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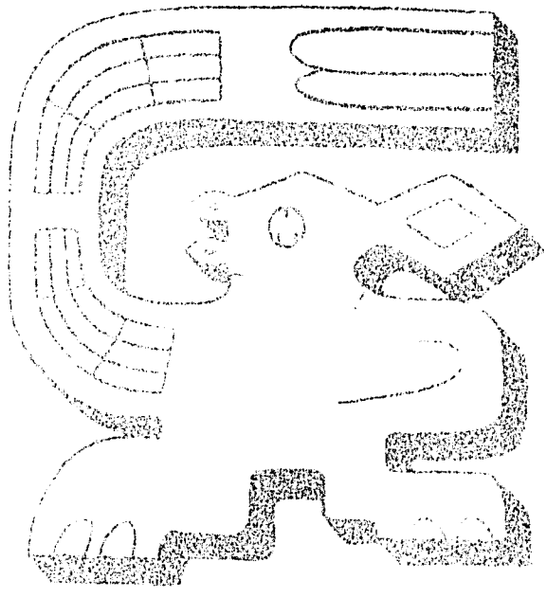

The Use of Socio-Economic Research in Developing a Strategy of Change for Rural Communities: A Colombian Example

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THE USE OF SOCIO-ECONOMIC RESEARCH IN DEVELOPING A STRATEGY OF CHANGE FOR RURAL COMMUNITIES: A COLOMBIAN EXAMPLE*

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I. Introduction

The purpose of this paper is to discuss the use of socio-economic research in development programs that are aimed at directly effecting change at the local level. It will suggest a role for socio-economic research in less developed countries and present a research model which points out some of the types of data needed to construct a workable strategy of change.

The paper will argue that the role of the researcher in these areas includes the following functions: (1) to isolate a meaningful unit of analysis; (2) to assemble and classify necessary data; (3) to identify relevant problem areas, given the framework of society's goals; (4) to formulate alternative solutions for problems; (5) to present criteria for selecting a problem, as well as its solutions; and (6) to formulate a workable strategy for the action-takers to effect the selected change. Moreover, it is argued that in many cases data must be assembled on a wide range of variables in order to construct a workable strategy of change.

II. The Role of Research in Less Developed Countries

In many of the more developed countries, where resources for socio-economic research are relatively abundant, researchers are often able to concentrate on so-called "basic" or "applied" research. That is, some researchers focus on establishing relationships between certain variables and constructing appropriate theories, while others concentrate on applying data and theories to specific problem areas. It is often the case that individuals other than the researchers draw on these findings, plus their own broad knowledge of the existing situations which surround a problem, to construct informally a method for solving a given problem.

In rural areas of less developed countries, much of the social science research has been carried out in a similar manner, although conditions are strikingly different. In some cases, for example, researchers feel they need to conduct broad "basic" studies in order to formulate an idea of existing conditions.[1] Many research projects terminate with a mass of data which may or may not assist in problem-solving. On the other hand, some research activities are very narrow in nature and are aimed at justifying a predetermined course of action. In the first case, the decision-maker often finds that he does not have enough background to

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1. This is not surprising, since most research workers are foreigners, foreign-trained nationals with little local experience, or nationals who lack knowledge of conditions in the rural parts of their respective countries.

integrate the basic studies into his analysis of the problem. In the second case, the decision-maker finds that the results of past research activities do not materially assist him in solving similar problems which occur later.

Because in less developed countries research resources are extremely scarce and time to solve pressing social problems is limited, it becomes imperative for research techniques to lead to satisfactory solutions of problems, as well as forming a useful residual of hypotheses, theories, and models which will make the solution of future problems less taxing. The role, therefore, of the social science researcher in a less developed country is often substantially broader than he might realize. He must be prepared to carefully define a functional unit of analysis which will serve for studies that are typically interdisciplinary. He must be capable of assembling a broad range of data, in order to describe the population being analyzed. This includes using research techniques which are the most functional, given the restraints of budget, general background information available, personnel, and time.[2] He must be ready to define carefully the problems on which he is focusing his research. He must also be prepared to relate his data to the problems identified and to propose plausible alternative solutions. Furthermore, he must be ready to present criteria for selecting both a problem and a method of solution. Next, the researcher must, although he typically has not done so, be able to suggest a strategy for introducing or stimulating the selected change.

As used here, a strategy of change can only be constructed after the researcher has completed all of the above-mentioned steps. Thereupon, he can order the problems observed during the analysis, postulate a series of plausible solutions for each of the problems, and then assign weights to both the problems and methods of solution. By the use of these weights, and by working within the various restraints which apply to the specific situation, he can then select both the problem and the method of solution. Finally, the researcher should formulate, from his data, the alternative methods of introducing the change. This includes some statement of the probability of success of the various alternatives, the limitations of these alternatives, and something about the penalties which might result if the proposed change fails.

III. A Model for Constructing a Strategy of Change

The logical starting point in formulating a strategy of change is to define a functional unit of analysis. In traditional areas the community[3] may offer advantages as a focal point for socio-economic studies. First of all, the community frequently approaches self-sufficiency and also contains a majority of the important social institutions within its confines. Furthermore, it is often isolated from outside communications.[4] Any effective change, therefore, must be generated within these types of communities, rather than stemming from general outside activities. Such a community can be illustrated by Contadero, Narino.[5]

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2. For a treatment of problems encountered in field work in developing countries, see A. Eugene Havens, "Methodological Problems Encountered in Sociological Survey Research in Colombia," *America Latina*, XIV (May 1964).

3. We are using "community" broadly, so that one "community" may contain several village centers. See T. Lynn Smith, "The Role of the Village in American Rural Society," *Rural Sociology*, V (1942), 10-21.

4. As a general rule, the more developed an area is, in terms of market economies, commercial farm production, transportation, education, and communications, the more limited is the use of the community as a focal point for this type of research.

5. Located in Colombia not far from the Ecuadorian border and the subject of one of a number of community studies conducted by the Land Tenure Center in Colombia during the past two years.

In a community like Contadero, information on a broad range of social variables is needed to define problems, suggest solutions, and help formulate methods for introducing change. The general types of information which were gathered in the study of Contadero included descriptions of (1) the physical conditions found in the community; (2) the cultural patterns which were superimposed upon the local social system; (3) the historical patterns of diffusion and change; (4) the community's articulation with other systems of government; (5) the economic make-up of the community; (6) the human resources available; (7) the family structure; (8) the educational system; (9) the ecclesiastical system; and (10) the decision-making processes of the behavioral units.

A. Physical Conditions

A community's physical environment places important limitations on the types of economic activities that may be pursued. Factors such as rainfall, altitude, terrain, quality of soil, and seasonal variations dictate, to a certain degree, the enterprises which can be undertaken there.

Contadero, for example, varies in altitude from 6,500 to 9,800 feet. The community center and the majority of the population are located at an altitude of 8,000 feet. The climate is generally cool to cold, with temperatures ranging from zero to 18 degrees centigrade. Rainfall is fairly well distributed throughout the year, but is usually more concentrated during the March-May and October-December periods. The threat of frosts and the presence of lower quality soils force owners of land at higher altitudes to emphasize pastures in their farm operations. At lower altitudes most of the land is double-cropped. The topography of the area is rolling to very steep. The soils are rather acidic, but respond well to lime and commercial fertilizer applications.

B. Cultural Patterns

Similarly, a knowledge of cultural patterns is of utmost importance for the development of programs of change. Distinguishing these cultural factors can lead to an understanding of why members may be likely to reject change introduced at the community level. The patterns which encompass the existing social structure provide blueprints for the type of social behavior which is present in the community. If certain innovations are introduced, it is possible that they will be perceived as threats to the existing social order, in that they may create hardships for certain members of the society. Changes may also run counter to established ways of doing things, attitudes, and prejudices.[6]

The cultural patterns and physical conditions largely dictate the type of economic organization found in the community. Among other things, cultural patterns affect the rhythm of work, the way the labor supply is mobilized, the incentive system for labor, the method of land transference, and the general organization of the family. Information on these patterns not only helps in deciding on what change to introduce, but provides clues as to the best method to employ in introducing the change.

A starting point for collecting data on cultural patterns is a historical analysis of the community. Contadero, for example, was originally an Indian reservation. For more than two centuries there has been a merging of Spanish and indigenous cultures, brought about by a dominant group which controlled the means of authority and which could, therefore, specify

6. See Walter R. Goldschmidt, "The Interrelations between Cultural Factors and the Acquisitions of New Technical Skills," in Bert F. Hoselitz, ed., *The Progress of Underdeveloped Areas* (Chicago: University of Chicago Press, 1952), p. 139.

the roles to be performed. This domination is so complete that today all members of the community speak only Spanish and are members of the Catholic Church. Only a few of the original customs are retained, such as native health remedies, eating habits, forms of dress, and methods of crop cultivation.

The Indian reservations, according to law, were governed by a locally elected council, called a *Cabildo*, which was in turn responsible to the representative of the colonial or national government in the region. Emphasis was placed on group, rather than on individual pursuits within the subordinate, indigenous group. The dominate group, however, was more concerned with its individual, self-oriented, pursuits. The *Cabildo* was responsible for granting rights to exploit plots of land and for the general organization of the community. A form of communal activity which still exists is called *minga*, and refers to the exchange of labor between members of the reservation for harvesting and planting crops.

When the Indian reservation was disbanded in 1941 and land titles were given to private owners, no one individual controlled a large quantity of land. The land was more or less evenly distributed into small holdings. Social differentiation was based upon being an Indian or a white, but these distinctions were not biologically based and today are completely confused. The two positions of legitimate authority which remained in the community were, and still are, those of the parish priest and the mayor. Without any significant social differentiation, and lacking any one group which controlled the means of authority in recent years, the community developed into a homogeneous unit, with the family being the major collectivity.

Contadero, then, is a community in which individual decisions are largely based upon values which represent traditional patterns and are reinforced by the "hard cake of custom," and where the family strives to maintain itself by means of direct exploitation of fragmented plots of land which are equally inherited by the family offspring.

C. Historical Patterns of Diffusion and Change

It is important to study past patterns of diffusion and change, in order to have some idea of what types of alterations have taken place in the community, to present some clues as to how these changes were introduced, and to help determine why some changes took place and others did not. A knowledge of the historical patterns of diffusion and change can also be valuable in helping to focus the field study. In the study of Contadero, it was convenient to classify the historical changes into two groups: the broad social changes which have occurred since the Spanish Conquest, and the changes recently experienced in customs and production practices.

Unlike some parts of Colombia, Contadero *has not* experienced drastic social changes that might have disrupted existing structural forms.[7] Since this has not occurred in Contadero, and since the family has been able to maintain the social order, the changes that have taken place in the social structure have been gradual.[8] Recent changes in the community include the use of some modern health facilities, such as the local dentist, the health clinic, and manufactured drugs. Most of these changes have taken place since 1956, and the major source of information has been by word-of-mouth communication.

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7. The region in which Contadero is located was one of the few areas in Colombia which has not been wracked by violence since 1948.

8. See Bert F. Hoselitz, *Sociological Aspects of Economic Growth* (Glencoe: Free Press, 1960), p. 46, for a discussion of what happens when traditional patterns of family organization break up.

A number of changes have also occurred recently in agricultural production practices. Several new varieties of barley and wheat have been introduced and adopted by most producers in the past eight years. The use of commercial credit, insecticides for potatoes, commercial fertilizers, lime, and small portable mechanical threshers are also fairly recent changes. Some of these practices were introduced by the agricultural development bank. Producers often heard of an improved production practice through market-middlemen, who in turn had purchased grains or potatoes in other areas where these practices had already been adopted. After some individuals in the area had tried the new technique, a number of people received information about the practice by direct contact with these early adopters. The newly informed farm operators then contacted the local agricultural development bank and were able to purchase the new technique. In some cases, the bank encouraged the adoption of these practices by granting credit only when these practices were used.

With this brief review of the patterns of diffusion and change in Contadero, we can note that recent alterations in agricultural production practices have been undertaken after the producers were informed that better practices existed, by sources upon which they could rely, after some local application and success, and finally through the efforts of the agricultural bank. It can also be noted that people placed more credibility on word-of-mouth sources of information than on other types of communication. Moreover, it was apparent that local opinion leaders were of little importance. These patterns were reinforced by the holders of legitimate authority within the community, so we now turn to a consideration of these authority figures.

D. The Ecclesiastical Structure

Knowledge of the ecclesiastical structure is often essential for forming a strategy of change for a rural community. In most traditional societies, a church is the central figure of authority, particularly where Catholicism is predominant.

The ecclesiastical structure in Contadero is entirely made up of the Catholic Church. The major historical function of the Church there was to convert and train the Indians in Catholicism and to teach them Spanish. The Church is still closely associated with the educational system, influencing the formation of the curriculum, providing teacher training, and giving adult education by means of radio schools. The major formal source of information for the members of Contadero is the weekly newspaper, *El Campesino*, which is published by a Catholic organization (Jesuits).

Much has been said about the role of the local parish priest in Latin America. In many areas, he legitimizes as well as introduces change. In Contadero, the parish priests (the community is divided in two parishes) are not active agents for change. Nevertheless, they are important legitimizers.[9] Therefore, the Church, as an authority structure, exerts control over the local people and, as such, is an important variable to consider in change programs.

E. The Family Structure

The family performs two all-important functions: (1) it transmits the values and goals of the community to offspring; and (2) it serves as an economic unit by providing food and shelter for itself. Most changes which are introduced will be evaluated by the family in terms of these two functions. In order to be accepted, a change must not run entirely counter to the established patterns of behavior present in the culture, and it must not threaten the family's

9. This is why research teams should make the parish priest one of their first contacts, so that he can inform the local people of the purpose of the research activities

ability to perform its economic function of providing for its maintenance.

In Contadero, the family structure is one of transition between extended and nuclear. Many family units have developed which are entirely nuclear. In most of these cases, however, the father of either the husband or wife, or of both, resides nearby and is looked to as a major source of information for decisions. The behavior patterns present during the *resguardo* days of the community are, therefore, changing, but have not completely disintegrated. In the *resguardo*, the *gobernador* was almost always one of the elders of the community and was considered by many as the sage. This respect for age is still present in the family structure.

The division of labor within the family is well established by cultural pattern. Domestic duties are delegated to the wife and older daughters, while day-to-day farm duties are carried out by the husband and his older sons. All of the family's labor resources are utilized during the planting and harvesting periods.

Changes to be introduced in Contadero, given the type of family organization present, must be somewhat in accord with the established patterns of behavior within the family structure. A change which varies the economic relationships within the family could have a serious impact upon the authority structure currently present in the community. If children become economically independent from the family, it is quite likely that they would be less willing to accept the eldest male family member as a key determiner of their action. [10]

It is, therefore, likely that any change to be introduced will be more widely accepted if it is tailored to fit these culturally defined behavior patterns of the family.

F. Political Structure of the Community

A final factor which embodies legitimate authority for the community members is the political structure. Almost every community has some formal or informal means of governing itself, and although it may be largely self-sufficient, it must have some extra-community ties with broader forms of government. It is, therefore, often vital to identify how local group decisions are made, to describe the formal as well as informal rules by which the community lives, and to assess what capabilities the various local political institutions have with respect to a strategy of change.

In Contadero the local unit of government is the *municipio*.[11] The *alcalde*, who is in charge of the *municipio*, is appointed by the *departamento* [12] governor, who in turn is appointed by the popularly elected president of the republic. The *alcalde* is recognized as a legitimate authority figure by the community members, probably as a carry-over from the reservation days, but his sphere of influence in agricultural production decisions is negligible. He is assisted in making decisions by a locally elected town council. As has been true throughout the country since development of the *Frente Nacional* in 1958, the membership in the council is divided equally between the liberals and conservatives, despite the fact that less than one percent of the population is liberal.

For practical purposes, it is difficult to separate the group decisions made by the Church and those made by the *municipio* officials in Contadero. It is almost always the local priest

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10. See Ruth Anshen, *The Family: Its Function and Destiny* (New York: Harpers, 1959), pp. 488-523.

11. A *municipio* resembles an organization somewhat between a township and a county in the United States.

12. In most respects, a *departamento* serves the same functions as a state in the United States.

who makes the announcements and enlists popular support for any group project. Furthermore, he is often closely consulted by the *alcalde* and town council on significant matters.

One of the more important ties which Contadero has with broader forms of government is through its participation in the *departamento* tax revenues on liquor and tobacco, but this amounts to only five to ten percent of the *municipio's* operating budget.[13] The largest source of revenue, fifty to sixty percent of the budget, is derived from a tax on the declared value of the registered land. The bulk of the expenditures are for salaries, a few public works, and office building repair.

Aside from the agricultural development bank and the national police, individuals in Contadero have very little contact with, or knowledge of, the national government. In fact, less than 15 percent of the farm operators in Contadero knew who their representative was to the national congress. In general, the residents of Contadero identify themselves only slightly with outside governmental activities. The building of a new health center and some of the school buildings, the appointment of the *alcalde*, and the small contribution made to the *municipio's* budget by the *departamento* are the principal outside relationships.

This description of the community's political structure and its articulation with broader forms of government shows several important factors. The first is the extremely weak identification which the members of the community of Contadero have with any forms of authority outside of the Church and family. The second is the general debility of all the political institutions relating to Contadero with respect to effecting some type of change. The third is the importance of the Church in group and individual decisions.

Now that the major cultural patterns and authority structures of the community have been described in general terms, we turn our attention to the economic organization of the community.

G. The Economic Structure of the Community

Even in the most traditional communities, economic factors play an important part in programs of change. Among other things, these factors include: (1) the types of production within the community; (2) the organization of the producing units; (3) the manner in which the rights to land resource use are distributed; (4) the method in which labor and capital resources are applied; (5) the make-up of the families' occupational structures; and (6) how the local marketing system functions. Since it is often true that a large percentage of the total output in traditional communities is derived directly from agricultural production, the analysis will often focus on the farm units found in the area.

Farm organization. In spite of the presence of several small flour mills and a substantial amount of handicrafts in the homes, over three-quarters of the goods and services produced in Contadero stem directly from agricultural production.

Farms in Contadero are typically small, highly fragmented, and oriented toward production for home consumption. Usually, one-quarter of the area in each unit is devoted to native corn, interplanted with several varieties of beans and squash. About the same proportion of land is devoted to barley and wheat and a similar amount in potatoes and other vegetables. The remaining one-quarter of the land is devoted to pastures. The livestock enterprises often include one or two dairy cows plus replacements, a few sheep, several pigs, one or two draft

13. In 1963, the *municipio's* annual budget amounted to a little over one dollar per capita.

animals, a few chickens, and some guinea pigs for home consumption. Wheat, barley, and potatoes are almost always double-cropped. Corn and beans, on the other hand, take up a full crop year.

Farm units range in size from less than one hectare to over 80 hectares. The modal size is three to four hectares. Almost all units include more than one parcel of land, the average being about four. Oxen plus hand labor are the means of cultivation.

Generally, operators use a set rotation of corn-potatoes-cereals-corn in their various lots. Commercial fertilizers are applied in limited quantities to potatoes, but are only rarely applied directly to cereals, corn, or pastures. Limestone is occasionally applied, [14] and potatoes are regularly sprayed with insecticides.

Land tenure. Land tenure arrangements have significant implications for the kinds of enterprises which will be undertaken on the farm, the types of investments that will be made, the flexibility which is present in the farm operation, and the manner in which production decisions are made and carried out.

Although most of the land in Contadero is owned in fee simple by local residents, it is common to find complex sets of tenure arrangements involved in the actual operation of the land. For example, just 20 percent of the farm units in Contadero included only land which was "purely" owner-operated.[15] Production decisions are often shared in these units through a method of sharecropping called *medias*. Under this arrangement, the land owner supplies one-half the seed and one-half the fertilizer (if used). The sharecropper furnishes all of the labor and the balance of the production inputs. This arrangement is especially prominent between the older individuals or single women who own land and younger individuals who take the land as "croppers." A number of special arrangements for the use of land are also common between relatives. Production decisions are, therefore, often shared between at least two individuals. Few of the tenure contracts are written, and the length of time is only occasionally for more than one year. Nothing exists in these contracts which would encourage sharecroppers to make any long-run land improvements.

Capital and labor resources. As is true for land, capital resources are extremely limited in Contadero. Almost all of the institutional credit is provided by the agricultural development bank, but this amounted to only a little over ten dollars per capita in 1964. Interest rates for loans from this bank are very reasonable, but loans by private individuals often carry rates of three to five percent per month. Most of the smaller farmers do not or cannot obtain credit from the bank. They typically rely on private sources of credit to meet unexpected needs. Private capital outside of investments in land and livestock is practically nonexistent. Most people, when faced with a sudden cash outlay, sell livestock or land to cover the cost.

Labor resources, in contrast to capital, are overabundant in Contadero. Farm labor wages are only 20 to 30 cents per day, about one-quarter the national average. In spite of a large out-migration of young individuals, sufficient numbers of able-bodied workers are still available to meet peak harvesting and planting needs.

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14. Even though limestone is generally applied to soils to change the pH, most farm operators in Contadero thought it was applied to kill flys and other insects.

15. See Dale W. Adams *et al.*, *Public Law 480 and Colombia's Economic Development* (Medellin. Facultad de Agronomia, 1964), p. 179, for an example of similar farm tenure characteristics in another area not far from Contadero.

Occupational structures. Partly because people have substantial amounts of free time outside of agricultural production, almost all farm families have sources of income from some other employment in the community. This means that decisions as well as time are shared between several activities and that farm operators' reactions to change can be substantially different than in a case where agricultural production is the only source of income.

Most of the families in Contadero derive a part of their real income directly from agricultural production. But a substantial part of the cash income is obtained from other sources. Almost all of the farm operators and their mature sons, for instance, work part-time as day laborers on other farms during planting and harvesting periods. Moreover, practically all of the women spend their spare time spinning and weaving wool. Other men gather firewood for sale, hire out with their oxen for custom farm work, or spend time buying and selling various commodities. In a number of cases, small stores located in the family home furnish additional income.

Marketing systems. Another reason for the diversified occupational structures in Contadero is the uncertain marketing conditions which face the individual farm operators. These conditions shape a number of farm production decisions. Except for the largest farm operators and the more important merchants, almost all marketing activities in Contadero are centered in the local village. The production in excess of family requirements is sold to local middlemen, assembled into larger lots, and trucked to outside market areas.

Items for local consumption are brought in by various merchants, including rice, salt, crude sugar, and coffee for home consumption. Fertilizer, limestone, sacks, cereal seed, and insecticides are the main purchases for production purposes. Seven small shops in the village retail these commodities throughout the week, but a large proportion of the sales are made on the Sunday market day in the open plaza. Many families are largely self-sufficient, but almost all buy some commodities each week and appear to understand the fundamental elements of the money marketing system.

Almost no farm storage capacity is present, and practically all of the crops are sold immediately upon harvesting. Wide fluctuations in the prices of potatoes, beans, and corn often occur as a partial result of this. It is not uncommon, for example, for prices of these products to drop 25 to 50 percent during the harvesting season. Year-to-year variations in prices are also common. For instance, in January 1963 farmers received as low as 60 cents per 100 pounds of potatoes in Contadero, yet in May 1964 the farm price was over six dollars per hundred. Prices for barley, wheat, and animal products tend to be more stable.

H. Human Resources

Attention must also be directed towards the human resources available in the community. Such considerations as the number of inhabitants relative to other resources, age-sex distribution, health, and education are important elements to study in this respect. In addition, it is necessary to understand the process of migration in and out of the community, in order to ascertain how the relationships between human and other resources have been changing.

As could be expected, there are somewhat more females than males in Contadero. Young men often leave the area for military service and later find occupations in other parts of the country. It is often true, moreover, that the individuals with the most education find opportunities outside of the community. Heavy out-migration in the past 20 to 30 years has apparently kept total population more or less stable in Contadero and has had a substantial impact on the educational level-age-sex distribution.

In many traditional communities, the health characteristics of the population could be an important factor to take into account in developing a strategy of change. Although infant mortality rates are quite high (1.1 per 100 live births) and dental conditions very poor, the average level of health in Contadero is somewhat better than in warmer climates of Colombia (where infant mortality rates are about 2 per 100 live births). In this case, health would probably not be seriously limiting factor for most programs of change.

I. The Educational System

Closely associated with a study of the human resources is an analysis of the educational factor. This includes not only a study of the level of formal education, but also an analysis of the ability of the educational system to participate in a strategy of change.

Total learning experience, and thus "real education," is difficult to measure, but the level of formal education is often a useful indication of a person's learning experience. In Contadero formal education is critically lacking. Of the twelve primary schools in the community, only three offer more than three years of study. No school offers more than five years of formal education. Not many students attend past the second or third year, and few can functionally read of write. Some educational facilities are available throughout the community, but almost one-quarter of the eligible children are not enrolled in school. Heavy school drop-out rates often reduce enrollment by one-half during a school year. Sickness, lack of family interest, and labor requirements on family farms during harvesting and planting seasons are prime factors here. Only four of the twelve teachers in the community have more than ten years of formal schooling.

The low over-all level of education in the community poses restraints on the methods which can be used to introduce change. In brief, the educational system does not serve as a means of upward mobility for the residents, since it does not prepare them for occupations other than those encountered in the local area. It does not give the young members of the community new ways of perceiving their situation and therefore perpetuates the *status quo*. Furthermore, the general debility of the educational system seriously limits its utility as an agent to help introduce or reinforce any selected change.

J. Decision-Making Processes

During the process of constructing a strategy of change, the investigator must be able to identify the critical decision-making units which might relate to the strategy. The key units may be different from study to study, but it is likely that they will include the farm operators, the town council, the educational system, the Church, local leaders, and various governmental agencies. Since the selection of the key decision-making unit is dependent upon both the change selected and characteristics of the units themselves, it is likely that no definite selection can be made until most of the field research is completed. It is therefore necessary to assemble information on several of the decision-making units which might be involved in the strategy.

In Contadero the decision-making units were initially grouped as follows: (1) those which might introduce the change to the community; (2) those which might carry out the change; and (3) those that might reinforce the change. After the study was almost completed, the appropriate change selected, and the method of introduction chosen, the key decision-making units were identified. On the basis of the evidence available, it appeared that some outside agent would have to introduce the selected change, that farm operators would be making the critical decisions with regard to the implementation of the change, and that the agricultural

development bank would be a key unit in reinforcing and furthering the change.[16] Of these three, it was decided that the decisions made by the farm operators would be the most critical *vis-a-vis* the success of the strategy.

Farm operators in Contadero can be classified into two general groups with respect to farm production decisions. The first group includes operators of the small units where home consumption requirements guide production decisions. Larger units are typically oriented toward market conditions and profit maximization. The criteria used for making production decisions on smaller farms, on the other hand, are distinctly different and were analyzed separately.

Small farm operators in Contadero make most of their production decisions on the basis of minimizing the risk and uncertainty involved. The small margin of family operations above the survival level, the extreme variability in some marketing conditions, the lack of cash reserves, and the high subjective value of land as a source of wealth combine to make a cash loss almost intolerable for farmers in this group.[17] The abundance of family labor and the limited range of alternatives available for that labor are also important factors in farm operators' decision-making criteria.

Based upon the previous discussions, we may now turn to the part in the research role which is concerned with the identification of the problem and the selection of the method of solution.

IV. Problem Identification and Solution Selection

With the above-mentioned data, the next step in constructing a strategy of change is to identify the relevant problems, given society's goals.[18] This includes listing the problems which are possible to solve, given the resource restraints, as well as assigning some types of values to the solution of these problems.[19] Next, criteria must be established for selecting a specific problem for solution and for determining the method of solution. One criterion, for example, might be the maximization of expected social returns from a given unit of input.

In Contadero, several relevant problems can be identified. Focusing just on agricultural production, for example, we can note that crop yields are substantially lower than could be expected with the use of improved techniques. Potato production is less than one-third that which can be obtained with improved seed, lime applications, and economic levels of fertilizing and spraying. Likewise, corn yields are only about one-third to one-half that which could be expected with the use of improved seed.

Based on the resources which were available for introducing a change and the social value of solving the problem, it was decided that increasing the yield of corn would be the problem selected in this case. A number of possible solutions could be suggested to resolve this problem. Irrigation, proper fertilization, improved seed, farm specialization in corn production, liming, and the use of insecticides were a few of the more apparent solutions.

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16. Given the structure and functioning of the community, which has been previously described, these selections were reached by elimination.

17. Essentially, what we are suggesting here is that, almost regardless of the promised pay-off, farmers will not gamble if a cash loss is involved which would encumber his land.

18. These goals may or may not be consistent, and they may be wholly or partially competitive or complementary.

19. In some cases, this may include assigning negative values to not solving the problems.

Irrigation was rejected because of the physical characteristics of the area, the lack of any institution which could administer the irrigation project, and the high investment costs of installing irrigation. Likewise, farm specialization in corn was discounted, because it would run sharply counter to the traditional farm organization, force farm operators to incur substantial risks and uncertainties, and make poor utilization of the available family labor. Encouraging the application of lime was also rejected, because the requirements for supplementary educational material to show why lime was necessary would likely be beyond the capabilities of the change agent. Encouraging additional fertilizer application would require expanded use of credit, which is already in short supply. Furthermore, detailed agro-economic data was not available on how much fertilizer could profitably be used in this area. The introduction of the use of insecticides on corn was viewed favorably, since it would be very similar to the practice, already widespread, of spraying potatoes. It was thought, however, that a new improved corn variety [20] could be introduced more easily and could be expected to show a larger increase in production. Further considerations which led to the selection of a new corn variety as the means of solution were: (1) a new corn variety would be a logical step for farm operators to take after they have already successfully adopted new wheat and barley varieties; (2) a new corn variety would be compatible with established cultural patterns; (3) no major changes in established farming practices would be required for adoption; (4) relatively little damage would be done if the change did not succeed;[21] (5) the change could be reinforced and continued with relatively little effort on the part of the change agent; (6) the new change was easy to communicate by word of mouth, since it involved no complex ideas; and (7) as long as taste requirements were fulfilled, no family objections would be likely.[22]

V. Method of Change Introduction and Continuance

After the problem has been carefully defined and one of the alternative solutions selected, the method of introducing the change must be chosen. This includes deciding which agent is to introduce the change, what unit is going to receive the stimulation, the timing of introduction, and finally, the technique with which the change is passed between the change agent and the unit to be stimulated. After these steps have been considered, it is necessary to give some attention to the ways the change can be reinforced and continued.

The study of Contadero revealed that there were only two agencies remotely capable of carrying out the introduction of the improved corn seed. One was the Church, through the local priest, and the other was the local agricultural development bank. For several reasons, already mentioned, neither agency was thought to be ideal for this purpose. But it appeared that both could be used to reinforce and continue the change, once it was introduced.

A number of possible techniques for introducing new corn seed in Contadero could be suggested. Among the more plausible were: (1) free distribution or sale of seed in the local plaza; (2) sale through the agricultural development bank or local merchants; (3) free distribution of some sample seed to local opinion leaders; and (4) some sort of random-sample distribution of free seed.

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20. An improved variety rather than a hybrid was selected, because farmers were not accustomed to purchasing corn seed each year. Fortunately, in Colombia, a number of suitable corn varieties are available, through the joint research efforts of the Rockefeller Foundation and the Ministry of Agriculture.

21. That is to say, the change is divisible, so that small trials could be made. This would also help reduce the degree of uncertainty for the decision-taker.

22. Since the decision to grow corn in Contadero is basically to fulfill family needs, the taste requirement is extremely important. The corn must be suitable for eating on the cob while it is green and also provide a tasty flour.

Each of these techniques of introduction could be accompanied and reinforced by various types of communication. Public announcements by the priest, for example, would be one way to inform people of what the change was. Public posters, notices in the Church paper, public meetings, written instruction, or word-of-mouth communication were all plausible alternatives.

In this particular case, it was decided that timing of the introduction would be especially critical. If the seed were introduced sometime after the traditional corn planting period of October and November, there was a substantial chance that the seed might be eaten, lose some of its germination power, or be destroyed by rodents before planting time. It was therefore decided that introducing the seed about one month before the planting time would be the best possible timing.

Finally, it was decided that an outside change agent should introduce the corn seed during the latter part of September to the 130 farmers who were interviewed in getting basic information for the study. About one pound of improved seed would be given to each producer. Verbal information at the time of distribution, an article in the Church paper, and an announcement by the local priest were considered sufficient communication reinforcement. Lastly, sufficient time would be spent with the local priest and the head of the agricultural development bank so that they would understand the advantages of the improved seed over the native varieties. Furthermore, attempts would be made to encourage the development bank to start carrying the improved corn seed for the next planting.

A final step in the analysis would include returning to the area a year later to observe the results. This would involve rechecking the original strategy's effects against desired outcomes and evaluating why the program might not have turned out as expected.

VI. Summary and Conclusions

The present paper has attempted to illustrate how researchers in less developed countries can construct strategies for economic and social changes at the local level. It was argued that this process cannot be carried out successfully until the role of the researcher is clearly understood. It is our contention that this role often includes not only data gathering and analysis, but also problem identification and concrete suggestions of methods for solving the problem, i.e., constructing a complete strategy of change. We further contend that this research is often interdisciplinary by nature and requires the analysis of a broad range of variables before the obstacles and facilities for change can be identified.

Although the data required to formulate a successful strategy of change will likely vary from place to place, it is hoped that the general approach herein outlined can serve as a guide for developing research programs in a number of different areas.