving a dramatic rise in yields through the combined

use of a plant with a high yield potential and an agronomy which enables the plant to reveal its potential. Practices such as application of fertilizers, efficient water management, and control of diseases and pests first learnt in maize soon got transferred to other crops. Thus, hybrid maize acted as a catalyst in the spread of scientific farming in the United States during the period 1920-1940, and it is fortunate that we have here today Dr. G. F. Sprague, one of the pioneers in maize breeding. In India also, the release of hybrid maize has had a visible impact on production and the average yield of this crop which was 790 Kgs. per hectare during 1957-58, rose to 1030 Kgs. per hectare during 1964. During this year we have nearly 200 thousand hectares under different hybrids and over 8000 hectares are under hybrid seed production. It is proposed to cover an area of 1.62 million hectares with hybrids during our Fourth Plan period ending in 1971.

Thanks to the release of high yielding hybrids of maize, Sorghum and Pearl millet as well as dwarf varieties of wheat and rice, the demand for inputs such as fertilizers and seeds has grown rapidly. Today, there is a general awareness that the pace of progress in food output would depend upon the extent of use of hybrid seeds and new plant strains, chemical fertilizers, insecticides, fungicides, herbicides, irrigation and drainage, modern implements, new growth aids, and everything else we can get from research.

Hybrid maize has led to several interesting developments in our agriculture and as scientists working on this crop, you might be interested in some of them. Firstly, it is a crop in which we initiated in 1957 with the cooperation of the Rockefeller Founda-

tion, a new pattern of research in our country. Under this pattern, scientists working in the different parts of the country were brought together under a coordinated project and a multi-institutional and multi-disciplinary approach was introduced into the research programme. The effectiveness of such an approach will be obvious from the fact that within four years of the initiation of the project, four double cross hybrids were released to suit the needs of the different parts of the country. Since then, five more hybrids have been released and these have given yields of the order of 4 to 8 tonnes per hectare in different parts of the country, in contrast to a maximum yield of about 3 tonnes from the open pollinated varieties. More recently, composite varieties which are as high yielding as the hybrids and whose seeds the farmer can sow again have been developed. Also, hybrids with 4 to 5 cobs per plant, as against the normal one or two, are also in the breeder's assembly-line. Rapid progress has been achieved in breeding work by growing one or two crops in South India during the winter months, when maize normally cannot be grown in North India. Thus, the coordinated approach led to the purposeful and planned exploitation of the climatic and seasonal variations in crop growth prevalent in the various parts of our country and thereby helped to attain the breeding aims speedily.

Secondly, our research on hybrid maize has led to the development of new land use patterns through the standardisation of highly productive and remunerative rotations. In many parts of North India, a wheat or barley crop can be grown after the harvest of maize and many farmers have harvested over ten tonnes of grain per hectare per year by adopting a hybrid maize-dwarf wheat rotation. Such high yields have introduced a consciousness among farmers of

grain production not merely in absolute terms, but in relation to a unit of time. For example, a farmer in the Hospet area of Mysore State when asked why he was shifting from the cultivation of sugarcane to maize, replied that this is due to his 'getting three times more profit from a crop of hybrid maize in 110 days than even a crop of sugarcane which takes about 400 days'. I am personally happy at this trend in the thinking of our farmers since one of the most advantageous facets of tropical and subtropical agriculture is the possibility of growing several crops a year in the same land. The strategy of agricultural development in South East Asia should fully exploit this phenomenon unique to tropical and sub-tropical farming, particularly since there is not much scope in most of this region for a further extension in the cultivated area.

The third aspect of maize research which is of interest to policy makers is the possibility of making available adequate quantities of poultry and cattle feed through the increased production of this cereal. This is of particular interest to us since the average yield of milk or eggs is very low in our country and a doubling of the average milk yield or egg production is easy through better feeding. Already, a prosperous poultry industry has developed in certain parts of India like the Punjab, largely due to the availability of grains like maize.

Fourthly, maize has much significance from an industrial angle. We have a fast developing starch industry which needs considerable quantities of maize. A special hybrid, named High Starch Makka, has been developed by our scientists solely for starch manufacture. Factories for the production of various forms of corn flakes have also come into existence. I also

hope that the extraction of maize oil which can find extensive applications in the manufacture of soaps, paints, dyes and glycerine would also become more popular. Fermentation of maize can give rise to chemicals like butanol and acetone which have many industrial uses, as in our fast-growing antibiotic industry. The stalks of maize have both important industrial and agricultural uses. Being a good source of cellulose, they can serve as raw material for paper manufacture. I am happy to see from your programme that you will devote one session to the industrial implications of maize research. Industry and agriculture need to develop strong symbiotic bonds, if both are to flourish. Maize workers should become aware of the needs of industry and industrialists in turn should realise that the plant breeder of today can develop speedily special varieties tailored to their needs.

Our scientists have shown that the incorporation of maize stalks in the soil can greatly improve soil structure and provide the much needed organic matter, which gets depleted fast in the tropics. We should popularise such methods of organic enrichment of the soil, since the other alternative of growing a green manure crop is a luxury, if the possibility of growing a food crop during that period exists.

Above all, recent developments in the genetic manipulation of protein quality in maize have attracted the interest of all developing Nations. The discovery made by Prof. E.T. Mertz, whom we have the privilege of having in our midst today, that a single gene may increase the content of the amino acid lysine in the kernel, has invoked much hope in the minds of scientists working in the tropics and sub-

tropics that some of the chronic problems of malnutrition prevalent in these regions can soon be solved. I am particularly interested in this aspect of study since we have diseases like Pellagra in Andhra Pradesh and Lathyrism in Central India, which are caused by amino acid imbalance in the grains of Sorghum and Lathyrus respectively. The rectification of such defects in protein quality is therefore a matter of urgency in our country. Already, a major breakthrough in enhancing the quantity and quality of the proteins of wheat varieties through the use of atomic radiations has been made at the Indian Agricultural Research Institute and Prof. Mertz's presence here would be extremely valuable in planning further research in this field.

I am extremely happy that on the occasion of this Third Inter-Asian Maize Improvement Workshop, we are also honouring Dr. Ralph W. Cummings, who has worked in India for nearly a decade as the Director of the Rockefeller Foundation's Agricultural Programme. It is a fitting tribute to Dr. Cumming's monumental contributions to the improvement of maize and other cereals that these two functions have synchronized in this way. As I mentioned earlier, it was with the active support and participation of the Rockefeller Foundation that we started the All-India Coordinated Maize Improvement Project in 1957. Dr. Cummings played a dominant role in moulding this project and the fact that the pattern of organisation of agricultural research first attempted in maize has subsequently been adopted as a model for all the major crops is a sufficient testimony to his foresight and vision. The All-India Coordinated Maize Improvement Project today has not only assumed significance in Indian Agriculture but has become the spearhead of an Asian

revolution in maize production. We are happy that the material developed in India is proving to be very valuable in increasing maize production in all our neighbouring countries and our gratitude is due to Dr. Cummings and the Rockefeller Foundation for fostering such international cooperative endeavour in agriculture.

Realising that a strong research base is an essential pre-requisite for an agricultural take-off, Dr. Cummings devoted much effort and attention to the creation of excellent facilities for research and training of students in agriculture. He served as the first Dean of the Post-Graduate School established at the Indian Agricultural Research Institute in 1958, and thanks to the guidance he gave in its early stages of development, this School is now the foremost training centre for post-graduate students in our country. The number of students from all parts of Asia who desire to join the Indian Agricultural Research Institute Post-Graduate School is rising rapidly. We welcome this interest and the opportunity it provides to strengthen the bonds of friendship and understanding with our neighbours.

The educational pattern developed at the IARI Post-Graduate School with the help of Dr. Cummings has become also the model opted for by eight other Agricultural Universities subsequently established in different parts of our country. Thus, in the field of agricultural education also, Dr. Cummings has made a most significant contribution by lending his wide knowledge and experience to develop a system of instruction most suited to our needs. I am, therefore, very happy that his intimate association with our plans for agricultural research and development

during the past decade is being perpetuated by the dedication of the Cereal Research Laboratory at this Institute to him. Cereal research in India has derived invaluable support from both Dr. Cummings and the other scientists of the Rockefeller Foundation and we today have coordinated projects in rice, wheat and millets in addition to maize, involving collaboration between Indian and American scientists. This Conference bears witness to the extension of this cooperative endeavour to all other countries in Asia and they have thus become outstanding exercises in international cooperation in the field of agricultural research. On behalf of the Government of India, I would like to pay a tribute also to the President and Members of the Rockefeller Foundation for their foresightedness and contribution to human welfare through the extensive collections of plant material they have helped to assemble throughout the world. With the spread of new varieties there is a grave danger that the fruits of thousands of years of natural and human selection might get lost to posterity. It has, therefore, been an act of great wisdom and vision on the part of the Rockefeller Foundation to have come forward in such a bold and imaginative manner to support the collection, preservation and use of all relatives of cultivated plants. I once again thank Dr. Cummings for all that he has done for us and I wish Dr. and Mrs. Cummings very many more years of very active, happy and satisfying life.

Exchange of ideas among those involved in agricultural research and development in the developing nations has unfortunately not been as intensive as between those of developed and developing nations. This situation needs to be mended since I am sure everyone will agree that developing nations have much to give to each other by way of knowledge relating to

the strategy of agricultural research and development under conditions of small holdings, poor resources and illiteracy. I am, therefore, happy that this Asian Conference on Maize at which we have also the privilege of the participation of several distinguished Scientists from the United States and Mexico is being held in India. I am confident that your combined efforts would result in many significant developments in Asian agriculture and I, therefore, very warmly welcome you and wish your deliberations success.

Printed at the Offset Press, Farm Information Unit, Directorate of Extension
Ministry of Food, Agriculture, Community Development and Cooperation, New Delhi