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Ninth Progress Report
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Participating Agency Agreement
between
The Agency for International Development
and
The Economic Research Service
for analysis of

FACTORS ASSOCIATED WITH DIFFERENCES AND CHANGES IN
AGRICULTURAL PRODUCTION IN UNDERDEVELOPED COUNTRIES

By

Foreign Development and Trade Division
Economic Research Service
United States Department of Agriculture

January 1968

A.I.D. ECONOMIC AND
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This ninth semi-annual report describes progress on the productivity project during the last half on 1967. The first progress report, dated November 1963, and the Participating Agency Agreement No. 12-17-0017-123 should be referred to for background information. The second to eighth semi-annual progress reports list accomplishments through the first half of 1967.

Country Studies

A progress report can include two quite different types of information: (1) A report of events that occurred and the steps taken in the execution of the project; and (2) reporting of preliminary findings relative to the substantive parts of the project. Both kinds of information are included in this report. However, since project results often occur in spurts, the nature of the reports for each country study varies and in some countries more attention is given to project execution and in others to presenting preliminary findings. For the two countries, Taiwan and Greece, where fieldwork has been completed and draft reports prepared, there is little to note pending the publication of these reports.

1. MEXICO

During the months of June and July, the offices (INIA) used by the country investigator, Reed Hertford, were closed by a national student strike that included this agency of the Ministry of Agriculture since it is located at Chapingo, the National School of Agriculture. His work nonetheless progressed after he had become located temporarily in the American Embassy through arrangements made by the U.S. Agricultural Attache.

In August, Hertford presented an invited paper to the annual meeting of the AFEA and the Canadian Agricultural Economics Society in Guelph, Ontario, Canada, entitled, "The Development of Mexican Agriculture: A Skeleton Specification." This paper laid some emphasis on three propositions: That the initial conditions prevailing within countries prior to "take-off" may be extremely important in explaining their differential rates of take-off; that highest growth in agriculture may be associated with rapid expansion of the use of traditional production inputs; and that rapid growth in agriculture may cause large inequities in the distribution of benefits from that growth. In each instance these propositions were highlighted by reference to the Mexican experience.

Two contracts were completed during this period. One with Mr. Juvencio Wing S. (who received strong support and collaboration from Mr. Vicente Cedillo) to develop Mexican fertilizer price and quantity indices by States for the period 1939 through 1962 and also to estimate fertilizer consumption by States in terms of value (current prices) and net weight. Using data compiled under this contract, it was noted that total fertilizer use has increased at the rate of almost 12 percent a year which, with only a slight increase in land use, amounted to an increase of over 10 percent a year in the amount used per hectare of harvested cropland. The basic factor causing this rapid increase was a decline of one-third in the relative price of fertilizer, largely the result of rising crop prices and fairly constant fertilizer prices.

The other contract was with Iowa State University under the direction of L.B. Fletcher and carried out by Bernie Sanders. This contract called for a

detailed study of the effects of Government price regulations of basic subsistence crops (corn, beans, rice and wheat) upon Mexican agricultural production and productivity from 1935 to 1962. A report based on this contract concluded that the guaranteed price program in Mexico is an agricultural policy program that can be used to meet an array of different objectives. A guaranteed price program with limited purchases could be used to reduce seasonal price fluctuations, increase production and raise farm incomes for the portion of the farm sector receiving the guaranteed price. The Mexican Government took steps to reduce its costs and the costs to the producers not receiving the support price through complementary programs such as control of wholesale and retail prices and the restriction on the quantity of the commodity entering the free market.

The regulation of prices in Mexico resulted in a change in the price structure of corn, wheat, and beans at the farm and wholesale levels. These changes were in the direction of higher prices with some regions receiving larger price increases than others. Consumption, production, and yields increased as a result of the policy with differences in the regional changes due to differences in price responsiveness.

In November, Hertford completed a draft manuscript on "The Principal Historical and Economic Issues of Mexican Agricultural Development." This paper, presently under review for publication by ERS, is a much expanded version of a paper Hertford had earlier presented in "briefings" at the U.S. Embassy in Mexico. (See Seventh Progress Report.)

In December he transferred to Washington, and terminated activities of the project in Mexico.

2. NIGERIA

As indicated in the previous progress report, the Eastern Region of Nigeria declared its independence at the end of May 1967. About the first week of July actual fighting between Federal and successionist troops broke out. It therefore was necessary for Mr. Huth to return to the United States.

A draft outline of the planned report (included as Appendix I of the 8th progress report) presents the kinds of questions and issues that were being investigated in Nigeria and the detailed data that were being obtained in field surveys. There are no data for Nigeria on the production and consumption activities of farm families as complete or detailed as those that were being collected under this project.

The actual tabulation of the field survey data was nearing completion by the Economic Development Institute in Enugu when the civil war broke out. With the subsequent fighting in Enugu, followed by its capture by Federal troops, all contacts with those responsible for tabulating the data were severed. From reports of the U.S. consul who left the Eastern Region October 17, 1967, the evacuation of Enugu was orderly and thorough, and therefore, it is hoped that the data were removed to safekeeping somewhere within the heartland of the former Eastern Region.

Pending further information regarding the field survey data, work on other aspects of the study is being continued in Washington by William P. Huth. Work is being pursued on the overall development and performance of Nigerian agriculture as well as on important institutional aspects, particularly land tenure. These parts will make a useful contribution to the literature on agricultural development, especially as regards West Africa, and will complement the analysis of farming practices within and between villages should these data become available at a later date.

3. INDIA

Much of the work on this project was devoted to data gathering and analysis. During the year, information has been collected on a large variety of physical, social, economic and institutional factors which are thought to be relevant to changes in India's agricultural production at national, state and district levels.

District production indices and area, production, and productivity growth rates have been completed for the States of Madras and Uttar Pradesh adding to those for Punjab completed in 1966. Production data have been compiled on a district basis for Bihar, Orrisa and Mysore. It has not been possible in the case of Orrisa, however, to obtain satisfactory district production data for more than 2 or 3 crops in addition to rice. It is planned, however, to use data on these few major crops in the analysis of recent patterns of change in the State of Orrisa.

Preliminary drafts of the first few chapters of the outline for the final report of the first phase of work have been completed. In addition, fairly detailed drafts have been completed on the agricultural development of Madras and Punjab States; these will be condensed for inclusion in the final report. It is expected that the first draft of the major report covering the first phase of this study will be completed not later than April 1968.

Dr. Bandhudas Sen, one of the Indian Agricultural Economists working on the project, presented a paper to the annual meetings of the Indian Agricultural Economic Society in Jabalpur, December 1967. This paper entitled, "The Role of Agriculture's Contributions in The Theory of Economic Growth in Over-Populated Countries," was later published in the Indian Journal of Agricultural Economics, Vol. XXII, No. 4, October to December 1967.

The services of both the Indian and the U.S. leader of this research have been drawn upon by their respective Governments in special studies concerned with agricultural program evaluation and planning. Results of this research have been of much value on these activities. The Economic Research Service will soon publish a report entitled, "Accelerating India's Foodgrains Production 1967-68 to 1970-71," which is a product of such service activities. The findings of this study have also found their way into GOI planning documents through contributions of the GOI leader of the research.

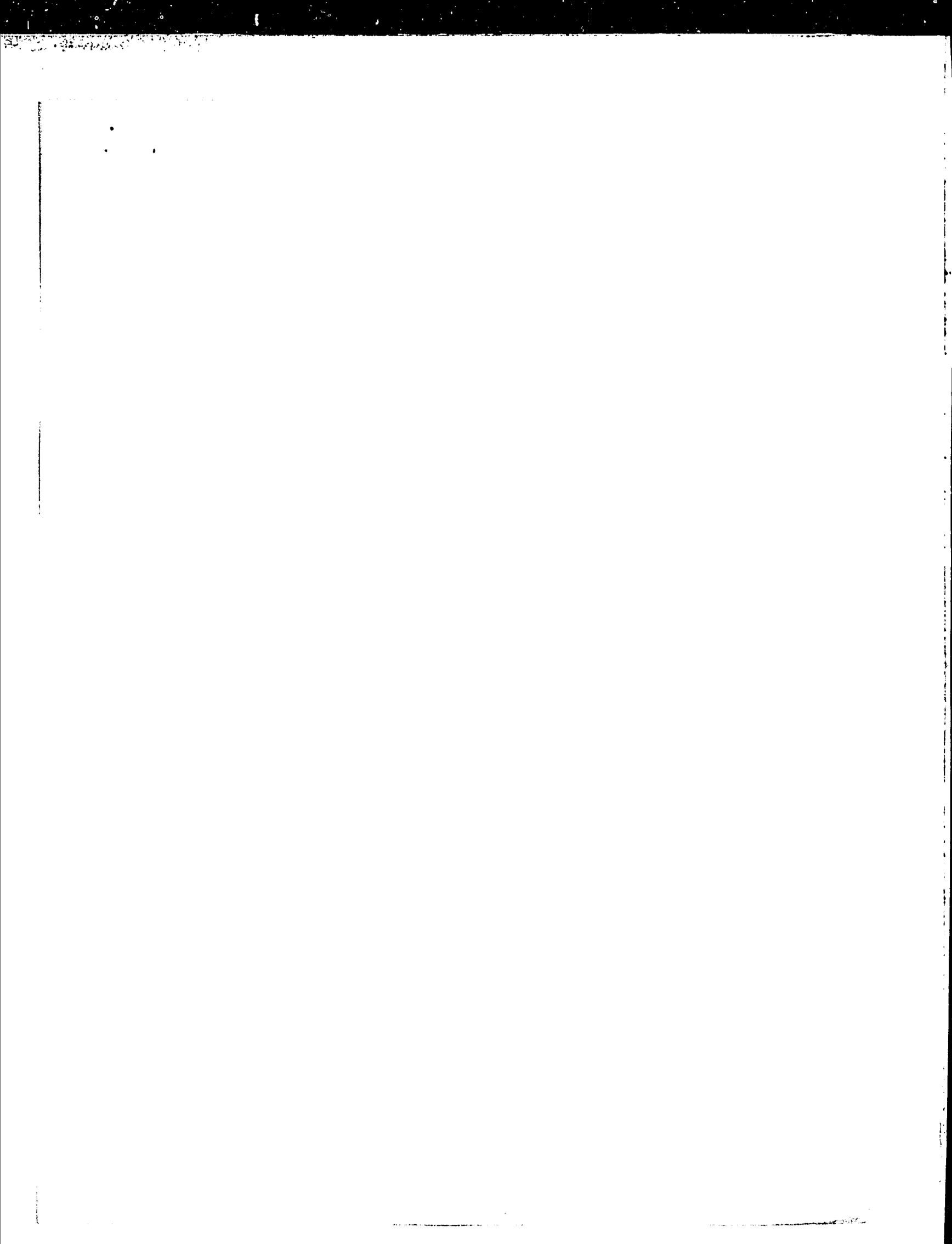
4. BRAZIL

Collecting and processing data continued to be a major activity during July through December. By the end of the period, about half of the items in a check list of nearly 300 had been assembled. Nearly all of this information was compiled by States and regions. Toward the end of the period an increasing amount of time was being given to calculations which would disclose relationships among the various factors associated with agricultural development in Brazil.

Data published in August 1967, enabled estimates to be made of the rate of capital formation in agriculture since 1950. State and regional components were erratic, so the results cannot be considered very precise. The overall rate for the country seems to have been within the range of 5 to 10 percent annual compound rate. For machinery and equipment, it was in the range of 10 to 20 percent per year.

Evidence has been developed indicating a considerable increase in labor productivity in spite of the lack of progress in crop yields. Increased use of animal power appears responsible. Use of mechanical power has increased greatly, but it is still not extensive enough to affect national average labor productivity very much. In the southern region, where the proportion of farms using animal power is largest, cropland per worker is nearly twice as high as in the northeast and north.

At this stage of the study, indications are that Brazil's prospects for agricultural growth depend strongly on investment in land development, increased



Colombian agencies have different estimates of acreage, yield, and production for each of the crops. To correct this situation, preliminary tables of agricultural production in Colombia were prepared and distributed for criticism and suggestions. The tables contained annual data from 1948 or 1950 to date. They show acreage, yield, and production of 17 major crops and the production of minor crops as well as output of livestock and livestock products. The production estimates are also shown in constant prices and aggregated to show total agricultural and food production. This single set of consistent estimates was selected from a comparison of all the available estimates. Although revisions are being made, the preliminary data are being widely used in agricultural planning and programming by Planeacion, the Ministry of Agriculture, and AID/Colombia.

Sample Census data for 1965 are being tabulated by the Central Statistical Agency (DANE) for comparison with the 1959 Census of Agriculture estimates. The new estimates of the number of farms and acreage by size of farm made possible a comparison of the change in the number of farms and in acreage by size of farms for this 6-year period. Preliminary comparisons indicate that the principal increase in crop acreage has occurred on farms larger than 50 hectares.

A contract was made with the Agricultural Experiment Station (ICA) for an analysis of the productivity gap between experimental plots, field trials, and actual yields obtained by farmers for seven crops: corn, rice, wheat, barley, beans, potatoes, and sugar cane. Preliminary results suggest a fairly wide productivity gap as indicated by the following yield estimates. These figures are included only to suggest the likely magnitude of the gap and should not be quoted.

(not to be quoted)

<u>Crops</u>	<u>Experimental Yields</u>	<u>Farm Yields</u>	
		<u>Traditional</u>	<u>Commercial</u>
		<u>Kilos per hectare</u>	
Corn	5000-7200	500-1200	-----
Rice, irrigated	4100-6200	1200-1500 (dryland)	2600-3100
Wheat	4500-6600	800	1400-2000
Barley	5900	1500	2500-3000
Beans	1400-1500	450	1100
		<u>Tons per hectare</u>	
Potatoes	25-65	7	15
Sugar cane	150-215	42	100

The Central Planning Agency (Planeacion) has increased its staff in agricultural planning. They are making direct use of preliminary results of the productivity study and taking a more active role in the study. An economist has been assigned by them to assemble information on historical estimates of agricultural inputs. They have said that they wish to undertake the analysis of cattle ranches which has been included in the outline of the productivity study.

As AID/Colombia has expanded its analysis of Colombian agricultural problems, the economists in the mission are making direct use of preliminary results of the productivity study, and developing analyses based upon the statistics that have been developed to date by this project.