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THE ROLE OF THE RESEARCHER IN BRINGING ABOUT CHANGE IN A DEVELOPING COUNTRY¹

by

Henry F. Dobyns²

The scientific investigator can and does play a number of key roles in bringing about change in a developing country. I am not sure that we have the time this evening to discuss any great number of the possible roles the researcher may play in setting the change process in motion. Yet certain researcher roles are so important in bringing about change in the direction of national development that they can be readily identified.

My experience in the Andean countries of South America, in Mexico, and among the tribal peoples in the United States has led me to conclude that the most important role the scientific investigator can play in bringing about change in a developing

country is not a purely research role, but rather a training-through-research role.

There are, to be sure, many kinds of minor changes that the researcher can set in motion by playing a variety of purely research roles. Such changes are likely, however, to be minor or of short-term significance. They tend to achieve isolated impacts on the developing country, and not to be mutually reinforcing and cumulative, save by accident, as long as the research input comes from outside the developing country's own citizenry. Long-term and cumulative research acceleration of the change process generally results only from the activity of a domestic research population that interacts, to be sure, with members of the world scientific community in other countries, but carries forward a development-oriented program of research independently within the specific nation.

Allow me to illustrate this point with some examples from my own field of anthropology. Last October the Fifth Interamerican Indian Congress met in Quito, the capital of Ecuador. By far the largest delegation attending the Congress was that from the host country, with over sixty delegates. Many of these delegates presented papers on Indianist topics to the seven workshops held simultaneously during the Congress. Although his remarks were not reported in the proceedings, a young Ecuadorian priest accurately summed up the quality of the research represented by his countrymen's papers when he addressed to the Chair the remark that they reflected the fact that his country was

still in the "pre-scientific" era.

The fact of the matter is that there is not a single professionally trained Ecuadorian anthropologist working in that country today. One Ecuadorian with an M.A. degree in anthropology from the University of Chicago works for the International Labour Organisation in Africa. Yet, in Ecuador, "anthropological" research is carried out by men trained as school teachers, attorneys, and so on. No Ecuadorian university teaches anthropology, except for the study of the physical nature of man, and Ecuadorians have not studied anthropology outside their country.

As long as U.S. and European anthropologists are engaged in what might be termed "scientific imperialism" this state of affairs does not matter - it may even be somewhat advantageous. By "scientific imperialism" I mean the frequent practice of the fully trained professional from a developed country visiting an underdeveloped country to carry out a specific research project. The typical anthropologist gathers his own data and then analyzes it, so he requires no professional support or collaboration in the country where he conducts a study. The advantage of "scientific imperialism" lies in the lack of local professionals close to the phenomena the scientific imperialist analyzes who might check up on his conclusions and dispute them.

The moment practitioners of a scientific discipline from a developed country become involved in a development-related

research in an unevenly developed country, on the other hand, they must concern themselves with the state of the discipline in that country. When the Cornell University Department of Anthropology undertakes to work with the Ecuadorian Institute of Agrarian Reform and Colonization, its anthropologists immediately begin field training Ecuadorians.

The kind of problem the Agrarian Reform Institute poses to the Cornell anthropologist is this: given the fact that this organization has assumed technical title to seventy-six manors belonging to the State, the Institute ideally should have in hand a base-line study of the former serf population of each and every one of those manors before planning and mounting its specific reform program in each estate. Cornell University, faced with its own rising tide of students who require increased staff to teach them, and competing for faculty with other United States universities in the same situation, can assign one anthropologist to Ecuadorian developmental research. That is exactly one-seventy-sixth of the number of fully qualified anthropologists Ecuador needs for this one development and change program right now.

So the Institute of Agrarian Reform requests that Cornell's one available anthropologist initiate a base-line study of one of the larger manors, where local conditions suggest that a large number of individual farmers might be benefited by a successful agrarian reform program. In this case, the anthropologist discovers that the manor population consists

of a non-resident overseer, two local foremen, and twenty-two Indian serf families. This is a population of almost ideal size to be studied by an anthropologist over a year's time. Even smaller populations have been written up in full-scale monographs.³ If the anthropologist were engaged upon an imperialistic scientific investigation, she might settle in to study twenty-five families all by herself.

In this case, however, the Ecuadorian Institute of Agrarian Reform and Colonization works under tremendous political pressures to produce significant results quickly. Cornell's cooperating anthropologist does not have a year available to study twenty-five families. She has three to four months to conduct a base-line study, analyze her findings, and report them to the Institute so that it can move ahead on a politically-set schedule of action. This forces the cooperating anthropologist to hire local staff: a Peruvian anthropology student, an Ecuadorian social worker with brief training in an Organization of American States community development program, an Ecuadorian attorney-anthropologist; and improve their interviewing and analytical skills on the job in the field as the research progresses.

The first and obvious research finding in this case is that the population that must be studied is not twenty-five families, but a minimum of six adjoining populations. For the manor with its handful of serfs had been worked by labor from five adjacent "free" Indian communities. The land base

in each of the five communities is minute, and up to eighty per cent of the adult male population is absent at any given time earning wages for unskilled labor in Ecuador's cities and ports. The research team is faced at once with the basic problem of counting the population that may be affected by the agrarian reform program to be carried out on the manor. The community on one side turns out to have 170 families. The community on the other side turns out to have about 270 families. The team has not yet succeeded in even estimating the population of the other three communities behind the estate, largely because of the long-festering bitterness toward the manor operators for territorial encroachment on community lands.

The field team proceeds with its assigned research, but a more general conclusion than the ones sought by the Agrarian Reform Institute emerges from this experience. In Ecuador, the pace and excellence of land reform measures are to a large extent tied to the supply of trained scientists. Even to carry out her immediate applied social science investigation, Cornell's single anthropologist must train Ecuadorian personnel in interviewing and quantitative data analysis.

If rapid and large-scale social change is to be achieved, then a great many Ecuadorians must be trained in anthropology very quickly, in order to man the many research posts clearly called for.

The same experience also reveals that Ecuador is handicapped not only by an acute shortage of social scientists, but also an acute dearth of scientists of all descriptions. If the social science team is to make realistic recommendations to the Institute concerning the human use of the former manor lands, it must know the human carrying capacity of the land. This means assessing the agricultural potential and the livestock carrying capacity of the manorial holdings. Such an assessment requires agronomists, soil chemists, stockmen, etc. The social scientists find that the Institute has two mobile teams of such experts to cover all its holdings in the country. This estate must wait its turn to receive even an approximate evaluation based on a brief two-weeks reconnaissance. The country needs, not the scientific imperialist who visits Ecuador and returns to the United States or France, etc., to publish a paper on soil regions of Ecuador, but a score of soil scientists who will spend one to two years systematically mapping local soil characteristics while training on the research project Ecuadorians in Ecuadorian educational institutions.

The key role played by native scientists in the change process is very well exemplified in Israel, a nation that is certainly changing and developing rapidly. Advanced training for a select few has been provided in Israel by the Hebrew University and the Technicon in Haifa, founded prior to World War II, and the Weizmann Institute. Scientists there have

already made significant contributions to basic physics, the desalinization of water, and various techniques for raising arid land agricultural production, and they have managed to launch solid fuel rockets and operate two nuclear reactors. Yet, in many instances these scientific achievements basic to the development of Israel have not rested entirely upon Israeli training. For most scientists and engineers there "have drawn at least part of their techniques from foreign institutions" (Bayne 1963:380). The plant physiology research group in the Negev Institute is headed by a man with ten years' experience in California, and includes Ph.D. holders from the universities of Nebraska, California, and California Institute of Technology (McElheny 1965:1129). Israel Mining Industries' process development team is headed by a Columbia University Ph.D. and its organic chemicals research is led by a University of Pittsburgh Ph.D. (McElheny 1965:1130), and so on. A key question in Israel is whether the existing experience and skills can reproduce themselves swiftly enough to maintain the general rate of cultural development achieved thus far by tremendous infusions of intellectual capital (Bayne, 1963:380).

Having belabored the need for training local scientists in the course of developmental research, I would like now to discuss some, at least, of the types of research roles appropriate to the initiation and acceleration of the change process.

The very term "underdeveloped" implies that the role of the scientific investigator in a country so labeled is more appropriately "applied" than "pure" research. "Underdevelopment" implies, that is, that a country is attempting to catch up with others that are already "developed".

To the extent that science is general and generally applicable, scientists in underdeveloped countries need to be adequately trained in their respective disciplines. There is great danger, however, in attempting to apply general scientific principles worked out by scientists in one ecological or cultural context, to other ecologies or cultures. Potatoes that produce magnificently because they are resistant to diseases prevalent in New York State may turn out to be completely susceptible to highland Mexican potato diseases (Paddock and Paddock 1964).

Let us examine a particular case in some detail. The government of Bolivia, which has received more United States aid per capita than any other country in the world (Gerassi 1965:283), promotes colonization of its vast lowland jungles by its dense highland Indian population.

A general prediction that might be made about resettlement projects all over the world is that: if human beings move from a familiar to an unfamiliar ecology, then they will not know how to exploit fully the food resources available in the strange environment.

This proposition implies that a migrant population will tend to continue to rely upon the foods available in the ecological niche it left, if previous research has not identified useable foods in the new environment and the results of such research have not been communicated to the migrants.

This general proposition is one that any Bolivian social scientist with adequate training should be aware of or able to formulate for himself. Such a general proposition cannot predict, however, which specific foods a given migrant population will retain from its ecology-of-origin, and which it may accept in its new ecological situation.

Only new "applied" research on the migrant population in the new environment can provide such information.

We may consider the research problem in this instance, as in many cases of developmental research, as that of collecting appropriate information to draw up a "cultural context map" of Bolivian food habits.

One portion of this map depicts the established tastes of the highland Indian population of Bolivia, its traditional dietary, homemaking customs, and so on.

Filling in this portion of the "cultural context map" is a task that even the scientific imperialist can help carry out. A series of unconnected and uncoordinated community studies may still provide sufficient information to permit drawing up a general outline of highland Indian food preferences and habits.

Thus, one finds that rural Bolivian Indians eat meat but rarely, yet enjoy it and like mutton.

One finds that the dietary staples are cereal grains, and tubers originally domesticated in the Andes - the potato, olluccu, oca, etc.

One finds that food crops that are unique domesticates in the high altitude of the Andes furnish a significant portion of the diet - quinoa, canihua, etc.

Then, relying upon extant scientific generalizations, one can predict that "Immigrants to a new cultural and ecological environment will borrow more extensively from the indigenous group than vice-versa" (Linton 1940:491).

Only new research that would generally be labeled "applied" can reveal that portion of the "context map" depicting the migrant reaction to the new environment. In Bolivia's Caranavi zone, for example, a quick reconnaissance reveals that the highland colonists are occupying an area without indigenous inhabitants. The jungle Indians native to the area either have been exterminated by communicable diseases, or pushed out by the Bolivian army's pioneer battalions. So there is no opportunity for the colonists to borrow food habits from the natives.

Quick reconnaissance reveals that the Indian colonists in the Caranvi zone inhabit an environment rich in tropical fruits. All along the penetration road one sees grass thatched fruit holding and loading huts where the colonists bring

bananas, oranges, tangerines, and so on, to ship to the city market. Jungle green hillsides are speckled with the bright orange blossoms of mango trees, and the deep green leaves of the tremendously efficient papaya tree stand out against the blue sky.

Only when I had a very difficult time obtaining a papaya fruit for breakfast in the hotel in Caranavi where a captive monkey and several hens reveled in dozens of ripe fruits falling from the trees in the yard did I begin to wonder. Systematic questioning by members of the research-and-development team revealed that the Indian colonists regarded papaya fruit as poisonous, and that they did not eat it.

Systematic observation of Indian colonists' food habits by the members of the research-and-development team also revealed that the farmers treat bananas as do the city dwellers who purchase the ones exported from the area. That is, they eat the fresh, ripe, fruit. Living in an ecological niche which offers bananas and plantains in plenty, they do not know how to cook these fruits in any of the twenty-five to fifty ways known to inhabitants in the same kind of environment in other parts of Bolivia.

The completion of the "context map" by research describing conditions in the new environment permits developmental decisions to be made once the findings are communicated to policy makers.

Until those responsible for community development in Bolivia knew that Indian colonists in the Caranavi zone believed papaya fruit to be poisonous, they could not even formulate a realistic home demonstration program for the colonists.

Until the policy-makers knew that the colonists were eating bananas as fresh fruit only, they could not even plan to provide home demonstration aimed toward teaching colonists' wives to treat this type of fruit as a major tropical environment cooked food resource.

Knowing that the Indian colonists were making considerably less than maximum use of the tropical food resources available to them in their new agricultural settlements, the authorities could devise a home demonstration program to make the settlers more economically self sufficient, and better fed qualitatively and quantitatively.

In the specific case, the Cornell research-and-development team was able within a few weeks of discovering the food habits of the settlers in the Caranavi zone to add an energetic home demonstration agent from the Santa Cruz Province where tropical fruit cookery is well-known.

One of the typical requests personnel of the Agency for International Development makes to the social scientist is for a simple manual of procedure that will enable any individual charged with bringing about change in some developing nation to go and succeed in doing so. On occasion, even

well-trained scientists have asked me to state the general rules for successful cultural change from a single case (Mosher 1962:123). The only general rule I can offer seems to be that each change program requires accompanying research to provide decision makers with a suitable "cultural context map" of the cultural system as it emerges during the process of change (Dobyns 1962:123, Arensberg 1962:124).

The "cultural context map" of Vicos worked up by the Cornell Peru Project during its fairly well-known (Holmberg 1960) prototyping project there (Lasswell 1963:99-120) cannot be abstracted from that specific situation and applied willy-nilly to others. The research-and-development teams now at work in Bolivia whose activities I have touched upon briefly are directed by the same personnel that carried out the Vicos prototype project, employing the same general social science principles. Yet cultural context mapping of the specific cultural patterns of the Caranavi colonization zone is just as necessary and integral a part of development there as it was at Vicos.

At Vicos, the highland Indian population was resettled in a radically different environment. It was developed in place. This development included the addition of new foods to the Vicos Indian diet, and an increase in the quantity of traditional foods available to the Indians.

In this case, the food preferences and habits of the Indian serfs could not be outlined even in very general terms with

any assurance. When the Cornell Peru Project began, no highland manor population had been scientifically studied, so it was questionable whether the food habits of Indians living in free land holding communities would also obtain among serfs bound to the land. The number of studies that had been made of highland Indian communities was also too small at that time to permit extrapolation with any great degree of confidence.

Investigation disclosed that while the Indian serfs relished meat, only about eight per cent of the manor population that owned eleven or more head of cattle enjoyed meat at all regularly (Vazquez 1965:9, Alers 1965:19). Tubers were also enjoyed, but crop failures due to lack of knowledge of insecticides had virtually removed potatoes from the diet (Vazquez 1952:42), and the men always avoided mashua in any event, believing that consuming it destroyed a man's potency and virility. Cereals had also to be purchased for cash earned by cheap wage labor, and eggs were a principal sales export item, whose taste was known to the serfs only as a medicine.

The Cornell Peru Project staff was able, once the research revealing the facts just outlined had been carried out, to make a developmental decision to take the manor fields out of flax production and plant them to potatoes, and to institute a sharecropping arrangement designed to teach the serfs how to raise potatoes on their own plots successfully (Holmberg 1960).

Now that developmental decision depended not simply upon the social research conducted by anthropologists. It also depended upon agricultural research conducted by horticultural scientists seeking heavily producing white potatoes resistant to disease, and field trials of fertilizer, fungicides and insecticides under high altitude Andean conditions. Without assurance from agricultural researchers that a complex of potato cultivation practices would yield good results under Vicos soil, climactic and attitude conditions, the social scientists could hardly have decided upon potato production as the mainstay of the change program at Vicos with confidence.

Thus the cultural context map worked up for the Vicos prototyping endeavour necessarily included both agricultural and social scientific research roles in the developmental process.

Perhaps the nature of a national "cultural context map" may be more readily appreciated by reference to the Israeli example. While agriculture launched this small country economically, its reliance upon citrus fruit sales leave it no better off than those one-crop countries that earn foreign exchange selling coffee. Since Israeli citrus fruit must be sold in Europe after a long sea voyage, it competes with the Italian and Spanish citrus crops, and is subject to European Common Market tariffs (McElheny 1965:1123-1124).

This side of the Israeli cultural context map helps to specify the kinds of research projects scientists in the

Weizmann Institute decide to embark upon, through the Yeda development company, formed in 1959.

On the one hand, improving inventions that will aid the present foreign exchange mainstay are to be sought. Yeda has already developed a plastic protective coating for citrus fruit, as well as new varieties of seeds (McElheny 1965:1129).

On the other hand, basic or improving inventions that will increase Israel's capacity to market industrial products abroad are to be sought to diversify the country's sources of foreign exchange.

The early Yeda efforts appear to be mainly sophisticated instrumentation - a constant-velocity Mossbauer spectrometer developed in the electronics department, an ultramicrotome developed in the biological ultrastructure department, etc. (McElheny 1965:1129).

A politician can decide upon a course of action, such as a program of popular cooperation in community development projects on the part of the citizenry, on the basis of his impressions gained in wide travel through his country, and vivid memories of as little as one settlement (Belaunde T. 1959:37).

One of the appropriate roles for the researcher in a country where such a politician gains office is to survey the actual incidence of local capacity for significant community development inputs, as indicated in the history of community development projects, already successfully carried out (Dobyns: 1964:48-97).

Systematic collection of this class of information permits basing decisions as to the priority of allocation of scarce resources upon non-partisan and measurable criteria of probable success - as in the United States AID small projects program established in Peru as the Hon. Brian Beun has done - rather than upon the partisan criterion of having voted for the government in power at the last preceding election.

The periodic collection of such data also permits the measurement of developmental progress. Many kinds of simple data collection are required to estimate progress or stagnation in the underdeveloped nation, and some that are not so simple. The detection of nativistic religious movements may be as simple as reading newspaper reports of fighting in the Congo, or may require skilled interviewing (Mair 1959). Census taking and counts of various kinds identify a series of indispensable researcher roles in development.

To recognize the need for quantitative measures of progress in underdeveloped nations, and to launch large-scale data collection projects does not necessarily guarantee the reliability of the information compiled. One result of "cultural context mapping" can be a realistic assessment of the lack of reliability of **quantitative** measures.

Many unevenly developed nations consist largely of rural peasantries. Participation in the process of seeking quantitative information from peasants is likely soon to convince the researcher that statistics based upon information provided by peasants are based upon evasion if not prevarication.

Peabuntries tend to fear quite resonably that census taking leads to increased taxation (Davis 1951). Members of the Anthropology Department have encountered rural Andean peasants who even underreported the number of their children for fear the central government might seize some of them (Doughty 1963:70). Even if he is not trying to collect quantitative data, the social scientist typically encounters suspicion on the part of peasants (Salim 1962:3), who lack the experience or intellectual horizons to comprehend the purposes of scientific research for other than very practical ends. When even so essential a modern activity as writing must be justified by the peasant (Friedmann 1960:6) the much more complex concept of research requires even more justification.

Another appropriate role for the researcher in the developing nation is the investigation of the nature of data collectors involved in census taking and similar large-scale attempts at measurement.

The neophyte researcher exposed to suspicious peasants often overcompensates in an attempt to gain rapport. The student from the national university, and upwardly aspirant member of the middle or upper class reared to look down upon peasants (Burela 1965) if not actively to exploit them (Friedmann 1960:20-21, Schaedel and Escobar 1959:17) suddenly finds himself at the mercy of peasants who can harm him professionally by withholding information from him. Faced with the disquieting attitude of the peasant suspicious of the

motives of everyone, and constantly on the defense, (Friedmann 1960:33), the beginning researcher may panic and seek to gain the cooperation of the peasants by making them promises of practical benefits to come as a result of the research which are far beyond the poor power of a university student or even a full professional to obtain (Vazquez pers. comm.).

Many underdeveloped countries employ one form or another of rote learning in their public school systems. In some countries where the Anthropology Department has carried out research, this type of training develops among students a strong motivation to provide "correct" answers to questions. This motivation has been found to carry over into census and similar types of interviewing. The enumerator trained in such a school system finds it very difficult to accept a "do not know" response from an informant, even when "do not know" is an appropriate response, and built into the schedule. Structured questionnaire results being biased by the elimination of "do not know" responses by the interviewers, it is important to both cultural context mapping and measurement of developmental progress that research be carried out in this and other interviewer characteristics that bias data.

Another type of reliability problem encountered in our research is the "half-sophisticated interviewer." In a current research program, one of our field supervisors administered a wave of three questionnaires to residents of a highland Andean farm community. He included in the questionnaire

certain questions designed to test the reliability of informants being reinterviewed. He employed the same interviewers to administer all three waves of questionnaires. The interviewers recognized the questions designed to test respondent reliability, but interpreted them as tests of interviewer reliability. In order to "protect" themselves, therefore, the interviewers carefully consulted the original interview schedules before turning in their later questionnaires, and made sure that the replies recorded on the later schedules agreed with those on the first interview. Thus the whole reliability test was invalidated by the "half-sophisticated interviewers" (Morris 1965).

Another instance of "half-sophisticated" study may be cited from the Vicos experience. The Vicos population has been subjected to a wave of nutrition surveys. These surveys have been based on the premise that Vicos families consumed two meals each day, in the morning and evening. The nutritionists have gone out to ask wives in sample families what they would prepare for the morning and evening meals, weighed the estimated quantities, and analyzed their results. Now the base-line anthropological study carried out in 1949-1950 indeed found the then-serfs to be consuming two meals per day (Vazquez 1952:42). It also reported that nutritional conditions were exceptionally poor even for the manorial system because of local crop failures in the serf fields (Vazquez 1952:59). As soon as Cornell Peru Project technological

innovations in agriculture permitted the Indians to raise large potato crops successfully, the Vicos diet improved materially (Alers 1965:20). After the then ex-serfs took over the management of the estate in 1957, they instituted a policy of growing grain on community fields for sale to Indian families at a fraction of the regional market price, further improving the staple food supply in Vicos.

Long before the 1960 nutritional survey, therefore, the Vicos family was consuming three meals a day. When the members of the Cornell Peru Project discovered that the nutritionists were going out to analyze only morning and evening meals, they pointed out that the Indians were by this time eating a noontime meal as well. The very anthropologist who conducted the base-line study pointed this out but his statement published eight years earlier outweighed all his verbal statements with the nutrition surveyers. North American students spending the summer living with Indian families remonstrated that their landlords were serving them thick soups with an egg on top for lunch, but the eight-year old printed statement that no lunch was eaten by the serfs, who knew eggs only as medicine, governed the research behavior of the nutrition surveyers. Thus the amount of dietary change that actually took place was grossly underreported by "half-sophisticated" surveyers. The inevitability of such research behavior occurring in developing countries while they are training their own researchers makes indispensable the research

role of studying the methods and techniques employed in all kinds of data collection designed to measure change. For without knowledge of the quality of the measures being taken, policy makers cannot employ those measures confidently.

To recapitulate briefly, then, what I have outlined as roles for researchers bringing about change in underdeveloped countries, these involve:

First and foremost, the recognition that the role of researcher concerned with long-range and significant cultural change must be a training role at the same time that it is a research role.

Secondly, while researchers in developing nations must be firmly grounded in general scientific principles, their active investigatory roles most frequently must deal with problems of application. What I have called "cultural context mapping" constitutes a major role for the social scientist, the home economist, the nutritionist, and other specialists who must provide policy and decision makers with facts upon which to base both planning and policy.

Third, the collection of data for measuring developmental progress is a major research role which calls for methodological analysis of the data collectors themselves, in order to evaluate the reliability of the data being fed into the change process.

In other words virtually every type of scientific research is pertinent to the role of the researcher in the

in the developing nation at one time or another, and all are crucial to accelerated change. For only research can provide facts upon which to base human control of natural environments and human attempts to control human institutions for the benefit of all men and women advantageously.

NOTES

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3. Kurusu consisted of 18 dwellings when studied by Smith (1956:4); Niiike consisted of 24 households (Beardsley, Hall and Ward 1959:225).

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