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PROYECTO COOPERATIVO DE INVESTIGACION SOBRE TECNOLOGIA AGROPECUARIA EN AMERICA LATINA "PROTAAL"

TECHNICAL CHANGE IN THE SMALL FARM SECTOR

RESULTS FROM STAGE I AND A RESEARCH PROPOSAL SUBMITTED TO THE MINISTRY FOR DEVELOPMENT COOPERATION, GOVERNMENT OF HOLLAND FOR STAGES II AND III

INTER-AMERICAN INSTITUTE OF AGRICULTURAL SCIENCES

OFFICE OF THE ASSOCIATE DEPUTY DIRECTOR GENERAL FOR RURAL DEVELOPMENT

San Jose, Costa Rica, October, 1980

BACKGROUND INFORMATION ON THE PROTAAL PROJECT

The Cooperative Research Project on Agricultural Technology in Latin America (PROTAAL) aims to develop a series of research efforts dealing with the nature of the agricultural technological change process in the region. This work is being carried out with the cooperation of the Inter-American Institute of Agricultural Sciences (IICA), which acts as the executive agency, the Ford Foundation, the United Nations Development Programme (UNDP), and the International Development Research Centre (IDRC) of Canada.

The Project views the process of generation and transfer of technology as a pehnomenon endogenous to the society in which it develops. Through an integrated analysis of the process ,research efforts aim to provide information that will improve the understanding of the technological problem and, consequently, the definition of policies, organizational models and actions that will contribute to technological progress and the development of the agricultural sector.

Project activities began on January 1, 1977 and organizationally, they developed for the most part with the participation of research teams in a number of countries on the continent.

Within the same general framework, the PROTAAL Project has also conducted a special research project entitled "National Agricultural Research Systems in Latin America: A comparative analysis of human resources in selected countries", which received funding from the Rockefeller Foundation and IICA.

Finally, in May 1980, a second phase of the Project (PROTAAL II B: "Technical Change in the Small Farm Sector") began with special funding from the Government of Holland. It aims to intensify the analysis of the technological process in the campesino farm sector. Case studies for this new phase are expected to take place in Brazil, Peru, Ecuador, Colombia and Costa Rica, and provide information that will facilitate better management of the technological variable in rural development programs and projects.

In order to disseminate the research findings, and to generally improve the exchange of information, the Project publishes the following three types of papers and monographs:

a. Papers on methodologies and on empirical research findings resulting from central Project activities.

b. Papers dealing with activities related to the Project.

c. Papers written by Project staff, and eventually by other authors involved in Project activities, which prove useful to the development of the Project.

Inasmuch as the papers are not usually published in final form, critical comments are welcome.

PROYECTO COOPERATIVO DE INVESTIGACION SOBRE TECNOLOGIA AGROPECUARIA EN AMERICA LATINA (PROTAAL)

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PROYECTO COOPERATIVO DE INVESTIGACION SOBRE TECNOLOGIA AGROPECUARIA EN AMERICA LATINA (PROTAAL)

COOPERATIVE RESEARCH PROJECT ON AGRICULTURAL TECHNOLOGY IN AMERICA LATINA (PROTAAL)

TECHNICAL CHANGE IN THE SMALL FARM SECTOR

RESULTS FROM STAGE I AND A RESEARCH PROPOSAL SUBMITTED BY THE MINISTRY FOR DEVELOPMENT COOPERATION, GOVERNMENT OF HOLLAND FOR STAGES II AND III

SUDIRECCION GENERAL ADJUNTA DE DESARROLLO RURAL
OFFICE OF THE ASSOCIATE DEPUTY DIRECTOR GENERAL FOR RURAL DEVELOPMENT

San José, Costa Rica, October 15, 1980

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TECHNICAL CHANGE IN THE SMALL FARM SECTOR

A Research Proposal for the Development of the Second and Third Stages of the Project 1/ 2/

I. INTRODUCTION TO AND SUMMARY OF THE RESEARCH PROPOSAL

The following pages present a detailed research proposal that comprises the second and third stages of the original proposal presented to the Ministry of Cooperation of the Dutch Government under the title: "Technical Change in the Small Farm Sector". Included are the results of the work developed during a preliminary first stage that took place between May and November, 1980. This first stage was primarily directed to the development of a detailed methodological proposal and the selection of case study sites, subjects that make up the larger parts of this proposal.

The main thrust of the project is addressed to the development of an adequate analytical framework and the generation of empirical data useful for the understanding and interpretation of the role, potential and consequences of technical change (modernization) in the development of the small farm sector, particularly those of peasant economies.

The main conceptual and methodological proposition that guides the overall project stresses the fact that there are many different types of small farms, each one developing from a different historical perspective and presenting different production conditions. This implies that useful and possible solutions to the problems related to technical change in the small farm sector may be considerably different. Consequently, they must be analyzed within a broader perspective in order to understand the basic causal relationships and the most appropriate and feasible solutions to each case. Following this basic idea, the focus of the methodological proposition rests in the construction of a typology to facilitate a systematic selection of case studies. This will enable theoretical generalizations to be developed on the basis of empirical data collected and analyzed in the case studies.

The proposed typology is based on a number of variables that describe the historical origin and basic structural characteristics of small farm

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1/ The specific target group to which the project is directed is an intersection of the populations usually denominated small farmers in the American agricultural economics literature and campesinos in the Latin American literature. A precise definition and characterization of both terms and of the target population is presented in Section IV B. Both terms will be used more or less interchangeably in this paper.

2/ Prepared by: Martín Piñeiro, Eduardo Trigo, James Chapman, Enrique Martínez and Jorge Caro.

sector to the rest of the economic process, including government policy. On the basis of this typology, seven case studies in five countries were selected representing important production situations potentially useful for the understanding of the process of technical change. The cases and countries are: a) campesino farmers producing corn, beans and coffee in the central valleys of Costa Rica; b) production of corn and beans in the Rionegro region in Colombia; c) two cases in Ecuador: potato production in Carchi and in Riobamba; d) two situations of campesino farmers with strong community relations in Cuzco, Peru; and e) bean production in the Sao Paulo region in Brazil. The first of the Ecuadorian cases represents individual campesino farms undergoing a process of capital accumulation, while the second case represents a situation with community relationships and process of impoverishment. In the Peruvian cases, main production is for home consumption in one site, while a second site produces mainly barley for beer production. The Brazilian case represents a situation of small farm production integrated vertically with the industrial sector.

In addition to these seven case studies, the project will integrate a study on the small farm sector of Uruguay and probably a similar study in Paraguay. These studies, financed by other sources, will function as associate studies maintaining a larger degree of independence from a methodological view but sharing results and experience.

The main products expected from the overall project are:

a) A set of methodological papers setting the general analytical framework and methodology to be used as general guidelines for the selection and development of case studies.

b) Research results from individual case studies. These studies will include detailed descriptions of small farm structure and technological behavior.

c) A comparative analysis of case studies emphasizing possible general conclusions with respect to the role and potential effects of technical change under small farm production conditions.

d) Summary recommendations with respect to technology development and institutional organization for the generation and diffusion of technology and needed complementary economic policy.

The remainder of this proposal consists of six sections and three appendices. Section II presents a general description of the problem and its importance, and some general guidelines regarding the analytical perspective that guides the project and leads to general working hypotheses. Sections III and IV present research objectives and methodology respectively. The section on methodology includes a description of the small farm typology used, the process followed for case study selection, a methodological proposal for the development of case studies and tentative methodological ideas for the development of the comparative analysis of case studies.

Sections V through VII delineate expected results and their use, project organization and calendar of activities, and a bibliography. The first appendix includes proposals for each of the selected case studies and a short research proposal for the associated case in Uruguay. The second appendix includes two papers: one prepared by Dr. Miguel Murmis, and a second one by Dr. Alain de Janvry and Dr. Luis Crouch, under consulting arrangments. Finally, the third appendix contains a description of the first working meeting held in Chorlaví, Ecuador from July 28 to August 1, 1980.

A. A Note on the Nature of the Research Project

The research proposed herein attempts to develop a general understanding of the technological process in the small farm sector. It is important to stress that the project does not attempt to make specific recommendations regarding the definition and design of appropriate technological components for the small farm sector, with the partial exception of the insights that may be gained on this subject in relation to the specific sites to be studied. An objective of this nature would require a larger number of case studies and a very careful definition of ecological and agronomic conditions that are fundamental variables for the definition of site-specific technological packages.

The basic line of thought here is that the socioeconomic context is defined by a relatively small number of characteristics common to most relevant situations in Latin America. These conditions define a general behavioral model in regards to technology within which ecological agronomic characteristics can be expressed. In this sense, the expected results from the project will be especially useful in the definition and characterization of the principal variables that define the socioeconomic environment and the causal relationship between them and technical change.

The analysis and interpretation to be developed during the project will indicate the relative priority of these variables, their relation to wider social processes that define global capital accumulation and the way they must be analyzed in order to correctly define the potential and expected effects of technical change in specific small farm production situations. The correct understanding of the general model is a pre-requisite to the definition of ecological and agronomic constraints which, being site-specific, influence the technological opportunity set of each individual farmer.

II. TECHNOLOGICAL CHANGE AND PEASANTS IN LATIN AMERICA: THE PROBLEM SETTING 1/

A. Introduction

Technological change in agriculture has been considered as either the salvation or the doom of peasants. Schultz, for example, argues that peasants are poor but efficient, and that production and welfare increases in traditional agriculture consequently require technological changes as a prerequisite (Schultz, 1964). The gradualistic technological modernization of peasant production systems as the key to economic development has subsequently been argued by a host of writers including Mosher, Wortman and Cummings, Lele, Coombs and Ahmed, Stevens, Norman, Harwood and Wertz, among many others. In absolute constrast to this position, technology has been denounced as aggravating the plight of peasants by analysts of the social consequences of the Green Revolution such as Griffin, Byres, Feder, Scobie and Posada, and Whittenbarger and Havens. One of the objectives of this project is to analyze this issue systematically and in greater depth. We take as a departing postulate the observation that technology (its rate and bias) is a social product and that the economic and social impact of technology and, in particular, its impact on peasants, is also fundamentally determined by the institutions of particular societies. Hence, whether peasants, and which peasants, are helped or hurt by technological change is not technologically determined but a social choice. And it is because the nature and impact of technological change are social choices that it is important to clarify what types and under what conditions those choices are made.

B. Importance of the Campesino Farm Sector in Latin America

It is a recognized fact in Latin America there is a large, important rural peasant population. If we consider farms with 5 to 50 hectares as family farms, we see that they constitute an important percentage of the total number of agricultural producers in the majority of the Latin American countries (Table N° 1). On the other hand, there seems to be a fairly widespread opinion in the literature dealing with agrarian change in Latin American that the peasantry is, in some sense, disappearing via an increasing polarization of rural inhabitants into proletarian or semi-proletarian and capitalist categories. The data which demonstrate this, however, are not readily available for most countries. Furthermore, an analysis of the census data regarding size and number of farms provides inconclusive results.

It is important to note that the family farm sector, especially in those countries where more than 30 percent of the total number of farms are family farms, controls relatively little land. This fact is related to the topic of rural poverty, which will be examined later.

1/ This section draws heavily on de Janvry and Crouch (Appendix 2) and Fiorentino Piñeiro and Trigo.

TABLE N° 1

PERCENTAGE OF NUMBER OF FARMS AND AREA OCCUPIED BY FARMS OF 5 - 50 HECTARES IN RELATION TO THE TOTAL NUMBER OF FARMS LATIN AMERICA

COUNTRY	YEAR	% OF NUMBER OF FARMS	AREA IN FARMS %
MEXICO	1970	25.9	3.4
REP. DOMINICANA	1970	24.6	30.1
HAITI	1971 (a)	3.6	19.7
JAMAICA	1969	8.2	20.3
COSTA RICA	1973	37.1	18.4
EL SALVADOR	1971	11.6	30.9
GUATEMALA	1964	23.0	25.9
HONDURAS	1966	46.8	34.3
NICARAGUA	1963	42.8	13.2
PANAMA	1971	45.2	32.7
VENEZUELA	1961	40.4	6.5
CHILE	1964	36.5	5.2
COLOMBIA	1970	32.1	18.6
ECUADOR	1968	21.7	28.4
PERU	1961	14.8	6.7
BRAZIL	1970	46.9	14.2
ARGENTINA	1960 (a)	24.4	0.9
PARAGUAY	1961	48.4	n.d.
URUGUAY	1970	48.2	4.0

(a) Only farms of 5 - 20 ha.

SOURCE: Liboreiro, E.: La problemática del pequeño agricultor...table 3, p.96

Table N° 2 presents changes in the size and number of farms and total farmed area in 17 American countries. The data show that there is a trend toward more farms of smaller average size. When this phenomenon is contrasted with that in the United States, where capitalist concentration of farms holdings (namely, a dramatic decrease in the number of farms and an increase in their average size) has already taken place to a great extent, one may suspect that there has not been a process of capitalist development in Latin America.

At the same time, while in the United States the decrease in the number of farms and the increase in average size from census to census is predictably monotonous, in almost no Latin American country is there a readily discernible trend in average size of farms (Table N° 3). Moreover, in Latin America not only is there no real trend but, in some countries, there is an increase in average farm size and then a decrease, while in others there is first a decrease and then an increase 1/.

This confusing evidence in regards to farm numbers is corroborated by figures related to the absolute number of peasant farms 2/. These seem to have increased in some countries and decreased in others, without any apparent logic (see Table N° 4). Generally, wherever the number of peasant farms increased, so did the area of the peasant farms as a proportion of the total farmed area. The average size of peasant farms, however, appears to change without relation to the other categories. In countries where there is an apparent "peasantization" in terms of number of peasant farms, such as in Brazil, there was nevertheless a decline in the average peasant farm size although only a small decline. In countries where there has been, in terms of numbers, an apparent "depeasantization", such as in Venezuela, on the other hand, the average peasant farm size is remarkably stable. Thus, no broad generalizations are possible about the fate of the small farms, with the possible exception of Mexico, which is the only country where the depeasantization process closely mirrors that of the United States.

The preceding paragraphs attempt to ilustrate the numerical importance of the small farm sector in Latin America, and from there characterize the two main problems associated with peasant production: the food supply and rural poverty.

The food supply problems arises from the fact that in a number of countries, food produced on peasant farms represents a sizeable proportion of total production and, at the same time, has shown a relatively slow rate of increase.

1/ It is more than likely that these strange, capricious alterations in the direction of powerful social trends are more apparent than real and that they are due to changing concepts and definitions in the censuses, as well as to varying quality of census-taking.

2/ Incorrectly defined as those with less than 5 ha.

TABLE N° 2

Changes in Total Number of Farms, Area Covered By All Farms, and Average Size, 1940-1971

Country	Period	Number of farms (base period = 100)	Area of farm (base period = 100)	Average farm area (base period = 100)
Mexico (private)	1940-1970	82	86	92
Dominican Republic	1950-1970	92	117	127
Costa Rica	1950-1973	94	172	184
El Salvador	1950-1971	156	97	63
Guatemala	1950-1964	120	93	78
Honduras	1956-1966	114	96	84
Nicaragua	1952-1971	204	209	104
Panama	1950-1971	106	174	164
Venezuela	1937-1961	144	111	a/
Chile	1936-1965	125	111	88
Colombia	1954-1971	128	112	87
Ecuador	1954-1968	184	116	63
Peru	1961-1971	162	119	73
Brazil	1940-1950	259	149	57
Argentina	1952-1969	101	103	102
Uruguay	1951-1970	91	97	108
United States	1950-1969	44	86	197

a/ Not available.

Source: U. S. Economic Research Service, "Agriculture in the Americas: Statistical Data," 1976 (mimeographed).

TABLE N°3

Number of Farms and Average Size

Country and years	Number of farms thousands	Average size hectares
United States		
1950	5,388	117.4
1959	3,708	157.3
1969	2,390	230.7
Mexico		
1950	1,366	78.1
1960	1,346	86.1
1970	994	75.7
Costa Rica		
1950	82	22.0
1963	64	41.3
1973	79	40.5
Chile		
1936	202	136.8
1955	151	183.6
1965	253	120.9
Colombia		
1954	919	30.2
1960	1,209	22.6
1971	1,176	26.3
Brazil		
1950	2,064	112.5
1960	3,337	74.9
1970	4,932	59.4
Argentina		
1952	546	366.2
1960	457	383.1
1969	549	374.1

Source: U. S. Economic Research Service, "Agriculture in the Americas: Statistical Data," 1976 (mimeographed).

TABLE N° 4

AVERAGE NUMBER, SIZE AND PERCENTAGE OF TOTAL NUMBER OF FARMS AND TOTAL FARM AREA OF PEASANT FARMS IN SELECTED AMERICAN COUNTRIES

Country and year	Peasant Farms					
	Farms Considered "peasant farms"	Number	Percent of total farms	Percent of total farm area	Average Size	Percentage difference in Average size
	hectares	thousands	Percent		hectares	percent
Mexico (private)						
1950	<10	1.366	73.6	1.3	2.1	-19
1970	<10	522	52.4	1.3	1.7	
Costa Rica						
1950	< 5.6	12	27.9	1.1	1.7	0
1973	<5	35	45.5	1.8	1.7	
El Salvador						
1950	<10	141	81.0	17.1	1.1	9
1970	<10	237	86.9	19.6	1.2	
Guatemala						
1950	< 7	266	76.2	9.0	1.3	0
1964	<7	313	75.1	11.6	1.3	
Honduras						
1950	<4	89	57.0	8.1	2.3	9
1966	<4	120	67.4	12.4	2.5	
Venzuela						
1950	1-5	112	50.7	1.2	2.4	0
1970	1-5	70	31.6	2.9	2.4	
Colombia						
1950	< 5	919	54.9	3.3	1.8	-9
1970	< 5	1.176	59.5	3.7	1.6	
Brazil						
1950	< 5	459	22.2	0.5	2.5	-12
1970	<5	1.801	36.6	1.3	2.2	
Chile						
1955	<10	56	37.1	0.3	1.4	21
1965	<10	123	48.6	0.7	1.7	
United States						
1950	<4	484	9.0	0.2	2.0	-30
1969	<4	162	5.9	0.05	1.4	

continued on the next page

TABLE N° 4 -- Continued

Sources:

U. S. Economic Research Service, "Agriculture in the Americas Statistical Data", 1976 (mimeographed)

For Mexico, see Secretaría de Industria y Comercio, Dirección General de Estadística, IV Censo Agrícola Ganadero y Ejidal, México, 1965; also, idem. V. Censo Agrícola Ganadero y Ejidal, Mexico, 1975

For Costa Rica, see Dirección General de Estadística y Censos, Censo Agropecuario de 1950, San José, 1953; also, idem. Censos Nacionales de 1973, Agropecuario, San José, 1974.

For El Salvador, see Dirección General de Estadística y Censos, Segundo Censo Agropecuario 1961, San Salvador, 1967; also, idem. Tercer Censo Nacional Agropecuario, 1971, Vol. 11, San Salvador, 1975

For Guatemala, see Dirección General de Estadística, Censo Agropecuario, 1950, Tomo I. Guatemala, 1954; also, Idem. Censo Agropecuario, 1964, Tomo II and Tomo III, Guatemala, 1971.

For Honduras, see Dirección General de Estadística y Censos, Primer Censo Agropecuario, 1952, San Salvador, 1954; also, idem. Segundo Censo Nacional Agropecuario, 1965-1966.

For Venezuela, see Ministerio de Fomento, Dirección General de Estadística y Censos Nacionales, Censo Nacional de 1950, II. Censo Agropecuario, Vol. 1, Venezuela; also, idem. III Censo Agropecuario, 1961, Resumen General de la República, Parte B, and IV. Censo Agropecuario, 1971, Total Nacional, Venezuela

For Colombia, see Departamento Administrativo Nacional de Estadística, Directorio de Explotaciones Agropecuarias (Censo Agropecuario), 1960. Resumen Nacional (Segunda Parte).

For Brazil, see Fundasao Instituto Brasileiro de Geografía e Estadística. Censo Agropecuario do Brazil. Serie Nacional, Volume III, 1970

For Chile, see Dirección de Estadística y Censos, III. Censo Nacional Agrícola Ganadero, 1955, Tomo VI, Santiago, 1966. also, idem. IV. Censo Nacional Agropecuario, Ana Agrícola, 1964-1965, Resumen del País, Santiago, 1966.

For the United States, see U. S. Department of Commerce. Statistical Abstract of the United States, 1957 and 1972.

In order to illustrate this point, it is necessary to establish that there is a division of crops between peasant producers and capitalist producers: Some crops are almost exclusively produced by one group of producers and others, while not exclusively produced by capitalists or by peasants, are dominated by one or the other. Some crops, of course, are produced by either one (Table N° 5). In Costa Rica, for example, it is clear that large plantations dominate the production of bananas and large farms dominate the production of rice, while large farms barely touch manioc or beans. In Colombia, large farms dominate rice and sugar production (although the latter data are distorted by the inclusion of panela), while peasants specialize in manioc, beans, and corn. Similar patterns can be seen for other countries. Using the only rigorous data we have on this social division of labor (that is those data based directly on social relationships) where peasant farms are those using largely family labor, we can see that, in the Dominican Republic, rice and tomatoes are capitalist crops, while corn, sweet potatoes and manioc are more peasant-dominated (Table N° 6).

In dynamic terms, we see that those crops which are capitalist-dominated seem to be increasingly so through time. In Table N° 5 for example, in Venezuela, where rice is capitalist-produced, the participation of capitalists over time has increased, whereas it has decreased (although apparently only slightly) for the peasant-produced crops. Somewhat similar tendencies can be observed in Costa Rica and in Guatemala.

An observation of growth records for the different crops shows that, in general, higher growth rates are obtained where production is capitalist-dominated and increasingly concentrated (Table N° 7). For example, in Colombia rice is the most large farm-dominated crop and it also has the highest growth record. In the Dominican Republic, it is rice, surgarcane and tomatoes that have high growth rates and are the most capitalist-dominated crops. Conversely, corn, beans, and manioc, the most peasant-dominated crops, have the lowest growth rates.

The conclusion, then, is that the production growth rate of peasant-produced crops is lower than that for capitalist-produced crops and consequently their relative importance as a percentage of total production is decreasing. To take an example, if we assume that in a country such as Costa Rica the capitalist sector (e.g. rice, sugarcane, some coffe, bananas, meat) grows at an annual rate of about 5%, and the peasant sector grows at about 1% (these figures look reasonable for the Dominican Republic also), and that in 1950 each sector accounted for half of the total output, by approximately the year 2000 the peasant sector will be producing only 10% of the total output. This gives some idea of the rate of disappearance of the peasantry as a commodity-producing segment of society.

The second problem related to peasant agriculture is the poverty and welfare situation which has emerged from it. The result of the slow disappearance of the peasantry as producers of agricultural commodities is its reappearance as producers of only one commodity: labor power. Largely because this disappearance is taking place at a time when the worldwide development of the forces of production creates an impressive array of laborsaving technologies that are more profitable than is labor-intensive

Share of large farms in total production and mean area harvested per farm, 1950-1971.

	Rice	Corn	Beans	Manioc	Coffee	Sugar	Cotton	Bananas	Wheat
Costa Rica									
Share farms > 70 hectares, 1950 (percent)	51	40	37	46	58	48[a]		85	
Share farms > 100 hectares, 1970 (percent)	67	21	13	10	26	57[a]		95	
Mean area, 1950 (hectares)	5.9	5.9	4.8	2.0	6.6	3.6			
Mean area, 1970 (hectares)	4.3	1.7	1.4	0.7	2.6	4.1			
El Salvador									
Share farms > 100 hectares, 1961 (percent)	17	27	12	b	46[a]	46	69		
Share farms > 100 hectares, 1971 (percent)	28	21	16		40[a]	33	73		
Mean area, 1961 (hectares)	0.5	1.7	0.7		3.8	26.8	1.4		
Mean area, 1971 (hectares)	0.7	1.7	0.6		3.6	21.4	2.1		
Dominican Republic									
Mean area, 1950 (hectares)	1.1	0.5		0.3					
Mean area, 1970 (hectares)	2.7	0.8		0.6					
Honduras									
Mean area, 1952 (hectares)	0.7	1.6	0.8		1.7			9.1	
Mean area, 1965 (hectares)	0.7	2.2	1.2		3.1			1.8	
Panama									
Mean area, 1950 (hectares)	0.9	0.8	0.4	0.3		0.7			
Mean area, 1960 (hectares	1.3	1.1	0.5	0.1		0.8			
Guatemala									
Share farms > 90 hectares, 1950 (percent)	20	18	13		94	75[a]			
Share farms > 90 hectares, 1964 (percent)	30	15	13		87	75[a]			
Mean area, 1950 (hectares)	0.7	2.1	1.2			2.8			
Mean area, 1964 (hectares)	1.2	0.9	1.3			2.2			
Venezuela									
Share farms > 100 hectares, 1950 (percent)	50	22			46[a]	46	69		
Share farms > 100 hectares, 1960 (percent)	55	19	13	14					
Share farms > 100 hectares, 1970 (percent)	70	37	12	11	50[a]	53	73		
Mean area, 1950 (hectares)	2.5	2.3	1.2	1.1	5.4	1.4	26.8		
Mean area, 1970 (hectares)	15.3	4.2	1.7	1.0	5.0	2.1	21.4		
Colombia									
Share farms > 100 hectares, 1959 (percent)	53	21	18	15	9	32		8	10
Mexico									
Share private farms > 5 hectares, 1960 (percent)	35	43	47		62	49	65		65
Share private farms > 5 hectares, 1970 (percent)	29	30	33		27		53		67
Share ejido sector, 1960 (percent)	63	47	49		27	48	35		33
Share ejido sector, 1960 (percent)	70	64	64		72		47		32

(Continued on next page.)

TABLE N° 5 Continued

[a] Share of total area instead of total production.

[b] Blanks indicate data not available.

Sources:

For Costa Rica: Dirección General de Estadística y Censos, Censo Agropecuario de 1950, San José, 1953.

Idem, Censor Nacionales de 1973, Agropecuario, San José, 1974.

For Dominican Republic: Direccion General de Estadistica, Oficina Nacional del Censo, IV. Censo National Agropecuario, 1950.

Secretariado Tecinco de la Presidencia, Oficina Nacional de Estadisitica, VI. Censo National Agropecuario, 1971, Vol I.

For El Salvador: Dirección General de Estadística y Censos, Segundo Censo Agropecuario 1961, San Salvador, 1967.

Idem, Tercer Censo Nacional Agropecuario, 1971, Vol II, San Salvador, 1975.

For Honduras: Dirección General de Estadística y Censos, Primer Censo Agropecuario, 1952, San Salvador, 1954.

Idem, Segundo Censo Nacional Agropecuario 1965-1966.

For Mexico: Secretaría de Industria y Comercio, Dirección General de Estadística, IV. Censo Aquicola-Ganadero y Ejidal, Mexico, 1965.

Idem, V. Censos Agricola-Ganadero y Ejidal, 1970, Mexico, 1975.

For Panama: Dirección General de Estadistica y Censo, Censos Nacionales de 1950, Primer Censo Agropecuario, Vol I, Panama, 1957.

Idem, Censos Nacionales de 1960, Segundo Censo Agropecuario, Vol I, Panamá, 1963.

For Colombia: Departamento Administrativo Nacional de Estadística, Directario de Explotaciones Agropecuarias (Censo Agropecuario), 1960, Resumen Nacional (Segunda Parte .

For Venezuela: Ministerio de Fomento, Dirección General de Estadística y Censos Nacionales, Censo Nacional de 1950, II. Censo Agropecuario, Vol I.

Idem, III. Censo Agropecuario 1961. Resumen General de la República, Parte B.

Idem, IV. Censo Agropecuario 1971, Total Nacional.

TABLE N° 6

Indices of Capitalist Development, By Crop

Crop	Proportion of production from capitalist farms a/	Proportion of hired labor in total labor
	percent	
Corn	.30	.44
Manioc	.17	.25
Beans	.26	.50
Tobacco	.37	.47
Sweet potato	.28	.30
Tomato	.33	.85
Rice	.67	.80
Cocoa	.24	.63
Coffee	.42	.59
Sugar	b/	

a/ Farms using more than 70 percent hired labor of total labor force.

b/ Blanks indicate data not available but close to 100 percent.

Source: U. S. Agency for International Development/Secretariat of Agriculture of the Dominican Republic, Sample Survey of Dominican Agriculture, 1975.

TABLE N°7

RATES OF GROWTH OF PRODUCTION, 1948-1952 TO 1968-1972 (percent)

	Wheat	Rice	Corn	Beans	Manioc	Sugar-cane	Coffee	Bananas	Cotton	Bovine meat
Costa Rica	a	4.8	-2.1	3.8	2.2[b]	4.8	6.4	3.4		7.1
Dominican Republic		5.4	0.3	1.3	1.1	3.6	2.2	1.4		3.3
El Salvador		3.8	2.3	0.3	7.6[b]	4.6	3.1	- 2.8	20.9[b]	2.6
Guatemala	2.3	4.0	2.3	3.9	4.0[b]	8.3	4.1	1.5	19.6[b]	0.3
Haiti		5.4	0.9	4.6	1.2	-0.8	-0.7	- 1.1	- 3.4[b]	
Honduras	0	-4.6	2.5	4.4		4.4	5.4	2.6		4.6
Mexico	6.9	4.2	4.2	6.6		6.2	5.6	5.0	3.0	5.8
Nicaragua		5.4	3.5	3.3	6.4[b]	5.6	3.2	10.9	12.4[b]	4.7
Panama		2.6	0.5	-3.0	-3.0	6.9	3.0	5.3		5.2
Colombia	-2.7	6.1	1.0	0.5	2.5	2.3	2.5	4.0	14.8[b]	
Venezuela	-7.7	8.2	4.2	-1.9	3.6	8.2	1.7	- 8.5	6.5[b]	

[a]Blanks indicate no production in either period or no data available.

[b]Very small production in base period. These rates were, therefore, not counted in the rankings in the text. Method of estimation:

$$r = \exp \left[\left(\ln \frac{\text{Prod } 1968\text{-}1972}{\text{Prod } 1948\text{-}1952} \right) : 20 \right] - 1.$$

Sources: 1948-1965: For all crops, Food and Agriculture Organization of the United Nations, Production Yearbook, 1971.

1968-1972: For wheat, corn, rice, and cattle, idem, Production Yearbook, 1972.
For sugarcane, idem, Production Yearbook, 1971, and Production Yearbook, 1973.
For beans and manioc, idem, Production Yearbook, 1971.
For coffee, cotton, and bananas, idem, Production Yearbook, 1972, and Production Yearbook, 1973.

technology at any reasonable factor/price ratio at the disposal of agrarian capital, the labor power made available by the disappearance of the peasantry is not fully needed by the process of expansion of capital. The rural wage thus tends to settle not far above a low minimum, beyond which fierce wage competition cannot drive it. Those who hold permanent or semi-permanent jobs thus begin to form a relative elite of workers who, although poor, are not desperately so. The large masses of the poor are thus to be seen among the peasants who no longer are efficient commodity producers who have not been absorbed into the capitalist sector or who provide only occasional, temporary labor.

The manifestations of this process are well known. According to World Bank data, some 42 percent of the rural inhabitants of Latin America had a per capita income of $75 or less (World Bank, 1975). Judging from Table N° 8 where we see that the mean per capita income for the lowest 40% of the population appears to be about $100 in 1963 dollars, the World Bank figure seems adequate. In addition, there is some evidence that the situation may be worsening or may have worsened in the past two decades (Griffin, 1977). In El Salvador, for example, real income of the poorest three quarters of the rural population may have declined by as much as 25 percent between 1961 and 1975 (Samaniego, 1978). In Guatemala and El Salvador also, the real income of the rural poor seems to have decreased (Griffin, 1976). In Peru, according to Webb, there has been no improvement in the level of material welfare of the poorest (Webb, 1977). Furthermore, where absolute poverty is so noticeable, the distribution of income in the countryside is notoriously unequal (Economic Commission for Latin America, 1970).

While income itself remains a somewhat abstract category, the commodities it can purchase are not. Thus, it is by examining levels of nutrition, mortality, education, and so forth that the consequences of poverty become clearest. For example, while in the United States the rate of nutrition-related deaths of children under five years of age in 1968 to 1972 was only about 300 per 100,000 population, in most of Latin America it was well over 1,000 (Table N° 9). This rate seems to be much higher in rural areas.

The struggle of the marginalized peasant for a living has two other important consequences: ecological change and population growth. In the first case the competitive edge of capitalist agriculture has displaced the peasantry on the more marginal, and hence more vulnerable, lands. Furthermore, since scientific development has responded largely to the needs of commercial agriculture, there is an inadequate stock of know-how on dealing with marginal lands. The population explosion can also be seen as a result of the struggle of the semiproletarianized, marginalized peasant to deal with the conditions of his existence. By increasing the size of his family, the peasant hopes to increase the number of labormarket participants or helpers on the family's land. Thus, while high population growth may be irrational from a social point of view, it responds to an individual rationality. The consequences of poverty, therefore, become social problems that tend to exacerbate the causes of poverty within the context of capitalist accumulation.

TABLE N° 8

LATIN AMERICA: AVERAGE INCOME OF THE LOWER 40% OF THE POPULATION IN METROPOLITAN, URBAN AND RURAL AREAS
1970 (US$ 1963)

Regional Area	Country	Metropolitan Area	Urban Area	Rural Area
I				
Argentina (R)	- -	542	- -	- -
Uruguay (R)	- -	453	- -	- -
Panama (SR)	673	871	448	- -
Costa Rica (H)	782	1.228	1.104	649
II				
Chile (H)	610	- -	790	440
Mexico (H)	645	- -	1.046	461
Venezuela (H)	- -	1.479	1.056	- -
III				
Brasil (R)	165	- -	240	101
Colombia (R)	318	- -	486	211
Honduras (R)	126	597	373	101
Peru (EAP)	- -	255	- -	- -

Key: R= Recipients
SR= Salaried Recipients
H= Households
EAP= Economically Active Population

Sources: CEPAL, Division of Social Development, prepared based on a household survey, 1977

TABLE N° 9

NUMBER AND RATES OF NUTRITIONALLY RELATED DEATHS[1/] IN CHILDREN UNDER 5 YEARS OF AGE IN SELECTED AMERICAN COUNTRIES 1968-1972

Country and area	Total Deaths		Nutritionally related deaths		
	Number	Rate 2/	Number	Rate 2/	Percent of total deaths
Argentina					
Chaco Province					
Resistencia	864	2.070	537	1.286	62
Rural departments	837	2.387	429	1.224	51
San Juan Province					
San Juan (city)	326	1.292	174	689	53
Suburban departments	780	2.195	451	1.269	58
Rural departments	1.050	2.404	576	1.319	55
Bolivia					
La Paz	4.115	2.660	1.958	1.266	48
Viacha	161	4.806	66	1.970	41
Brazil					
Recife	3.635	2.934	2.413	1.947	66
Riberão Prêto					
Riberão Prêto (city)	464	1.088	324	760	70
Franca	434	1.943	278	1.244	64
Communities	228	1.301	152	867	67
São Paulo	4.312	1.769	2.537	1.041	59
Canada					
Sherbrooke	371	407	179	197	48
Chile					
Santiago	2.489	1.299	1.381	721	55
Comunas	225	1.396	120	744	53
Colombia					
Cali	1.627	1.608	914	903	56
Cartagena	1.255	1.459	815	948	65
Medellín	1.348	1.445	835	895	62
El Salvador					
San Salvador	2.738	2.636	1.487	1.432	54
Rural municipios	1.082	5.049	593	2.767	55
Jamaica					
Kingston & St. Andrew	1,903	1.038	1.125	614	59
Mexico					
Monterrey	3.953	1.814	2.153	988	54
United States					
San Francisco	234	544	125	290	53
California, suburban	664	413	372	232	56
Total	35.095	1.672	19.994	953	57

1/ Includes deaths in which nutritional deficiency and inmaturity were identified as underlying or associated causes.

2/ Rates per 100.000 population.

Source: Puffer, Ruth Rice and Carlos V. Serrano, Patterns of Mortality in Childhood, PAHO, 1973.

C. Alternative Interpretations of the Small Farm Problem and their Implicit Policy Recommendations in Historical Perspective

The major features of the small farm problem were identified years ago and have received considerable attention from social scientists (particularly sociologists, agricultural economists and anthropoligists) and policy makers. Empirical evidence provided by research on social problems related to the agricultural sector which took place after the end of Second World War, gave birth to successive lines of interpretative efforts which provided the necessary intellectual backing for alternative programs and public action.

Four main interpretative lines of thought may be mentioned which have had considerable influence both in academics and government thinking. They will be termed for short the educational, the land reform, the technological and the rural development approaches to rural poverty. The first of them in a historical sense, the educational approach, was based on sociological work especially in the Asian continent and in Latin America, by Rogers and others, that emphasized "cultural backwardness" as the main determinant of inadequate behavior for adoption of technical innovations and overall production and income growth. Traditionalism, lack of education, cultural biases, were to be solved through education and the incorporation by peasants of "adequate values" so that technical adoption could become possible.

Partial failure of this strategy and the increasing of the unequal distribution of land and its socio-political implications generated towards the 1960's a widely influential school of thought which emphasized land tenure aspects as basic "structural" limitations to agricultural development. Policy recommendations were based on improvement of the pattern of land distribution through land reform which was the predominant theme during the early part of the 1960's. The series of works developed by CIDA (1963-1968) were relevant to this development, as was the work by the Land Tenure Center of the University of Wisconsin and that by Latin American "structuralists", Ferrer (1962) and Chonchol (1966) among others.

Almost simultaneously with the Land Reform theme, the work of Schultz (1956,1964), followed by the main stream of academics in agricultural economics, provided the intelectual stimulus for the development of a school of thought that emphasized technical change as the basis for agricultural development. The basic well-known argument of this school of thought is that small farmers are interested and culturally prepared to adopt adequate technology and increase production. The adoption process is slow because price policy, capital markets or available technology reduce profitability of technical change for the small farm sector. There is consequently a need to develop appropriate price and credit policies and to accomplish sound research efforts to provide framers with "high pay off" inputs to stimulate adoption. This line of thought, which has been considerably influential, gave way to the very large effort in the development of native research capabilities during the 1960's and more recently to the creation of the International Research Centers.

The large body of empirical economic research developed recently has shown that this research-oriented strategy has had quite unequal effects on different groups. Green Revolution technology was largely incorporated by large and medium-size farms, whereas small farmers were frequently unable to take advantage of new inputs and production techniques. Since, in many cases, small farmers comprised the dominant stratum, massive effects of research efforts were often lacking (Cleaver, 1962; Fiorentino, 1977; Dalrymple, 1976).

The rural development approach was born in the 70's partly as a consequence of these results and, undoubtedly, it dominates present thinking on the subject. This approach is based on the recognition of the fact that small farmers face a whole set of restrictions that inhibit and condition their possible response to modernization efforts. Besides the more obvious aspects, related to the explicit recognition of the need for roads information, markets, capital inputs, and an adequate capital supply from external sources, this approach incorporates more sophisticated interpretative arguments.

It is important to note that all proposed solutions incorporate technology as a central strategic variable. Nevertheless, the technology transfer process has been found to be more complex than was originally thought. The problem has been particularly serious for small farmers who have shown, in many cases, resistence to the efforts of programs of generation and transfer of technology.

The panorama is complex, given that there exist regions where small farmers have rapidly adopted new technologies developed by the private and public sectors. In others areas, programs have failed. Leaving aside the cases where technological transfer policies were incorrectly formulated or applied, simple explanations of what happened and why are not apparent.

The general perspective of this project is to suggest that an explanation of the observed technological failures must be interpreted within the general framework of recent and tentative hypotheses regarding stagnation of the peasant economy, which have not been incorporated to current "accepted knowledge". These propositions make use of the idea that the small farm sector is, in general, politically dominated or passive, and as a consequence, the determinants of technical backwardness or output stagnation should be sought in the areas of interrelation between peasant and outside sectors (Stavenhagen, 1969; Gunder Frank, 1970; de Janvry, 1975). Since the small farm sector is partially dominated by other sectors of the economy, small farm growth results from particular forms of social and economic "linkages" with the dominant sectors. There is stagnation whenever the dominant social forces either take advantage of backwardness or they are indifferent towards small farm development. This sector, in turn is unable to internally generate growth forces. Conversely, there is growth-oriented technical change wherever there exist social and economic linkages between small farms and the leading social sectors by which these sectors take advantage of small farm growth. 1/

1/ See Fiorentino, Piñeiro and Trigo for a discussion of the subject.

Starting from this general framework, the main proposition to be put forth here is that there are many different types of small farms, each developing from different historical settings which define different relationships with the overall economy. Consequently, the small farm problem must be analyzed within a broader perspective that allows for an adequate characterization of different peasant production situations. An adequate description of types would tentatively permit the understanding of the process of adoption of technology in greater detail. The social context in which the peasant economy is placed will be an important factor to consider in the attempt to understand the processes of technological change. The type of product produced (wage good, non-wage good), the form of articulation with the market (concentrated or not concentrated), the complex of social relations of production inherent to the sector according to the type of peasant (individual farmer or communal farmer), etc., all directly influence the process of accumulation and economic reproduction. At the same time, these factors influence the processes of technological change.

It is evident that in the areas occupied by independent small farmers, specializing in products that permit a large profit margin, differentiation processes will occur with capitalization and adoption of technology. The type of market articulation can be of importance here. For example, in Costa Rica coffee and bananas are produced as much by large as by small producers. Nevertheless, market relations are different in each case. With coffee, no direct integration exists with the marketing organizations. On the other hand, with bananas, small producers are obligated by contract to sell all their production to the Banana Company, which at the same time, supplies all necessary inputs (except labor) for the production and determines product quality. In the case of banana producers, we find the large enterprise fixing not only prices, but also regulating the entire productive process. But this, more than a case of technological adoption, is a case of subordination of the small producer to the large enterprise with all the risks that this implies as the small producer lacks control over sources of input as well as direct access to product markets.

The existence or not of communal relations can be a barrier to the introduction of technology, depending upon the type of relationships and the type of producer. For example, in those regions, where there exists a strong communal system, the set of obligations can impede the process of accumulation (e.g. fiestas, mutual help, etc.) previous to or concurrent with the processes of technological adoption. In the same manner, the existence of strong relationships between members of the community can prevent the adoption of technology that would imply a reduction in the number of workers required.

This set of economic and social relationships that are defined in the same context in which peasant production develops, determines the different types of peasant production units and, indirectly, their technological behaviour. On this basis, these relationships are systematized in the construction of a typology of peasant economies to be used as a general frame for the selection of case studies.

III. OBJECTIVES

The main objectives of the second and third stages of the project are:

1. To organize and develop a number of case studies selected on the basis of their relevance in terms of the typology developed during the first stage, and oriented to the analysis of the role, potential and effects of technological change on the small farm sector.

2. To develop a comparative analysis of the case studies with the following objectives:

   a) To contribute to the development of a conceptual framework useful to analyze technical change on small farms and their development in dependent market economies.

   b) To identify the basic conditions that must be present in order that technical change (modernization) can become a relevant development strategy for the small farm sector.

   c) To evaluate and measure the effects of the modernization process in the structure and behavior of the small farm economy.

3. To elaborate, on the basis of the comparative study, general suggestions regarding:

   a) The organization of the institutional system for the generation and diffusion of agricultural technology to the small farm sector.

   b) The definition and instrumentation of complementary economic policies that will increase the potential benefits of technical change to the small farm sector.

The project has been organized in three stages. The first stage with a duration of six months, has already been completed, with the preparation of this detailed project proposal. The second stage with an estimated duration of 15 months, will be dedicated to the development of individual case studies. The third stage with an estimated duration of 8 months will be dedicated to a comparative analysis of case studies, directed to draw useful generalizations regarding the nature of technical change in the small farm sector and to make recommendations regarding the institutional organization of the research effort (objectives two and three) 1/.

It is expected that the proposed research project will effectively contribute to the development of the participating countries' research capacities.

The project is based on the development of case studies in five countries. In the case of Brazil, the national research team, belongs to

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1/ Greater detail regarding the project stages is given in the Calendar of Activities in Section VII.

the University of Campinas. This group has done extensive research in the subject and it is expected that the project will aid in building up their basic research team and information base. In the rest of the cases, national teams will work from IICA's Offices, maintaining close ties with participating national institutions which will benefit from the research experience and empirical information collected. In Peru, this collaboration is with the University of La Molina (the national coordinator is member of its staff); in Colombia, with the Instituto Colombiano Agropecuario (ICA), and in Ecuador, with the Instituto Nacional de Investigaciones Agropecuarias (INIAP) and the Centro de Estudios sobre la Planificación y el Estado (CEPLAES). In Costa Rica, institutional collaboration is being developed with the Centro Agronómico Tropical de Investigación y Enseñanza (CATIE).

IV. THE GENERAL RESEARCH STRATEGY

A. Introduction

1. The socioeconomic context and the typology.

The main objective of the project is the analysis and interpretation of the process of technical change in the campesino farm sector in Latin America. The conceptual framework presented here emphasizes the importance of socioeconomic characteristics internal to different types of campesino farms and other variables of a regional and global nature that define the socioeconomic context within which productive processes take place. One of the basic assumptions of the conceptual model is that these external variables can be characterized and summarized in a limited number of analytical categories which are common to and prevalent in most campesino situations in Latin America. Moreover, the project postulates that these categories, in addition to internal variables, define a number of different types of campesino farmer situations that will present different technological behavioral patterns.

On the basis of these principles, the research strategy is based on two main items. The first is the construction of a typology of campesino farmer situations. This typology is constructed on the basis of the variables that, it is hypothesized, explain campesino farm technological behavior. The second item refers to the development of a limited number of case studies. These case studies are defined as Socioeconomic Spaces Predominantly Occupied by Campesino Farmers (ESEPPs) 1/ with certain and defined relationships with the rest of the economy. In this way, each case study attempts to represent one of the campesino farm production situations identified in the typology.

1/ ESEPP means, in Spanish, "Espacio Socioeconómico Predominantemente Ocupado por Pequeños Productores" which is a translation of the preceding title.

These case studies include a number of different countries that possess not only different types of ESEPPs, but also different types of public policies towards the campesino sector in relation to technological transfer.

B. A Tentative Typology of Campesino Economies 1/

1. Introduction

One of the basic ideas behind the project is the need to understand the technological process in the context of different types of campesino farmers. For this purpose, it is necessary to develop a typology based on the identification of the structural characteristics of the campesino farm economy and its functional relationship to the overall economic process. The fundamental purpose of the typology is to guide the selection of case studies and make them sufficiently representative. It will then be possible to generalize and theorize on the basis of the empirical findings.

There are several ways of producing a typology. One is to classify the units of analysis -in this case, campesino farmers- as a function of the main variable to be analyzed. For this project, the procedure would entail designing a typology in accordance with the particular characteristics of the technologial process. This type of approach, although it clearly distinguishes various types of production units as a function of the variables to be stressed, provides little hard data for generalizing on the causal relationships between the structural elements and the technological behavior of the units under study, which is a major objective of the proposed analysis.

The selected operational variables described in the following sections are not the only possibilities. Nor are they the only alternatives appropriate for a general typology of campesino farmers. They have been selected in order to develop a typology useful for the specific purposes of this research project.

2. An operational definition of campesino farmers

In order to construct a typology of campesino economies, it is necessary first to define their characteristics and differentiate them from the more widespread and less precise concept of the small-scale farmer.

The concept of the small-scale farmer has received less theoretical analysis than that of the campesino. However, a study of campesinos that is framed in a vague context or circumscribed by the parameters of the small-scale farmer category has the advantage of emphasizing, from the very

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1/ This section has been based on the work of the consultants Alain de Janvry, Luis Grouch and Miguel Murmis. Copies of their papers are included as Appendix 2. It also draws on discussion held during the first Working Meeting of the Project, held in Chorlavi, Ecuador from July 28 to August 1, 1980. Jaime Crispi's comments were particularly relevant for the adopted typology.

start, that the campesino unit forms part of a broad set of production units differing from the more typical capitalistic units of the overall economy. In this sense, it is important to emphasize that campesino units are not only part of a broad whole, but also that they tend to be involved in a process of change by which they are either being converted into other similar types of productive units, or resisting such conversion. Accordingly, the small-scale farmer category includes, in addition to campesino units as such, those that are in the midst of a transformation from campesino structures to others that, while they have no definitional or historical link with the campesino strata, are in many ways different from typical capitalist units.

From this standpoint, it is difficult to establish the upper limit of the small-scale farmer category, since there is no precise manner of determining what a small unit actually is. In many cases, the term is used in the interest of characterizing all enterprises that are not "large". A first criterion involves the concept adopted by certain agrarian reform programs that exclude any unit large enough to permit the owner to live off of the income derived from renting his land. 1/ 2/.

By relating the definition of campesinos to the wider framework of small-scale production, it is posible to avoid limiting it to common images of poverty and see it as part of a broader whole within which transformations are possible. Nevertheless, the standard definition of the small-scale farmer not only reaches far beyond the scope of the campesino sector, but also transcends all those units that maintain only token campesino traits. As a result, it is necessary for this study to establish more precise upper and lower limits for the campesino farm unit, which is the target of this project.

The basic reference point to be used herein for defining the campesino farm will therefore be the production unit based fundamentally on a combination of land and family labor. This is the prototypical campesino farm unit. The family has direct access to the land, and the essential resources for the production process are this land and the family's labor. At the same time the family labor force is utilized mainly on the production unit (this does not exclude the possibility of including a certain amount of off-farm activities).

In accordance with this definition, the upper limit of the category campesino farm, as used in this paper, is the point at which paid labor enters the picture and/or major capital accumulation begins to occur. 3/

1/ For instance, Peruvian and Mexican law use this terminology.

2/ There appears to be no need for establishing a lower limit to the small-scale farmer category.

3/ In one possible definition of this limit, the cut-off point occurs when over 50% of the farm income is generated by capital or paid labor.

On the other hand, in this study the lower limit of the campesino farmer category is when all members of the family sell a substantial part of their working capacity. This definition has been selected because, in view of the purposes of this project, it seems less crucial to include those production units whose available land is so limited that the members must look beyond the farming unit in order to survive. Technological change cannot be considered an important influential variable for such units, with the possible exception of labor intensive technology which would increase general agricultural employment opportunities. Therefore, these production units do not fit into our basic definition and consequently will not fall under this analysis.

3. The concept of a Socio-Economic Space Occupied Predominantly by Campesino Farmers (ESEPP)

Although the unit of analysis we wish to stress is the campesino farm, it should be re-emphasized that these campesino units are in a permanent process either of being converted into other categories of small-scale farming, or of resisting such a conversion. In other words, they are "escaping" from the space enclosed between the upper and lower limits of the strict definition of the campesino farmer adopted in this project.

This permanent process of ebb and flow implies that the areas to be selected for the study will include campesino units, in the strict sense used here, as well as a number of other types of units which could become numerically significant, depending on the degree of transformation or disappearance of campesino patterns taking place in the area as a whole. Accordingly, it seems operationally important to define the areas of interest for case study development, as a function of the significance of the number of campesino farmers who fit the chosen definition. Nevertheless, it should be emphasized that once the areas of study have been selected, the field work will cover all the different types of production units present in the area, as well as the interrelationships between them.

The selection of a socio-economic space to serve as the focus for the development of case studies also takes into consideration the mechanisms by which the campesino units are linked to the rest of the economy. Thus, the typology of campesino production situations will be defined not only in terms of internal characteristics of the family economic unit, but also through the factors that connect the unit to the overall accumulation process, and the function they serve in this process. These are the variables used for defining and describing each ESEPP in particular. The following section describes and analyzes the variables used for constructing a typology.

4. Variables selected

a. The historical origin (genesis) of Campesino Farmers.

Campesino farmers have origins which vary considerably. It would be reasonable to propose, as a working hypothesis, that the historical development of each campesino unit and its access to productive resources will have conditioned its technological

behavior. In view of this, it is interesting to consider the following five alternative situations:

1) Campesino units in consolidated (old) settlements, with no possibilities of territorial expansion, surplus manual labor and usually possessing a set of defined and specific cultural norms.

a) Settlements predominating with small parcel owners, where the family units is the basic unit of economic organization.

b) Settlements with presence of communal-style holdings with symmetrical relationships between the production units, primarily in terms of the exchange of manual labor.

2) Recently developed campesino units

a) Primarily of small parcels

i. Spontaneous settlements, mainly in frontier areas, with possibilities of territorial expansion and a shortage of manual labor.

ii. Settlements promoted by public or private settlement programs.

b) Primarily communal or associative, promoted by government programs.

3) Parcel units developing in association with and subordinated to agrarian capital (huasipungos 1/, share croppers, etc.). In these cases, access to the land entails a subordinate relationship with the large-scale concern.

b. The participation of the campesino units in the overall acummulation process and State action.

1) The campesinos' role and development strategies

An analysis of campesino economies, especially when emphasizing the evaluation and understanding of the effects of modernization, cannot overlook the relation of said economies to the overall economy's process of accumulation, and the strategies of the remaining social sectors towards them.

The overall variable cannot be separated from the particular characteristics of each country. Thus, for example, the campesino economies in Ecuador and Peru have had, and still have, a considerable impact on the overall development of those countries. This is manifested both in productive aspects, for they are an important source of agricultural

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1/ "Huasipungo" (Ecuador) - Land given to rural workers in addition to their wages.

products for the urban sectors, and because they are numerically significant, and at least potentially politically important. Accordingly, public policies have recognized this situation by trying to define economic contexts which support the campesino economies.

At the other extreme are countries like Argentina and Uruguay, where the campesino sector has had little or no impact, and where the successive axes of accumulation have not depend on the campesino economies. To the contrary, the logic guiding the process and strategy of the predominating public policies has sought to organize these economies to provide cheap manual labor to different capital sectors. Brazil's situation is different. There, the campesino economy exerts a certain impact on regional economies, especially in opening up the agricultural frontier as small-scale farmers (who are later expelled by capitalist enterprise). Nevertheless, the campesino economies have only secondary importance in the overall accumulation process and are gradually subordinated to capital's needs.

Between these extremes, the campesino sector in a number of countries like Colombia and Costa Rica have certain economic and political significance, although to varying degrees, depending on the product or region under consideration. In situations of intermediate importance, state policies for integrating these economies into the rest of the productive apparatus have never been clearly defined. Moreover, this general integration has varied over time in response to the modernization of the agricultural sector, with the progressive deterioration of the campesino's importance as a relevant productive sector, and their progressive subordination to urban-industrial interests.

This variable proves to be of considerable importance, due to its influence over the performance of the campesino economies, as it establishes a relationship between the overall economic process and the campesino economies, and is a means of anticipating the general trends of the entire body of implemented public policies.

2) Specific functional performance of the different campesino economies.

Aside from and in addition to this general relationship of the campesino economies with the overall process of accumulation and its impact on state policies, the performance of each particular situation of campesino farmers should be considered. This, in turn, conditions their relationship with other social sectors and consequently, the public policies specifically developed by the State.

The following 5 specific functions are worth considering in this context:

a) Supplying manual labor for:

i. The urban-industrial sector through permanent or temporary and supplementary migration.

ii. Temporary seasonal or permanent part-time agricultural tasks (dairy farming, Ecuador). In this case, the campesino economy is used to reduce the costs of reproducing the agricultural labor force.

b) Direct production of:

i. Subsistence goods generally associated with supplying manual labor for agricultural tasks.

ii. Wage goods, which reduce the cost of reproducing the industrial labor force.

iii. Export or consumer goods for the high-income social sectors (non-wage goods).

c. Relationships with form of capital associated with production

A variable which helps explain the technological performance of campesino production units is their degree of subordination to different forms of capital 1/. The different forms this relationship can assume can be summarized as follows:

1) Association with predominantly dispersed commercial capital.

This is perhaps the most frequent situation, particularly in isolated campesino sectors, and establishes variable relationships in terms of the campesino sector's negotiating capacity.

2) Association with predominantly concentrated commercial capital.

In this case, the relative magnitudes of the contracting parties make it possible to assume asymetrical relationships between the campesino sector and the sector associated with the circulation process.

3) Association with predominantly concentrated industrial capital (Agribusiness)

Association with industrial capital occurs through three types of situations distinguishable by the degree to which agribusiness influences production decisions of the farming units (Da Silva, 1980).

a) No direct subordination: These cases are perhaps the most common. Although the purchaser of the product is an agribusiness, market relations are established in the

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1/ Even though the order of presentation does not imply rigid sequential historical ordering, these forms of subordination to capital appear to follow a certain historical sequence, approximating the order in which they are listed.

absence of contracts or other institutional mechanisms by which the buyers can make production decisions.

b) Formal direct subordination: In this case, the agribusiness stipulates the type of product, harvest date, etc. but does not stipulate the organizational structure of the productive process. The family economic unit maintains a certain degree of independence, comparable to that of independent capitalist producers.

c) Actual direct subordination: In this case, the agribusiness also determines how the productive process will be organized. This converts the agricultural producer into a kind of home-based wage earner 1/

d. Internal dynamics of the process of differentiation, transformation and disappearance of campesino patterns.

A complete theory should explain the modernization process of the campesino sector, viewing technological progress as part of this modernization. This explanation should be made in terms of the three variables described in the previous section. Nevertheless, in the absence of such a theory, a control variable has been defined as a fourth variable to represent the process under study. This variable provides a certain degree of reliability for defining a typology and for selecting the case studies.

For this purpose, the following definitions have been adopted following a proposal by Murmis:

1) Campesino continuity with differentiation: Indicates an incipient process of change in the production units. As a result, some units begin to accumulate capital while others slip toward semiproletarianism. In spite of this process, all units continue to be fundamentally campesino in nature.

2) Transformation of campesino patterns: The process of change has been stepped up so that some units become capitalist units of campesino origin, while on others, the family labor force is sold for wages. This process can be primarily upward, with units in the process of capital acumulation, or downward, in which most of the units are breaking down, thus providing labor for the market.

3) Disappearance of campesino patterns: Finally, when this process is very strong, the family economic units are either totally transformed into capitalist units, or totally broken apart, turning the family labor into proletarian workers. 2/

1/ This description of the prevailing forms of capital associated primarily with the agricultural producer actually omits one type or relationship that is currently widespread: marketing cooperatives for agricultural products. They can be significant in certain situations.

2/ These situations are not necessarily different aspects of a single process.

These processes are present both for predominantly individual parcel campesino economies, and for community production systems.

Table N°10 taken from Murmis, is a schematic description of different forms of internal dynamics. It is important to note that the upward process of transformation or disappearence of campesino patterns can be produced either by an accumulation of capital (capitalist) or by a growing use of paid labor (land owner).

5. A Tentative Typology

The four variables described above can be used for preparing a typology of campesino farmers, or, in the terms used in Section 3, a typology of the socio-economic spaces occupied by campesino farmers (ESEPP).

The variables can be organized mechanically in a four-item matrix to produce a general typology. However, it would have a very large number of boxes (types of ESEPP'S), which would not be operational for the specific purpose of selecting representative case studies of predominant situations. Therefore, the matrix has been organized sequentially, and at each stage, boxes and variables habe been eliminated when they appear to be of minor importance for the specific purposes of this project.

As has been mentioned, the overall role played by campesinos in the global economy as well as its natural counterpart, the State's strategies toward the campesino economies, is a variable defined on the level of each of the countries. The task of adequately describing this variable would be a separate research project, much too extensive for the constext of this paper. For this reason, care has been taken in selecting countries that include more or less differentiated situations, as well as high levels of the relevant alternatives. The countries selected, Ecuador, Perú, Costa Rica, Colombia and Brazil, present a wide spectrum of the relative importance of campesino units in the overall economy. Consequently, country selection includes the definition of this variable.

The first double entry matrix arises from a combination of the two variables that define the relationship between the ESEPP and the rest of the economy, i.e., the functional role of each individual campesino unit, and forms of capital linking it to rest of the economic process.

The resulting matrix (Table N°11) contains units that supply labor, or situations of direct semi-proletarianism. As stated previouslv, these cases are not critical to an analysis of campesino production, and therefore can be eliminated.

The boxes that correspond to subsistence production fit into the wage goods category, since strictly subsistence situations are virtually non-existent. All boxes which have no great empirical relevance for this project are marked with an X, while those boxes that can be joined in one category are connected by a double arrow (⟷).

TABLE N°10

INTERNAL TRANSFORMATION PROCESSES IN CAMPESINO ECONOMIES

NOTE: The processes shown also hold for community campesino socioeconomic situations.

TABLE N°11

MATRIX OF SITUATIONS BASED ON THE VARIABLES DEFINING THE FUNCTIONS OF EACH ESEPP IN THE PROCESS OF ACCUMULATION AND THE PREDOMINANT FORMS OF CAPITAL THAT LINK THEM WITH OTHER ECONOMIC SECTORS.

PREDOMINANT FORM OF CAPITAL

PRIMARY FUNCTION		NON-CONCENTRATED MERCANTILE CAPITAL	CONCENTRATED MERCANTILE CAPITAL	CONCENTRATED AGRIBUSINESS CAPITAL		
				NO DIRECT SUBORDINATION	FORMAL SUBORDINATION	ACTUAL SUBORDINATION
Labor Supply	To agricultural sector	X	X	X	X	X
	To urban-industrial sector	X	X	X	X	X
Production	Subsistence Production	↕	↕	↕	↕	↕
	Wage good Production		↔	↔	↔	
	Non-wage good Production		↔	↔	↔	

Finally, we have the situation in which there is no direct subordination to industrial capital. It can be assimilated to the case of a relationship to concentrated mercantile capital. In selecting case studies, it appears unnecessary to differentiate between actual and formal subordination to industrial capital; therefore, both are included under the heading of direct subordination to industrial capital. This does not, however, prevent these categories of analysis from being useful in developing the case studies.

The next step is to combine the relevant boxes from the first matrix with the variable of evolution or historical origin for the various campesino economies, thus generating a second matrix, shown in Table N°12.

For the specific ends of this project, it appears that in this second matrix, it is appropriate to eliminate those boxes that correspond to recent settlement processes, whether in individual plots or with community organization, especially those that have been induced by government programs. There are three reasons for this research strategy decision: 1) the relatively recent nature of this production situation makes it difficult to reconstruct a historical process of technical change that includes all the variables used in the typology, as well as the characteristics of the specific situation; 2) in those cases in which the settlement process is a result of broad-scale government programs, the technological outcome is fundamentally predetermined by the nature of the programs; and 3) other research projects currently underway are dealing directly with the topic of this type of campesino production situation.

The category of concentrated mercantile capital (which includes industrial capital with no direct subordination) is of little empirical interest, as in most cases this type of capital bears no direct relation to the campesino farmer. Rather, the "bolichero" 1/ appears as the link or intermediary, whose specific function is to solve the logistic problems associated with storage.

Once the sample has been operationally simplified in this way, it is possible to combine the matrix in Table N°12 with the variable that corresponds to the degree of transformation in the campesino economies. Here too, certain simplifications can be made for de-emphasizing campesino community economies and the individual owners of small plots that are subordinate to agricultural capital, particularly in terms of the shortage (or total lack) of concrete situations classified as upward transformation.

The outcome of this integration of variables, simplified as shown, appears in Table N°13 The resulting typology includes 28 possible types of campesino economies (ESEPP), although they are not all equally important or representative.

The types of campesino economies that from their very origins have been related to, and subordinate to, agrarian capital have lost importance in recent years as a result of the modernization process and the changes in the social and legal structure of the agricultural sector.

1/ Argentina, owner of a small merchant business.

TABLE N°12

MATRIX OF SITUATIONS AS A FUNCTION OF THE VARIABLES OF TABLE N°10 AND THE FORMS OF EVOLUTION (Genesis) OF THE CAMPESINO ECONOMIES

FORMS OF HISTORICAL DEVELOPMENT		NON-CONCENTRATED MERCANTILE CAPITAL		CONCENTRATED MERCANTILE CAPITAL		CONCENTRATED INDUSTRIAL CAPITAL	
		Wage Goods	Non-Wage Goods	Wage Goods	Non-Wage Goods	Wage Goods	Non-Wage Goods
Consolidated Campesino Settlements	Communities			X	X		
	Small Plots			X	X		
Recent Settlements	Spontaneous settlement on small holdings (Frontier)	X	X	X	X	X	X
	Induced small lot settlement	X	X	X	X	X	X
	Induced community settlement	X	X	X	X	X	X
Campesinos	Associated & subordinate to agricultural capital						

TABLE N°13

TYPOLOGY OF CAMPESINO ECONOMIES OF IMPORTANCE FOR THE PROJECT

FORMS OF HISTORICAL DEVELOPMENT		INTERNAL DYNAMICS OF CAMPESINO SITUATIONS	NON-CONCENTRATED MERCANTILE CAPITAL		CONCENTRATED INDUSTRIAL CAPITAL	
			Wage goods	Non-wage goods	Wage goods	Non-wage goods
Consolidated campesino settlements	Presence of community relations	Campesino continuity with differentiation				
		Transformation Downward				
	Small individual parcels	Campesino continuity with differentiation				
		Transformation Downward				
		Transformation Upward				
	Associated and subordinate to agricultural capital	Campesino continuity with differentiation				
		Transformation Downward				

Similarly, situations in which the campesino sector is primarily linked to concentrated capital are still relatively infrequent, although in a number of countries like Brazil they are progressively acquiring greater relative. importance.

Consequently, during the process of selecting case studies, consideration was given to the fact that the typical and more widespread case of the campesino farmer is geared to the production of wage goods, also used for subsistence, with the campesino economy linked to non-concentrated mercantile capital. Therefore, it was deemed important to concentrate the case studies on these categories, ensuring adequate coverage of the variables, the historical origin, and the internal dynamics of the various situations.

In order to compile certain empirical evidence regarding other contrasting situations, an effort was made to select a limited number of cases which would focus on two particular phenomena of importance for the study. First, an in-depth look would be taken into upward differentiation situations, in order to understand the causes that lead to or make possible the process of capital accumulation. Secondly, it was considered important to include production situations that characterize different forms of capital relating and conditioning agricultural production.

The following section indicates the case studies selected and their principal characteristics.

C. Case Study Selection

Following the typology developed in the previous section, and according to possible case studies presented by national teams, the following case studies have been selected.

1. Costa Rica

The case study in Costa Rica represents a case where individual parcel holders exist in relation with non-concentrated mercantile capital in a general process of upward transformation. From a product composition point of view, the case combines wage goods (corn and beans) with a non-wage good (coffee). Coffee usually provides a good margin of profit, and has gone through a process of technological modernization. The occupation of this area began over a century ago.

2. Colombia

Colombia presents two cases of individual parcel holders 1/. The first is Rionegro, which is in an upward transformation based on the

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1/ The second case will be developed only if additional resources are forthcoming.

the cultivation of potatoes, corn, and beans (wage goods) in relation with non-concentrated mercantile capital. Old settlements exist which go back the XVIII century. The second case, Malaga, is also of an old settlement but in the process of downward transformation. The main product of interest in this area is tobacco, which is produced and commercialized within a framework of subordination to agro-industrial capital. Corn and potatoes are also produced and commercialized through the participation of non-concentrated mercantile capital.

3. Brazil

In the South of Brazil, there is a zone in recent expansion (since the late 60's), based on the production of beans by campesino parcel holders. It is a case of agro-industrial subordinated capital, with upward transformation which is illustrative of a more general process which has become increasingly common in Brazil during the last decade.

4. Ecuador

In Ecuador, two ESEPPs were selected, one in the Northern part of the country (Carchi Province) and the other in the South (Chimborazo Province). Carchi is an area specialized in the production of potatoes for the Ecuadorian market. Campesino parcel holders were organized in cooperatives in the 50's for the purpose of purchasing land from large estate owners. These cooperatives were dissolved after obtaining the land or were transformed into other types of organizations. At the beginning, the area was dedicated to the production of cereals, mainly barley for beer making. Due to the high priority placed by the Ecuadorian Government on potato production (basic component of the population diet), there was a reorientation to the production of potatoes which facilitated the capitalization of small producers. For example, campesino farms are able to decide whether to sell to small merchant-transporters in the area or to carry the production in their own trucks to the Quito market. A global process of upward transformation has taken place.

The Province of Chimborazo consists of 455 rural communes, 22% of the national total. In this Province, the case study includes two contigous areas (Quimiag and Penipe) which represent campesino persistence with downward transformation and semi-proletarianization. In this ESEPP, wage goods are produced, predominantly oriented towards subsistence consumption, with non-wage goods produced mainly for sale. Vegetables are produced in Quimiag, while in Penipe fruits are the major crops. Farmers in both areas sell their products in a non-concentrated capital market.

5. Peru

In Peru, two areas characterized by strong communal relationship in the Southern part of the country near Cuzco will be studied. In both areas there is persistence of campesino patterns with

differentiation. In one zone, a combination of products is produced of which potatoes (wage good) is predominant. The potatoes are marketed in relation to non-concentrated mercantile capital. The second zone produces mainly a non-wage good (barley) used for beer making. Production takes place in relation to a concentrated, industrialized capital sector.

6. Uruguay

Often, production destined for subsistence consumption is found in regions which may be considered marginal, as market relationships are poor or non-existant. Uruguay presents a relatively unusual case: family producers, with high market integration, which evolve a subsistence form of production as a consequence of a poor market situation and the orientation of government policies. The process may be characterized as persistence with differentiation (due to the fact that some farms seem to be in condition to confront the new situation) of campesino parcel-holding producers in relation to non-concentrated mercantile capital.

Each case study has been classified in the matrix framework developed in the previous section (Table N°14). In addition to the cases described here, previous work carried out under the project "PROTAAL 1", representing situations not covered by the proposed studies for this project, will be included in the comparative analysis. They are the case of downward transformation subordinate to agricultural capital facing non-concentrated mercantile capital relations (Brazil), and individual parcel holders in a downward transformation facing non-concentrated mercantile capital relations (Peru).

D. The Case Study Approach

1. Introduction

As mentioned in the discussion of the typology of campesino economies, one of the principal project objectives is that of gaining an understanding of the technological change process in the context of different types of campesino farm production situations. The situations chosen for study are representative of the most common situations in which technological change can be considered *a priori* a viable element of a larger rural development strategy.

In order to gain an adequate understanding of the process of technological change taking place in specific small farm production situations, and of the relevant variables which facilitate or inhibit change, in-depth case studies will be undertaken. Therefore, the number of sites selected has been kept to a minimum. Furthermore, each research site is a specifically defined region in which campesino farmers are the dominant producers of a certain agricultural product or set of products which serves as a focal point in examining whether, and to what extent, technological change has taken place.

TABLE N°14

TYPOLOGY OF CAMPESINO ECONOMIES OF IMPORTANCE FOR THE PROJECT
AND THE LOCATION OF SELECTED CASE STUDIES

FORMS OF HISTORICAL DEVELOPMENT		INTERNAL DYNAMICS OF CAMPESINO SITUATIONS	NON-CONCENTRATED MERCANTILE CAPITAL		CONCENTRATED INDUSTRIAL CAPITAL	
			Wage goods	Non-wage goods	Wage goods	Non-wage goods
Consolidated campesino settlements	Presence of community relations	Campesino continuity with differentiation	Perú 1			Perú 2
		Transformation Downward	Ecuador 2			
	Small individual parcels	Campesino continuity with differentiation	(Uruguay)			
		Transformation Downward	Perú (PROTAAL 1)			
		Transformation Upward	*Colombia 1 Ecuador 1	Costa Rica	Brazil	
	Associated and subordinate to agricultural capital	Campesino continuity with differentiation				
		Transformation Downward	Brazil (PROTAAL 1)			Colombia (Tobacco) **

* In this case, the study describes a situation subject to an active transfer of technology by State Institutions.

** Tentatively depending, on additional financing.

a. Target groups

In general, the project is aimed at producing insights into the conditions and problems of small producers of agricultural products in Latin America. Within the population of small producers, it is likely that some types will be more able to benefit from technological change than others. For example, rural people with few land resources or whose principal occupation is other than agricultural production, will not likely be affected strongly by changes in agricultural technology. Therefore, the project is oriented to produce results that will aid in the development of those types of small agricultural enterprises which can realistically benefit from technological change. The benefits to these groups will be of an indirect nature in as much as the research results are expected to influence action programs in the direction of making then better equipped to address the special characteristics and needs of the target population.

b. Project sites

Sites have been chosen for the development of empirical case studies in five Latin American countries; Brazil, Colombia, Ecuador, Perú and Costa Rica 1/. In each of these countries, small farmers are significant in terms of their role in food production and in terms of numbers of people employed in agriculture. The selection of one or two sites within each country was conditioned by the typology of campesino farm situations presented in this document, and by the interest and availability of collaborating institutions. The subject of analysis and the research strategy to be followed indicates that the research results will contain general applicability to Latin America. They may also be useful, especially for comparative purposes, in analyzing the process of technological change on small farms in other areas of the world.

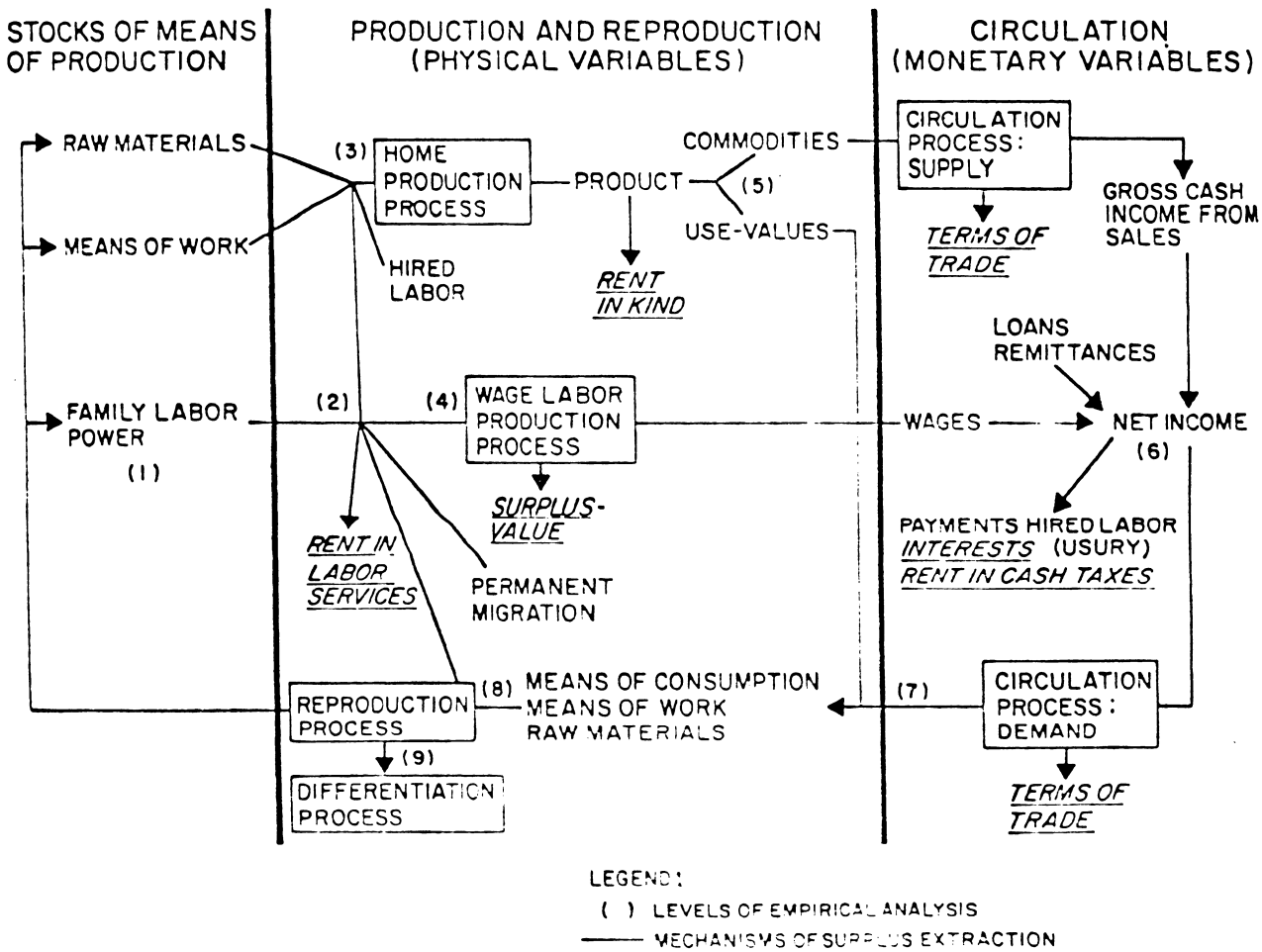
2. Conceptual framework

A frame of reference for the empirical analysis of campesino farm households has been developed by Deere and de Janvry (1979, p. 603) and is presented in Figure N°1. The organization of the campesino farm household is characterized by four key processes; the home (farm) production process, the wage labor production process, the circulation (market) process and the reproduction-differentiation process. In the left-hand column of the diagram, the stock of means of production at a particular point in time are identified. These include raw materials (land and water), means of work (seeds, animals, tools, chemicals, and fuels), and family labor (number, age and sex). In the right-hand column, the monetary variables that characterize the circulation process on both the supply and demand sides are

1/ Specific site case study proposals for each of the countries mentioned are included as annexes to this document.

FIGURE N°1

ORGANIZATION OF THE CAMPESINO FARM HOUSEHOLD



LEGEND:

( ) LEVELS OF EMPIRICAL ANALYSIS

—— MECHANISMS OF SURPLUS EXTRACTION

presented: gross cash income from sales, wages, net income formation, and purchase or rent of the means of work and consumption. The center column highlights the two fundamental production processes (farm and wage labor) and reproduction (of the family unit and of the means of work). These processes are indirectly related through circulation in terms of formation and disposition of income, and directly related through production for home use. These processes also directly reflect the social relations of production (e.g. tenure arrangements, horizontal and vertical production relationships, etc.).

In addition to the Deere - de Janvry framework, the research will include analysis of the socioeconomic factors which influence the external environment. These include agricultural policies at the regional, national and international levels, and the generation and transfer of agricultural technology by national and international organizations.

3. Case study methodology

a. Development of case studies

The case study approach has been selected to facilitate the in-depth analysis of the role and potential of technological change in the campesino farm sector. The overall objective is to obtain an understanding of the technological change process specific to small farm production situations in terms of descriptive socioeconomic variables on three levels: micro (within household relationships), regional (household - regional inter-relationships), and macro (relationships of household to global economy). The micro and regional levels are included in the Deere - de Janvry diagram, while the macro level is only partially included. The diagram in Figure N°2 illustrates the three levels of analysis which the project will undertake. The following is a listing and description of the variables which may affect technological change, to be included in the empirical analysis.

1) Micro (household) level

Variables to be examined at the micro level are those which reflect conditions, processes or decisions which take place within the household which do not directly depend upon relationships with the regional economy. The micro level variables are depicted in the left-hand and middle columns of Figure N°1. They are:

a) The stock of means of production

This is an accounting of the human, natural and technical resources available to the household family unit for use in productive activities. The specific variables present in this category include quantity and quality of land, quantity and quality of capital (means of work), and a measure of the capacity of the household to supply labor for income-generating activities.

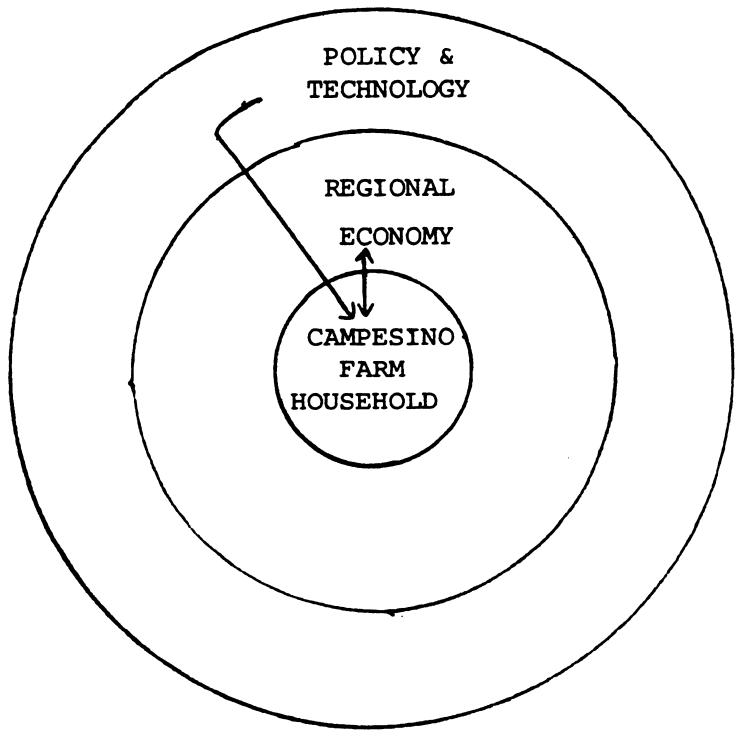


FIGURE N°2. Three levels of empirical analysis of the campesino farm economy.

b) Allocation of resources

Household labor power is allocated between home (farm) production, wage labor and (possibly) as payment for the use of raw materials or means of work. Raw materials and means of work are used mainly as inputs to the home production process.

c) Choice of farm production activities

This set of variables defines the farm product mix, mainly in terms of production of home consumption or intermediate goods versus goods to be sold on the market. Included are variables which describe the techniques of production of each product, and whether the particular set of techniques was generated internally ("traditional") or externally ("modern").

d) Reproduction and differentiation

Reproduction implies regeneration and maintenance of the consumption unit (family labor), of the means of work, and the acquisition of raw materials. Change in the level of the stock of means of production over time provides the basis for the analysis of social differentiation - the tendency to move up (family farm) or down (proletarian) the socioeconomic ladder.

2) Regional level

Variables to be analyzed at the regional level characterize household-regional economy relationships. Decisions are made jointly on the basis of working contracts or agreements. The terms of exchange depend largely upon the relative bargaining power of the campesino household unit and the parties with which it deals. Regional variables are depicted mainly in the right-hand column of Figure N°1. They are:

a) Market relationships

Products produced in the home production process destined for sale on the market are exchanged for cash, supplies or services according to the terms of trade agreed upon by the participants in the transaction. Similar relationships hold for the sale of (family) wage labor and the acquisition of the means of production and reproduction.

b) Communal (non market) relationships

Certain types of transactions, such as exchange or communal labor, take place outside of the market in that terms of exchange are governed by tradition or community norms rather than by relative bargaining

positions. This type of relationship normally exists within a definable sociogeographic area, such as a barrio or village.

c) Production relationships

Variables which describe production relationships pertain to the degree in which decisions regarding farm production are usurped by outside interests. Included are vertical relationships with agro-industry, which to a greater or lesser degree influences the organization of the productive process.

d) Infrastructure and public services

The existence of roads, physical markets, extension services and the like influence the cost of market transactions and the ease with which externally generated technology is transfered.

3) Macro level

Included in this category are variables external to both household and region, but which may affect the feasibility of technological change.

a) National agricultural policies

Policies developed by central planning agencies of national governments may affect the decisions taken by campesino farm households via such mechanisms as product price supports or controls (cheap food policies), subsidization of technological inputs or credit, and subsidization of product imports.

b) Externally generated technology

National and international organizations generate biological and mechanical agricultural technologies for adoption by producers operating under varying agro-climatic and socioeconomic conditions. The nature of these new technologies and their requirement for external support (chemical inputs, markets, credit, etc.) may affect their potential for influencing the decisions of campesino farm households.

c) Role of the product in the global economy

The nature of products produced in the campesino farm sector and their role in the larger economy may determine the availability of incentives for technological change. Products which are important components of the market basket of urban wage earners (wage goods) are likely to come under the influence of so-called "cheap food policies". Luxury or export goods (non-wage

goods) are subject to different types of policies which may affect the attractiveness of technological change differently than policies applied to wage goods.

The preceding list of variables which potentially affect technological change in the small farm sector, couched in the conceptual framework provided by Deere and de Janvry, make-up the basic elements for the development of the case studies. It is not likely that all of the variables mentioned will have a significant effect on technological change. Those factors deemed to have the greatest influence in each case will be studied most carefully while other variables may receive only superficial attention or be disregarded altogether. Since the research as envisioned is exploratory in nature, variables not included in the previous discussion may come to light. Thus the framework presented here serves only as a starting point. The possibility that the concepts developed during the research process may substantially modify the framework cannot be disregarded.

b. The methodological approach for field work

In the social sciences, there are two styles or traditions of survey work. The first approach, designated as "representative", is used widely by agricultural economists and sociologists to obtain statistical information relevant to and representative of large populations. The instruments used to gather this type of information are generally pre-structured in nature in order to facilitate the collection and processing of survey data.

The other perspective or tradition is the "in-depth" approach used in many anthropological studies. Non-structured (open-ended) methods of inquiry are adopted when the principal characteristics of the population under study are totally or partially unknown. Such techniques are useful for the development of studies involving changes over time, and when a qualitative understanding of the inter-relationships among the variables is necessary.

The definition of representative case studies at a regional level implies the need for in-depth studies that can capture the interelationships between the variables endogenous to each type of production unit ("micro") and the exogenous variables ("regional" and "macro"). The determination of the means by which these variables combine to promote or hinder technological change requires the reconstruction of present and historical productive processes. An approximation of this kind cannot be based on a field methodology of cross-section surveys that provide much information about the present but are not appropriate for a reconstruction of the past. Also, due to the nature of such instruments, it is difficult to incorporate new variables uncovered during the process of inquiry which may be of importance. In-depth studies, on the other hand, permit the

enrichment of the study with important variables not originally incorporated in the research structure. From this point of view, the project methodology is designed to incorporate in-depth, open-ended inquiry methods complemented by structured surveys in order to exploit the strengths of the "representative" and "in-depth" approaches while avoiding the problems inherent in the use of either approach alone.

1) Collection of information

The first step in the actual research process is the collection and organization of information to be later used to carry out the empirical analysis. The collection of information for each case is designed to be undertaken in three stages: a) an exploratory or baseline survey; b) a formal survey; and c) an historical survey. An explanation of the objectives and procedures for each stage is presented below.

a) The exploratory survey

The major objective of the exploratory survey is to obtain basic knowledge regarding the campesino farm production situation being studied and to determine the identity and nature of the key factors affecting technological change.

A small sample of key informants and members of the target population will be interviewed in-depth beginning with an exploration of variables describing the household-regional economy-global economy relationships which influence technological change. The questioning will be relatively unstructured and open-ended to promote the discovery of variables which have a significant influence on the process of technological change in the campesino farm sector. The results of this survey should provide a basic conceptual framework specific to each particular case which will serve as a reference in the design and execution of future survey work. Due to its critical nature, the exploratory survey will be carried out directly by the members of the country team responsible for the overall analysis of each case.

b) The formal survey

The results obtained in the exploratory survey will guide in the direction and design of the formal survey. The objective of the formal survey is to provide information on a wider scale regarding the important variables and their effects on technological change in the campesino farm sector. Emphasis will be placed on the validation, verification and enrichment of the basic conceptual model derived from the exploratory work.

The formal survey will consist of two basic parts; 1) a cross-section, multiple entry survey to be administered to campesino farm households and farms of other types located in the ESEPP, and 2) a survey of the individuals or groups with whom campesino farmers engage in economic transactions or who by other means are in a position to influence the campesino farm productive process.

The principal objective of the cross-section multiple entry survey, is to provide a description of the productive processes being carried out on campesino farms. Special attention will be paid to the techniques of production being employed. This information will serve as a basis for asking questions related to technological change in the historical survey. A limited number of non-campesino farms which may have working or economic relationships with campesino farmers will be included in the survey. This will allow for the comparison of technologies being utilized on different types of farms, while at the same time providing insights into functional relationships between campesino farms and the surrounding socioeconomic area.

The second part of the formal survey is oriented towards the collection of information which will promote an awareness and understanding of the linkages between the campesino farm sector and the regional and global economies. Subjects of the survey will include members of such groups as input suppliers, intermediaries, extension agents, rural banks and policy makers. This survey will be less structured than the cross-section, multiple entry survey, employing mainly open-ended, exploratory-type questioning techniques.

i. Strategies for sample selection and interview.

The purpose of the surveys being undertaken is to arrive at an understanding of the organization of the campesino farm household, its connection with the regional and global economies, and the role of that technology plays in modifying the behavior and performance of the system. Rather than attempting to predetermine the size of the sample to be interviewed from each relevant group according to the rules for statistical representativeness, the achievement of an adequate understanding of system functions will be the principal determining criterion. This implies that inquiry will continue until sufficient information has been gathered to allow each question posed to be answered satisfactorily. Prior to or during each survey entry, specific hypotheses will be formulated regarding the

nature of the subject matter being explored. After an initial sample is selected and interviewed, one of the following three situations will be encountered:

1) The hypothesis can be accepted, discontinue sampling;

2) The hypothesis can be rejected, discontinue sampling;

3) Information is insufficient, continue sampling.

As an illustration of the preceding discussion, consider the cross-section, multiple entry approach used to examine farm productive processes. During each entry, a stage in the productive process will be examined. An initial small sample of farmers will be selected and interviewed. If the questions formulated prior to and during the first round of interviewing can be answered, then the entry is complete. Otherwise, sampling, interviewing and hypothesis testing will continue until the criterion of understanding has been satisfied.

In this fashion, all relevant groups will be interviewed, the sample size from each group being determined by the ease of attaining insights into the behavior and functional relevance of each group.

This procedure is called sequential sampling, the theoretical background for which is contained in Wald (1947).

The specific make-up of the each questionnaire will vary from case to case as the relevant variables and influential groups are sure to differ. However, for purposes of comparative analysis of all seven case studies in the later stages of the project, some uniformity in terms of variables examined and the means by which they are measured must be maintained. Responsibility for assuring information uniformity and comparability will be assumed by the project coordinating team.

Due to the pre-structured nature of the cross-section multiple entry survey, it may be possible to hire outside enumerators should the need arise. However, those hired should be well versed in the project methods and objectives, and should possess sufficient academic background to allow the detection of new relevant information should it appear during the course of inquiry.

c) The historical survey

The main objective of the historical survey is to reconstruct the history of technological change on campesino farms located in the study area, and the traditional economic relationships between campesino farmers and those with whom they interact. The results of this survey will aid in understanding the extent and nature of technological change and how it has affected the campesino farm population over time.

A sub-sample of each group included in the formal survey will be selected for interview by members of each country team.

2) Procedures for case study analysis

The basic approach to the analysis of the indivudual cases is the development of conceptual system models. Each model should clearly describe the extent and direction of influence of each participant in the process of technological change in the campesino farm sector. Construction of the models will begin with the exploratory survey, with refinements taking place during the entire information gathering process. In effect, each model provides the structure and framework of the research and serves as a guide towards answering the questions posed during each stage of investigation. The case study analysis can be considered complete when the members of the research team in each country are satisfied that the model developed adequately represents the process of technological change on campesino farms in all important aspects.

4. Comparative analysis of the case studies

Upon completion of the case studies in each country, the central coordinating team will undertake a comparative analysis in order to determine those characteristics or conditions common to all cases for the purpose of generalization.

Specifically, the objectives of the comparative analysis are as follows:

a. To understand the social forces that determine the nature of technological change and to describe types of technological change that have taken place.

b. To understand and interpret the effects of the technical change process on the structure, conduct and performance of the campesino farm sector and the regional and global economies.

c. To be able to identify the basic socioeconomic conditions that must exist in order that technological change may become a significant development strategy for the campesino farm sector.

d. To identify those factors or conditions that appear to inhibit technological change or which produce changes considered detrimental to the campesino farm sector.

The comparative analysis will consist basically of a synthesis of the results of the individual case studies. The elements of the conceptual models developed for each case will be integrated to form a more general model representative of the conditions and processes of technological change in the campesino farm sector in Latin America.

V. THE NATURE OF THE PROJECT RESULTS AND THEIR DISSEMINATION

A. Nature of the Project Results

The results to be produced during the life of the project are of two basic types; academic and practical.

Academic results are those which further the state of disciplinary knowledge, irrespective of the utility of the knowledge for use in practical problem-solving situations. In this sense, the project results will contribute to an advancement of the state of the arts in terms of providing a general conceptual model of the campesino farm economy, its linkages with the regional and global economies, and the direction and nature of influence on technological change on campesino farms of the variables and interrelationships comprising each of the aformentioned economies.

On the other hand, practical results are of direct use to organizations concerned with contributing to the solution of problems facing specific groups or sectors. The project will produce the following results which, after suitable analysis and interpretation, have the potential to contribute to the solution of practical problems facing the campesino farm economy:

1. Results from individual case studies.

a. A detailed description of the productive process taking place in the different types of campesino economic units under study.

b. A description of the linkages existing between the campesino economic unit and units in the larger economy, and the functionality of these linkages with respect to technological change.

c. An historical reconstruction of the process of technological change which has taken place on campesino farms.

2. Results from the comparative analysis

a. A description of the social forces that determine the nature of technological change.

b. An interpretation of the effects of technological change on the structure, conduct and performance of the campesino farm sector.

c. An enumeration of the basic socioeconomic conditions prerequisite to technological change becoming a relevant developmental force in the campesino farm economy.

d. An enumeration of those socioeconomic conditions which inhibit technological change or which promote changes detrimental to the campesino farm economy.

The results derived from the individual case studies and their comparative analysis will contribute to the development of a better understanding of the functioning of peasant economies, particularly with respect to technological variables. This will enable the elaboration of general recommendations regarding the organization of institutions providing technology to campesino farmers and the development of complementary economic policies that will increase the potential benefits of technological change available to the campesino farm sector.

In addition to the preceeding, work has already begun on the development of a general typology of small farm production situations, which will be further developed and refined during the life of project on the basis of new concepts and insights. This is a by-product of the project which has potential application not only for analyzing technology, but also in other areas of study as well.

With the preceeding types of information, the providers of agricultural technology will be able to identify and take into account the socioeconomic environment of their target population, and will be able to determine ex ante whether conditions exist for the successful implantation of new technology. Furthermore, the concepts generated by the study will provide indications as to the effects on the social structure of the campesino farm economy once new technology has been adopted.

B. Dissemination of Project Results

The project results will be presented to the national agricultural research organizations in each of the participating countries and to the IARCS in the region: CIMMYT, CIAT, CIP and CATIE. The results will be presented in special seminars to be organized by members of the project staff (see Calendar of Activities in Section VII) and will be contained in documents to be published during the entire life of the project. Moreover Members of the project staff will participate in seminars and workshops sponsored by other national and international organizations involved in

rural development in general and generation, transfer and diffusion of technology in particular. For example, results of the first stage of the project will be presented at the Workshop on Methodological Aspects of Andean Program of Technology Development for the Rural Environment (PADT-Rural), an activity of the Cartagena Agreement Commission (Andean Pact).

VI. PROJECT ORGANIZATION AND CALENDAR OF ACTIVITIES

Project execution is organized in a decentralized way including a central coordinating team and four research teams at national level.

The coordinating team will be formed by three persons, two of IICA's permanent staff (a Coordinator and Co-Coordinator) and one hired through the project (Principal Researcher), and will be located at IICA's headquarters in San José, Costa Rica. Principal responsabilities are the elaboration of the projects methodological aspects, administrative control and the integrative analysis of the case study results. The coordinating team is also to develop a case study in Costa Rica, for which an Associate Researcher and an Assistant have been hired.

National research teams will be integrated by IICA's staff on a part time basis and by researchers hired especially to serve full time on the case studies. In the cases of Colombia, Ecuador and Peru, the teams will be located at IICA's National Offices and report to the coordinating team directly on technical matters and through IICA's country representative on administrative aspects. In the case of Brazil, the organizational scheme calls for a subcontract with the University of Campinas which will be responsible for the development of the case study. Technical aspects of the agreement are to be monitored directly by the coordinating team. Administrative matters in this case will also be handled by IICA's national Office.

As part of the responsibility for case study execution, the national teams are to develop the appropriate institutional arrangements to assure participation of national institutions, as a base for diffusion of results at the end of the project.

Monitoring of activities at the national level (case studies) will be conducted by members of the coordinating teams through: a) visits to countries; b) progress reports; and c) discussion meetings.

a) Monitoring visits: Present planning calls for three monitoring visits. The first, within two months of the initiation of the studies will be devoted to methodological discussion and planning of activities. The second will preceed the first general meeting and will concentrate on progress analysis and preparation of documents to be discussed at the meeting. The third and final visit, during the last phase of the studies, will concentrate on the contents of the case study final reports. The visits will serve also to disseminate important information among national team members in order to assure a common work perspective.

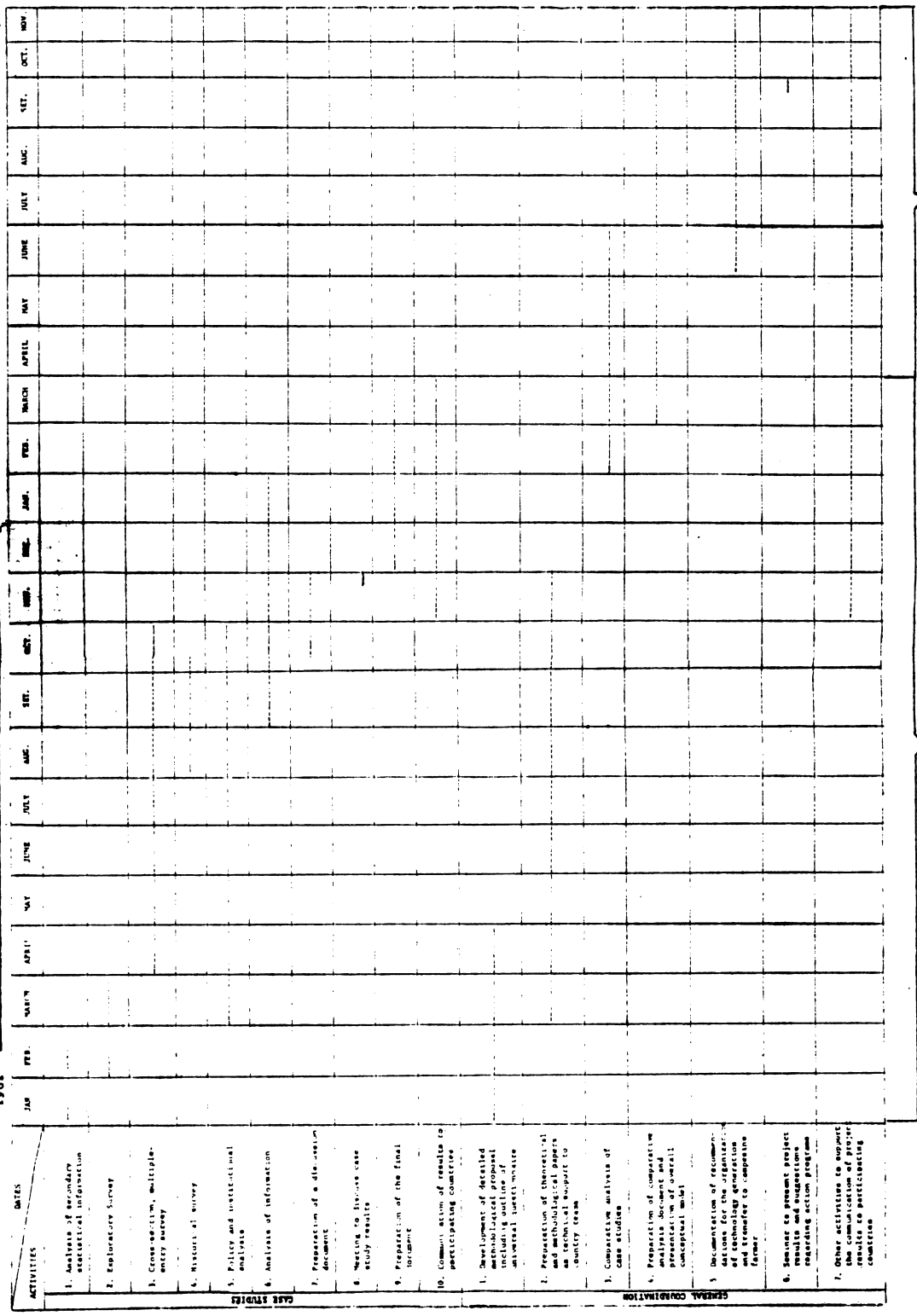
b) Progress reports: A progress report will be prepared for the first general meeting.

c) Discussion meetings: A general discussion meeting is planned toward the end of case study development. It is oriented toward progress evaluation and final adjustments in regards to data analysis and preparation of a final report.

The project has been organized in three stages. The first stage with a duration of six months, has already been completed, with the preparation of this detailed project proposal.

The second stage with an estimated duration of 15 months, will be dedicated to the development of individual case studies. The third stage with an estimated duration of 8 months will be dedicated to a comparative analysis of case studies, directed to draw useful generalizations regarding the nature of technical change in the small farm sector and to make recommendations regarding the institutional organization of the research effort.

CALENDAR OF ACTIVITIES



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