8 Sept. 1972
J.H. Hulse

TALK TO LANARK DEVELOPMENT GROUP - 10/9/72

To describe agricultural development in the third world in all its aspects within 10 minutes one would indeed need to be a fast talker.

I shall therefore confine myself to a very brief description of some international agricultural research programs by which agricultural prosperity in the developing world has recently been influenced. Since it is your country of interest specific reference will be made to India.

During the 1950's the Ford and Rockefeller Foundations created two international agricultural research centres. The first, in Mexico, was devoted to the improvement of wheat and maize, the second, in the Philippines, to the improvement of rice.

In countries such as Canada where arable land is comparatively plentiful, one can increase food grain production simply by increasing the acreage under the staple crops. If one acre of Saskatchewan Prairie yields 3/4 of a ton of wheat in a year, two acres will yield a ton and a half. On the Prairies, grasshoppers and army worms willing, we essentially control our production of food grains by the acreage we seed.

It has been estimated by the World Bank and FAO that in order to feed their growing population and to achieve even a modest improvement in present dietary standards the nations of the third world will need to increase their food production by at least 5% per year until and beyond the end of the century.

The cereal grains, such as wheat, rice, sorghum and maize, and the food legumes which include a wide variety of beans, provide more than 70% of the calories and protein for the majority of the poor people in the developing world. Consequently, increased food production means first an increase in these staple crops.

....2

In many of the developing countries almost all of the land suitable for crops is already under cultivation. Therefore the only way of increasing production is to increase crop yield; that is to increase the weight of grain per acre per year.

The classical approach to increasing yield is to add more fertilizer and water. However, if the farmer continues to increase the dose of fertilizer he eventually reaches the point with traditional grains at which they become top heavy and fall over and cannot be harvested.

Dr. Normal Borlaug at the Wheat and Maize Research Centre in Mexico decided that the solution to this problem was to develop wheats with short stiff straws which could support heavier heads of grain and thereby increase the output of each acre of land. Dr. Borlaug and his colleagues were successful and the outcome was the Mexipac short straw high yielding wheats which have now been planted in many parts of the world and for which Dr. Borlaug received the Nobel Peace Prize.

Yields:	Traditional	0.75 t/a
	New	4.5 t/a
	Now durum	4-5 t/a
Straw 2/3 ht. of traditional		

Scientists in the Philippines achieved a similar success and reduced the straw length of rice from an average of about 160 c.m. to 100 c.m. and enabled farmers in Southeast Asia to double their yields. More rapid maturity 100 days vs 160 days
2 - 3 Crops/year

Consequently in India, where these new high yielding varieties have been quickly accepted, wheat production has increased from roughly 10 million tons in 1966 to more than 24 million tons in the current crop year and the average yield of wheat throughout India has increased by more than 50%. In the same period rice production has increased from 30 million to 43 million tons.

And we may anticipate even higher productivity since the Indian Government plans to double the acreage under high yielding varieties between 1970 and 1974.

Acreage under High Yielding Varieties

WHEAT

1970

India 33%

1974 - 60%

RICE

	1970	1974
India	15%	30%
Pakistan	42%	
Philippines	50%	

Cereal Production (India)

65 - 67 (Ave)	70	74
67	91	109 (66% inc.)

Improved Protein

Rice 25% more

Maize + hi-lysine

After listening to the greatly over simplified account of recent agricultural research and its impact on India, perhaps some of you are saying "well what are we doing here today? Why don't we all go home and reseed and top dress our lawns, the Indians don't need any help." In reply I can only emphasize that while these important advances encourage optimism in a brighter future, the problem of world hunger is by no means solved. In the first place, to be successful, these high yielding varieties need adequate irrigation and fertilizer. Consequently the benefits of these new varieties of wheat and rice have not been enjoyed uniformly throughout the world or even throughout India. In Punjab, where per capita income is highest in India, more than 50% of the cultivated land is irrigated and the yields of all food grains considerably exceed

half a ton per person per year. In Bihar, the poorest state where less than 20% of the land is irrigated, the yield of food grains is less than 1/7 of a ton per person per year. Furthermore, the yields of wheat and rice in the Punjab more than double those in Bihar. Tube wells in India increase ca 50,000/yr - most to richer farmers: rich get richer. India still long way to go: last study by World Bank: Agric. output/farm worker: India $114, Thai $94.

A great deal remains to be done to increase the adaptability and particularly the resistance to local diseases of high yielding varieties of wheat developed in Mexico and rice developed in the Philippines when they are introduced to other countries.

Acceptability

Though they are the most important in terms of volume, wheat and rice are not the only food grains important in the Indian diet. Cereal grains generally are not perfect sources of protein but they can be brought almost to perfection by being eaten in combination with food legumes such as the beans and grams co-mon to the Indian diet. It is unfortunate that because of the high yields and therefore higher income they can derive by growing the dwarf wheat and rice varieties that many Indian farmers have begun to neglect and to reduce the production of the traditional dietary important food legumes. From the statistics available it appears that there has been a significant decline in per capita production of food legumes during the past four or five years, i.e. since HYV were introduced.

(Quality of diet for many Indians may be deteriorating)

Consequently in cooperation with other foundations my colleagues have been active in the development of a new international agricultural research centre, "The Institute for Crops Research in the Semi-Arid Tropics", known by the acronym ICRISAT which is just being established in Hyderabad in India. This international centre will try to bring about comparable improvements in the productivity of grain legumes and sorghum and millet, two very important cereal grains in the semi-arid tropics and in several important food legumes including pigeon peas and the Indian grams.

TRITICALE: Wheat and Rye: Better nutritionally than wheat - marginal lands.

For many years we in Canada have been impressed by the problems of distribution. I have already indicated that the Northwest states of India such as the Punjab produce far in excess of their needs while in other states, particularly in years when the monsoons have failed, wide spread food deficiencies have occurred. Back in 1962, at the beginning of the world Freedom from Hunger Campaign, we in Canada supported a project known as the Canada-Mysore project in which we helped the Indians to create a centre for research and training in effective methods of food preservation, protection and distribution. The United Church of Canada and many other Christian denominations contributed significantly to establishing and supporting this training centre which still continues and where several hundred Asians have already received training. In spite of this and other programs designed to improve the post-harvest protection, preservation and distribution of the cereal grains, grain legumes and other foods, very large quantities of food throughout the tropics are destroyed or seriously damaged by insect and rodent infestation and micro-biological infection.

Parpia: losses difference between sufficiency and need

Perhaps greatest problem: more uniform distribution of benefits of "Green Revolution".

In summary, I believe we can be cautiously optimistic for the future provided that the developed and richer countries of the world increase their support for research, development and training programs in agricultural and rural development throughout the third world. I hope during the discussion this afternoon to be permitted to suggest how the Christian churches in Canada can play an even more effective role in the future than in the past in this most important work.

_____//_____

JHH/wh