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RESEARCH NOTES ON AGRICULTURAL
CAPITAL FORMATION AND TECHNOLOGICAL CHANGE

The Ohio State University and
ESALQ/Universidade de Sao Paulo

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Date: November 26, 1971
Location: Piracicaba, Sao Paulo, Brazil

No. 12
Subject: Small Farmer Credit in Brazil

Tentative title of study: "Agricultural Credit Use on Low-Income Farms in a Depressed Rural Community of Sao Paulo, Brazil"*

Tentative completion date: June, 1972

This note reports on preliminary findings of a continuing research project. The data and conclusions are tentative and formal reference to them should be cleared with the author.

I - Objective

The objective of this study is to analyze the recent access of low-income farmers to institutional credit programs in Brazil. To achieve this objective I will: (1) analyze the production systems of these farms to see if they could efficiently use more credit, and (2) see if the subsidized credit has improved the relative income position of low-income farmers. The purpose of this note is to present some preliminary findings based on recently completed field work, and to briefly outline the structure of the study.

II - The Study Area and Data Base

This study is based on 150 farm interviews conducted in July 1971. The farms are located in two adjacent municipios** in the southern part of the State of Sao Paulo: Itapetininga and Guarei. These municipios are rural, the

* The study is being carried out in Brazil at the Escola Superior de Agricultura "Luiz de Queiroz" (ESALQ) under a USAID contract to study capital formation in agriculture. The author is a doctoral candidate at Ohio State University.

** A municipio is roughly equivalent to a United States county.

farms are small, and the economy depressed. The marketing center is the city of Itapetininga: population about 42,000. The city of Sao Paulo is about 100 miles to the east.

The sample was designed (1) to obtain a cross-section of small traditional farmers, and (2) to reinterview farms which were interviewed in a previous study in 1965.[1/] The previous study, by Paulo Araujo, focused on credit and provides a benchmark for the present research. Araujo found that farmers who had loans in force used land and capital more efficiently, had higher net income per worker, and adopted new technology earlier. He used a linear model to identify factors affecting the demand for agricultural credit. He showed that demand for credit was directly related to present debt load, volume of new investments, level of education of the farm operator; and inversely related to volume of internal funds, debt as a proportion of total investments, and cost of borrowed funds. Unexpectedly he found size of business and level of technology to be unrelated to credit demand. About 40 percent of Araujo's sample was re-interviewed to see how size and technology have changed since 1965. This time-series data should help to explain the relationship between credit use, growth, and technological change.[2/]

One-third of the farms interviewed in this study were also covered by Araujo. The other farms were randomly selected from the property roles of INCRA.[3/] (See Table 1.) This is a list of voluntary land declarations

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1/ Araujo, Paulo F. C. de, "An Economic Study of Factors Affecting the Demand for Agricultural Credit at the Farm Level," M.S. Thesis, Ohio State University, 1967. Summarized in "Demanda de Credito Rural em Itapetininga-Guarei, Est. de Sao Paulo," Univ. de Sao Paulo, ESALQ, Depto. de Ciencias Sociais Aplicadas, Serie Pesquisa No. 12, 1970.

2/ Also see Dale Adams, W. Simpson, and J. Tommy, "Capital Formation on Small to Medium Sized Farms in Southern Brazil, 1965-69," Research Notes 5 and 8, Ohio State University and ESALQ/University of Sao Paulo, April and June, 1971.

3/ National Institute for Colonization and Agrarian Reform.

collected in 1966 by the Brazilian Institute for Agrarian Reform. It is now maintained and updated by INCRA, and is used for some land reform and tax collections. This sample was stratified to include a large proportion of low-income farmers.

Table 1. DISTRIBUTION OF SAMPLE FARMS BY SIZE.

Class (hectares)*	Class average (hectares)	Distribution	
		Number	Percent
0-10	6.9	32	21.3
11-20	15.9	38	25.3
21-50	33.3	40	26.7
51-100	98.0	17	11.3
101-200	147.0	13	8.7
over 200	586.0	10	6.7
Total	76.1	150	100.0

The distribution shows that almost half of the farms being studied are 0-20 hectares in size. These farmers are mostly low-income and traditional. Their principal cash crops are beans and corn. The farms over 50 hectares tend to be more specialized in corn, and have milk cows. Most of the sampled farms consumed a large part of their production. (See Table 2.)

* One hectare = 2.47 acres.

Table 2. AVERAGE PROPORTION OF FARM PRODUCTION CONSUMED PER HOUSEHOLD.

Type of Production	Percent consumed** in the household
Beans	30
Corn	10
Eggs	80
Milk	65
Chickens	70
Swine	40

There appears to be an opportunity for more specialization in tomatoes and potatoes. Japanese farmers are producing these crops successfully, but few of the Brazilian farmers participate.

III - Agricultural Credit

Credit at concessional interest rates has been a major agricultural policy instrument in Brazil since 1960. Agricultural credit has grown from 16 percent of total bank credit in 1956 to about 30 percent in 1968. The present program is administered under the Rural Credit Legislation of 1965. Its main features are:

-- All banks must invest 10 percent of their deposits in rural credit,

-- The central bank re-discounts agricultural loans,

-- Interest rates for agricultural loans may not exceed 75 percent of the commercial rate[3/]

** Preliminary estimates of proportion consumed per household.

3/ Castro, Jose K. L. de, Legislacao de Credito Rural, Editora de Informacao Bancaria Ltda., August, 1970.

This law forces the participation of all banks at below-market interest rates. One of the objectives of the program is to strengthen the economic position of small and medium sized farms while encouraging the investment in modern technology. In 1970 the interest rates were 7 percent for fertilizer and improved seeds; about 13 percent for mechanized equipment. In Brazil where inflation is around 20 percent, the real interest rates are thus negative. In our sample 41 percent of the farmers had at least one loan in 1970-71; three-fourths of these were with banks. The other loans were with informal lenders whose interest rates ranged from 24 to 40 percent.

IV - Some Preliminary Findings

Resource Mis-allocation

Family labor, land, work animals, and non-mechanized machinery appear to be intensively utilized on low-income farms in this sample. This is facilitated by land rental agreements between adjacent farms and the exchange of labor during planting and harvesting. We observed a tendency among small farmers to increase their cultivated land when they had many teenage children in the house and decrease it as their family size declined. We also observed that extensive diversification is a method of more fully utilizing family labor: the children care for chickens and animals, the wife milks the cows.

We observed interesting behavior in the use of fertilizer. Low-income farmers are aware of the benefits of fertilization but appear reluctant to buy it.[4/] To illustrate, the following is a list of reasons why fertilizer wasn't used during 1970-71:

4/ This is in contrast to the findings of Nelson who suggests that commercial farmers are over-spending on fertilizer. Nelson, W.C., "An Economic Analysis of Fertilizer Utilization in Brazil", Ph.D. Dissertation, Ohio State University, 1971 (Preliminary draft).

-- "I didn't use fertilizer on the poorest land",

-- "I didn't use fertilizer this year because last year this land was planted to potatoes" (Note: potatoes and tomatoes are highly fertilized),

-- "I was afraid to use fertilizer but this year I tried and had success".

This research will examine the use of fertilizer and other inputs. First, I will try to describe the input price structure facing low-income versus more commerical buyers. Second, I will attempt to determine how production response is affected by lack of information on how to use the input (the question of what the formula means, soil analysis, timing, etc.)

Isolation

Low-income farmers in the study region tend to be isolated from markets, technical information, and banks. Seventy-seven percent of the farmers sold their production on the farm and 30 percent didn't obtain price information in advance of sale. We found that public media (newspapers, radio and television) reach about 20 percent of our farmers.

Extension service personnel told us that they do not have sufficient staff to contact many small farmers. While 40 percent of the farmers surveyed said that they had contacted an agent this year, it was usually to buy improved seeds. Most farmers interviewed used hybrid corn but few other modern practicies (only 13 percent had ever analyzed their soil).

Approximately 50 percent of the farmers knew a bank agent, yet only 28 percent had bank loans in 1971. Low-income farmers' access to bank loans may be limited for three reasons. First, banks prefer larger loans, reducing per cruzeiro administration costs. Second, large farmers actively seek out the bankers. Low-income farmers do not go to town as often, need more assistance in making applications and are not aware of the various credit programs available. Third, low-income farmers have difficulty guaranteeing loans. Thirty-five percent of our sample did not have a clear land title

which limits their access to bank credit.

These observations raise the following questions:

(1) Are product prices received by low-income farmers competitive in the sense that they reflect the central market prices minus transportation charges?

(2) Does lack of information constrain a low-income farmer's ability to optimize his production process?

(3) Are there "artificial" barriers which restrict a low-income farmer's ability to obtain bank credit?

Planned Underuse of Capital Resources*

We observed that low-income farmers seem to prefer not to use modern techniques even though they are aware of them. This may be due to an expected low pay-off. However, several writers have suggested that other factors are important. Hesser suggests that farmers plan to hold capital in reserve for emergency.5/ Barry and Baker suggest that farmers do not use all the credit they could conceivably obtain: "debt aversion is a form of risk aversion."6/ Wharton argues that the closer a farmer is to subsistence, the less risk and uncertainty he can tolerate.7/ These writers suggest that a farmer may be wary to use a new process, especially if savings or credit must be activated. They also may be reluctant to change because of habit or desire for leisure time.

* This is referred to as "internal capital rationing" in the literature. See 5/ and 6/ below.

5/ Hesser, L.F., "Conceptual Models of Capital Rationing Among Farmers", Journal of Farm Economics, 1960, pp. 325-334.

6/ Barry, P.J. and C.B. Baker, "Reservation Prices on Credit Use: A Measure of Response to Uncertainty," American Journal of Agricultural Economics, (53:7) May 1971, pp. 221-227.

7/ Wharton, Jr., C.R., "Chapter 2, Subsistence Agriculture: Concepts and Scope," Subsistence Agriculture and Economic Development, edited by C. R. Wharton, Jr., Chicago, Aldine, 1969, pp. 12-20.

We plan to determine if "planned underuse of capital" inhibits adoption of new technology on low-income farms. If found to be important we will address the following questions:

(1) To what extent are low-income farmers restrained by their life-style from altering their production behavior?

(2) How can agricultural agencies make new practices more attractive by reducing the risk and uncertainty surrounding their adoption?

In summary, low-income farmers appear to underutilize modern inputs. This may be due to lack of knowledge, economic barriers, or a personal preference by the farmer himself. This personal preference may be a result of one or more factors: risk aversion, desire for leisure time or dislike of increased management responsibilities.

V - Program for Research

There is little data available to study financial problems of low-income farmers. Economic research conducted in Brazil has generally excluded the smallest farms from consideration. This research program hopes to rectify the data deficiency.

Questions for Further Study

(1) Agricultural credit policy in Brazil has appeared to exclude the small producer. Does this imply a demand problem - is the farmer unable to profitably use more credit? or is there a supply problem - the banks don't serve the small farmer?

(2) Credit demand may be low because (a) small farmers do not have economically profitable opportunities to exploit; (b) they have opportunities (theoretically) but do not have the necessary information to exploit them; or (c) for various reasons they do not want to exploit known opportunities.

(3) Supply of credit to small farmers may be limited because (a) there isn't enough to go around (everyone is suffering from shortages), or (b) large farmers dominate the banks agricultural credit portfolio and leave very little for distribution to small operators.

(4) Technological change generally requires large amounts of credit. Has a lack of credit been an inhibiting factor on small farms? If so, will greater access to institutional credit serve their needs? Or do they require unique services that cannot be furnished by existing institutions?