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DE MAIZ Y TRIGO (CIMMYT)

Mr. Borlaug: I would like to touch briefly on some of the major developments that I think have evolved from the small, modest cooperative agriculture program of the Mexican government and the Rockefeller Foundation.

It is an old program, yet most people do not know about its origin. It preceded all other foreign technical assistance programs in agriculture by at least seven years. It was established in 1943 at the request of the Mexican government.

This request came, curiously enough, through official government channels at the inauguration, or shortly thereafter, of President Manuel Avila Camacho, when Vice President Henry Wallace represented the U.S. government at these ceremonies.

After the ceremonies, he was invited to visit agricultural regions in parts of Mexico with the outgoing President Lázaro Cárdenas and with the incoming Secretary of Agriculture, the late Marte R. Gómez.

After a trip of several days looking at the agricultural problems and lack of trained people, a request was made to the U.S. Government to assist Mexico to train young Mexican scientists and to help establishing a viable, dynamic agricultural research program which would lay the ground work for increasing production of basic food crops.

When Vice President Wallace returned to the U. S. he pondered this invitation and decided to call the Rockefeller Foundation, because of their 25 years of experience working in international programs with Ministries of Public Health in 26 different countries. He proposed that The Rockefeller Foundation look into the feasibility of establishing such a program. This was done and the program that Dr. Pino has mentioned was established in 1943.

I joined that group less than a year later and I have been there ever since. In the earlier period -- the first 20 years-- I worked exclusively with the Mexican - Rockefeller Foundation Program. During the last 15 years I have worked in agricultural research and production in a much broader context in many developing nations around the world.

The impact of this first technical assistance program has

had a tremendous influence in many countries around the world, and I would like to give some background on how this came about.

Before I do so let me mention briefly the magnitude of the food problem that lies ahead. Within the next 40 to 60 years, food production worldwide will have to be doubled. That is to say that we will have to increase production in the next 40 to 60 years--depending on how you assume and calculate population growth -- as much again as was achieved from the beginning of agriculture some 12,000 years ago up to 1975. Unless this is done, Mr. Chairman, there will be social, economic and political chaos in this world, no matter how much planning is done. This is a target that must be achieved.

Now, let's look at what was achieved from this very modest beginning in agricultural research in Mexico in 1943. The Mexican Government - Rockefeller Agricultural Program preceded President Truman's Point Four Proposal described in his State of the Nation address in 1949 by some five years. The Point Four Program, which initiated foreign technical assistance to developing nations, came into being in 1950.

So the Mexican Program was a pioneer agricultural

program from which the pay-off has been very great.

The so-called Green Revolution in wheat production was spawned in Mexico by this program and was spread later to other countries in Asia, Africa and Latin America. This "revolution" affected many crops but especially wheat, because it so happened that the Mexican wheat technology could be transplanted (with some modifications) around the world, and has had a tremendous impact on total food production.

The Foundation program, in collaboration with the Government of Mexico, had a twofold purpose: to train scientists -- young Mexicans -- to improve their food production, and to establish a good network of viable agricultural experiment stations.

This was achieved by 1960, after some 800 young scientists had been trained at various levels. The responsibility of the Rockefeller staff all along the line was to work ourselves out of a job, not to see how long we could stay in a bureaucratic situation. Thus in 1960, the trained Mexican staff were transferred to the National Institute of Agricultural Research, a purely Mexican institution created that year.

In the period from 1943 to 1960, there were many requests for similar types of collaboration for assistance in agricul-

culture by many developing nations. They came to the Rockefeller Foundation, which tried to meet several of these requests, but there were not enough funds. The Ford Foundation joined us, and one model international research center was established, the International Rice Research Institute (IRRI) in the Philippines.

Shortly after IRRI was opened in 1960, and only two or three months before the final farewell to the few of the Rockefeller Foundation staff that were still in Mexico, the late President Adolfo López Mateos offered a farewell dinner. All of his Cabinet members were present and many of the young scientists who had been trained.

As he rose to speak, he said " I am confused by this departure. Just two months ago I visited Southeast Asia. Quite by chance, while I was in the Philippines I was taken to the International Rice Research Institute, a magnificent organization. I was told that this was modelled after the Mexican agricultural program -- the Rockefeller Foundation-Mexican Government agricultural program-- that we are saying goodbye tonight".

"We know how much Mexico has benefited and since the model has been developed here, then I, as President of Mexico, strongly urge that my government and the two foundations look for some way to establish an international center for maize and wheat

improvement in Mexico, so that we can help other third world nations. Thus CIMMYT was initiated within three years. In 1963 it became a paper organization. It became viable, more or less, in 1967-68. Meanqhile, we worked in many other countries and the Mexican green revolution in wheat production spread to throughout world.

I will illustrate one case to provide a better comprehension of this work -- the case of wheat production in India. We began to work in India briefly in 1963 with Indian Government research scientists and a small group from the Rockefeller Foundation.

At that time, India's total wheat production was 10.4 million metric tons compared to the 1979 harvest of 34.7 million metric tons. In other words, there has been an increase in annual production of 24 million metric tons. If you place a market value on this increase for only one year, it would represent a pay-off of about $3.5 billion. More important than dollars, India, which now is in the worst drought perhaps in the last 30 to 35 years, has sufficient wheat in storage to provide some protection against projected cereal shortfalls in 1980. Based on their own production -- I should mention that rice production in the last four or five years also has

gone up dramatically -- India has a foodstock of 22 million tons stored in their warehouses, this was produced within their own country, and will serve them very well at the present time.

Were they to have tried to find those 24 million tons in the world market today, with the Soviet Union in trouble again, imagine what would happen to food prices around the world from the standpoint of the consumer. Worse yet, what would be the plight of the Indian population?

The agriculture of India has been transformed stemming from the small seeds that were originally developed in Mexico and which the late President López Mateos insisted should be spread to help other countries.

Similar transformations have occured in Pakistan, Turkey, Tunisia and many other countries. Today CIMMYT has trainees coming from all around the world to Mexico and especially the State of Sonora which during the months of March and April, is a mecca for wheat scientists from the United States, Canada and indeed from around the world.

What, beyond this, has the Mexican Government done to contribute to the improvement of agriculture in the United States?

There have been active joint agricultural campaigns conducted by the two governments. One of the first was the eradication of hoof and mouth disease in the 1940's and the early 1950's. This was a fine example of international collaboration which was completely successful. Otherwise, the U.S. livestock industry would have suffered tremendous losses.

Then there was the Mediterranean Fruit Fly Program based in Mexico, and again, through the joint collaboration of the two governments helped to protect the citrus industry of the U.S.A.

Currently, there is the joint program to eradicate the screw worm established to help protect the livestock industry in the United States. Although the fly had been eradicated in the U.S. A., it came back every year from the wintering sites in Mexico, thus the two governments have established a model laboratory, the first of its kind, for biological control of the fly. Many million of these flies are reared artificially each week. The males are sterilized with cobalt bombs and released. The female is not permiscuous; she mates only once. When she mates with a sterile male, there are no eggs, thus effecting biological control.

Another type of assistance less well known is the facilities the Government of Mexico makes available in the State of Sonora

for the U.S. Department of Agriculture and all of the spring wheat states in the upper Midwest -- the two Dakotas, Montana, Wisconsin and Minnesota -- as well as the Canadian Department of Agriculture.

These areas send all of their experimental materials of wheat and barley to Mexico each year. They are planted on a Mexican experiment station during the winter season. This work began in 1950 and has continued. Such research accelerates the breeding of new varieties in the U.S. and Canada, cutting the time required to develop new varieties in half.

This project was created after the disastrous wheat disease epidemics which spread across the United States and Canada in the early 1950's. At that time, land was made available by farmers in Mexico and the Mexican Government permitted the free movement of seed across the border, and for the return of the seed back to the U. S. and Canada.

These cooperative acts receive little recognition, yet they have done much for mutual understanding among scientists as well as making a tremendous contribution to the protection of agriculture within the three countries of North America.

Mexico also has sonsored nurseries to permit the same

acceleration of research in cotton at the Iguala Experiment Station of the Mexican Ministry of Agriculture. This, too, has continued for 25 years or more.

We all know about the Irish who immigrated to the U.S. during the potato famine. The origin of this potato blight is in the high valleys of Mexico where we have one of our main research stations, and this was developed as a potato research center with the assistance of Dr. John Niederhauser of the Rockefeller Foundation-Mexican program. It has become a center for international testing of potatoes from around the world including American potatoes and Canadian potatoes. The new types are sent to Mexico for screening against the natural infection and this, too, has helped tremendously in the production of this crop.

Finally, you have mentioned, Mr. Chairman, the intergovernmental Mexican-American legislative committees. I think these are bringind about a better understanding and I have been pleased to see in the press yesterday that finally there seems to be better understanding between our two great Presidents.

I think the first two meetings of the two presidents were not fruitful for both countries. I feel we should recognize our common

problems and not become provincial again in looking at the broad picture of U.S.- Mexican relations.

We all need to accept that we are a part of an ever more interdependent world. We only have to look at our imports to realize this fully. As one example we have 15 different commodities that are essential to our industries of which we must import 80 to 100 percent of the total needed. I will mention a few of these commodities, to stress their importance: chromium, titanium, aluminum, florium, and mercury. Then there is another group of 12 of which we import from 40 to 80 percent of the quantity needed. These include zinc, silver, potassium, petroleum --- and the petroleum situation is getting worse and worse, as all of the witnesses have mentioned.

We live in a new world. We don't have the self -- sufficiency we enjoyed before World War II when we were reasonably self-sufficient within our borders.

The sooner the general public comes to recognize our position in the world -- that trade in essential to our well being and that we have to give and take with our important trading partners-- the better off the world will be and especially the U.S.A. and Mexico and Canada.

There is one item that I think is a very prickly and important one, and this is the unemployment in Mexico. This has resulted, as we all know, in large movements of Mexican workers into the U.S. seeking employment.

There is a shortage of farm labor in the sourthwestern U. S. and in other areas, but it has become a prickly problem because we have not worked out a reasonable solution between our two governments. This will continue to cause problems. There are many here who, I am sure, think Mexico should solve this within her own boundaries. Perhaps she should, but she cannot do it overnight. President José López Portillo is well aware of the problem and has taken every measure to try to reduce population growth by effective and humane family planning, but there is a time lag which cannot be avoided.

When I first went to Mexico, in 1944, there were 18 million inhabitants. Today there are about 67 million, and this kind of population growth is very difficult to handle. About 45 percent of the population is rural, but the unemployment problem cannot be solved in the rural areas alone. There must be industrialization, and President López Portillo has inaugurated a vast program to accomplish this. Small industries, are planned which will

be partially financed from income from petroleum. There also are public works programs. But these projects will take time to bear fruit.

Meanwhile, we should understand that their problems are also our problems, and vice versa. But there are small groups that sometimes add to the frustrations and the misunderstandings between countries when dealing with these complex problems.

For example one of the ways of expanding employment opportunities for rural people in Mexico is in the production of horticulture crops, which require considerable manual labor.

Mexico has developed a good winter vegetable area in Sonora, near the U.S. border, but always there are complaints from Florida tomato lobbyists, in particular, who want to curtail the trade although the market only represents perhaps $150 million of exports each year. This export market is one way of expanding Mexican employment opportunities, while providing U.S. consumers with lower-cost and good quality winter vegetable s.

Finally, I would like to point out that for many years the U.S. has been an exporter of fertilizer to Mexico. Within the next five to ten years, we will become large importers of chemical nitrogen fertilizer from Mexico, without doubt. We no longer have

the gas or petroleum with which to produce it cheaply and economically. We should look at this aspect too.

In general, I am very concerned about our foreign policy for all Latin America. If indeed we have a foreign policy, for the 36 years that I have been in Latin America, it has been a patch work sort of thing. When there is a serious crisis, we take interest. But all of our attention, virtually, has been focused on Europe, the Far East, and now the Middle East. We have ignored to a large extent, the many Latin American countries to our south, starting with Mexico but continuing through to Argentina and Chile. We will see more and more trouble ahead unless we become cognizant of their difficult problems.

Senator Baucus: Thank you very much, Doctor, it was a very good statement.

You are absolutely correct, in my judgment, in many of your observations. We have neglected Latin America in the United States for years and we are beginning to pay the price, I think, for that neglect.

My view, though, is that finally many Americans are going to wake up and realize that you have to pay much more sensitive, constructive attention to Latin America than we have in the

past.

Someone once said that necessity is the mother of invention. Another way to say the same thing is that it is human nature not to do anything until you have to do it. It is human nature to procrastinate, but I think we are beginning to see the error of our ways.

I was very impressed with one of your earlier statements that in the very next 40 to 60 years we are going to have to double our food production. That is, produce as much in the next 40 to 60 years as the world has produced in the last 12,000 years.

My question is, because that is a very stunning statement, what are the major impediments to that kind of an increase in food production as you see it in the world? Is it that we do not have the right varieties of commodities, the irrigation, the water? What is it?

As you sit back and look at the problem from distance and perspective, what, fundamentally, is the problem?

Mr. Borlaug: This, of course, is a complex problem and one that, in order to develop it properly, would -

Senator Baucus: We only have five minutes, so if you could answer it in one paragraph.

Mr. Borlaug: It will require, first of all, that most of the food-deficit countries in the world accelerate production. Yet many of their soils are infertile due to a mining process with traditional methods of production, which has removed nutrients returning little to the soil from the standpoint of the plant refuse or from the standpoint of chemical fertilizer.

Senator Baucus: This is worldwide, or is this in developing countries, or what?

Mr Borlaug: Virtually everywhere.

Senator Baucus: America, too?

Mr. Borlaug: Well, since World War II we have been putting back more and more. Of course, we did put animal wastes back into the soil before we got all tangled up in transport problems--

Senator Baucus: We have tired soil. What else?

Mr. Borlaug: The Chinese have been the artisans in using all organic wastes—plant, animal and human going back into the soil. But, even so, they recognized beginning in about 1960 that they had to go farther and use chemical fertilizers.

Now, today, of course, there is great outcry on the environmental front that these chemical fertilizers are doing everything that seems to be negative and they do not comprehend that, without

proper use of the right kind of chemical fertilizers as well as other chemicals that are essential to increase in production, such a weed killers --

Senator Baucus: The central problem, then, is the soil and inadequate fertilizer. Is there anything else?

Mr. Borlaug: You have to replenish, but then you have to have improved varieties to utilize that change in soil fertility. You have to conserve the moisture, whether it comes in the form of rain or as ~~it is~~ irrigation water, and use it efficiently.

Then you have the problem of control of diseases and insects and weeds. When you fertilize depleted soil, all at once the weeds which were anemic and miserable, just like the wheat plant itself--

Senator Baucus: Are brought up, too.

Mr. Borlaug: Yes, all at once the weeds become aggressive and those weeds will use that fertilizer and overtake the crop, so you have got a whole new game.

Senator Baucus: More weed killers?

Mr. Borlaug: It does not necessarily have to be chemical. It can be mechanical rotations, but this will vary from country to country.

There also have to sound economic policies established by the national governments in these countries that will permit the adoption of the new technology once it is established. That has to be done in each nation or in each geographic region for the different crops. In the case of the export of the green revolution in wheat from Mexico to India, and many other countries, a certain adaptation was necessary to modify what was learned in Mexico, and there is a lag time between developing a technology and when it can begin to reach and benefit farmers. Agricultural research is still miserably under funded. Some recent information on funding is provided in the document that I left. The total expenditures on research all kind worldwide was estimated at $150 billion in 1979. Agricultural research was $4.5 billion, about 3 percent. I might mention that expenditures on defense research was 25 percent, or in other words, $37.5 billion.

Now, of all agriculture, research expenditures worldwide, only $220 million was spent in developing countries.

Senator Baucus: What structural changes can we make?

Mr. Borlaug: There has been a significant one in the last ten years, the International Agricultural Research Institute network. There are now twelve in operation.

Senator Baucus: So it works well?

Mr. Borlaug: It is working better than any other vehicle we ever had before. It needs improvement, and it needs ---

Senator Baucus: How should we improve it?

Mr. Borlaug: --Vigilance. It needs vigilance first to that the scientists in these organizations, as in our own national organizations do not become bureaucrats and lackadaisical and drift. When you are at the cutting edge, where there is hunger and if you are the right person for the job, you will work carefully but with the full feeling of urgency about the food production challenges ahead. The danger is that these institutes will become bureaucratic and build a cocoon around themselves whereby they no longer feel the problem of food deficits.

These international institutes now receive $120 million from about 30 different governments and organizations around the world. At the present time, they are adequately funded, but inflation keeps chewing on them, too, like all the other institutions.

So the job is clear cut. What we have got to do is to continue to support international research. I mentioned that we will have to double the food production in the next 40 to 60 years. Most of that doubling will have to come from the developing nations and if

we fail, there will be uprising of many kinds, first national and then spreading like a virus to international fronts.

It is very fine to dwell on human rights but these concepts have very little meaning to the masses of the people, when you have no food in your stomack, no shirt on your back, no roof over your head, when you have no job to gain your livelihood, when your children are not in school and when you have no medical care when you are ill. It is a wonderful goal to strive for, but let us not be deceived by the difficulties of trying to achieve this. We talk empty words.

Senator Baucus: Thank you very much, Doctor. I appreciate your testimony very much. I could go on for a long time this morning, but we just do not have the time.

I want to thank you, and if you have any additional statements which you want to submit, we would like to have those as well.

I appreciate it very much, Thank you.