



EMPRESA BRASILEIRA DE PESQUISA AGROPECUÁRIA (EMBRAPA)
BRAZILIAN AGRICULTURAL RESEARCH CORPORATION (EMBRAPA)

**MAKING EFFECTIVE USE OF INTERNATIONAL
PERSONNEL**

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EXISTENCE OF KNOWLEDGE AND TECHNOLOGY BACKLOG

The existence of a large number of proven technical innovations in the developed countries could be a fundamental factor in conditioning structural transformations in developing countries, since this technology reserve, much of which is transferable, creates the possibility for the developing countries to bypass the vast investments in time and resources that the accumulation of this knowledge represents. Advances that have taken years of research, and development by other nations or research institutions, are available for potential use and adaptation.

The potential for agricultural development of such scientific innovations as the correct use of irrigation, fertilizers, and improved seeds is perhaps greater in these countries than in the more advanced nations, since most of them are located in tropical or subtropical regions where climatic conditions are especially suited to the use of biological and chemical techniques designed to increase production.

Presently, however, skills that have been developed during the expansion of agriculture in temperate regions can only be directly transferred, with little risk, to countries with similar climatic conditions. Since most of the developing countries are outside of the temperate zones, there is a need to customize existing technology to allow for the great diversity of agricultural conditions existing in these developing countries.

Research workers must be constantly alert to the opportunities provided by new information, resulting from basic research carried out elsewhere, as well as to new technological breakthroughs. It would be professional negligence not to benefit from every step forward made in agricultural knowledge in any part of the world. As a result of increasing specialization, usually only workers engaged in research are able to keep abreast of developments in their own field and correctly evaluate the potential importance and applicability of the results of basic research carried out elsewhere.

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DIFFICULTIES OF TECHNOLOGY TRANSFER

Several specific problems have limited progress in transferring innovations so crucial to agricultural improvement. Lack of continuity in research programs and failure to make research relevant to actual conditions at the farm level are two major factors which have compounded the difficulties resulting from limited financial support and lack of trained manpower. Furthermore, technical assistance programs which enable developing countries to employ international scientists with broad experience and demonstrated capacity for productive research, do much more than simply overcome a quantitative deficiency. High quality academic training is a necessity but not a guarantee of successful performance as a research worker, while effective leadership in the planning and execution of research programs is a rare talent that is best nurtured through a "learning-by-doing" involvement in successful programs.

Although the need for foreign scientists is clear, their employment has entailed important disadvantages. It is almost inevitable that a foreign scientist will lack a deep understanding of existing farming systems and the constraints that condition the ability and willingness of local farmers to accept innovations. In fact, the educational background of many agricultural scientists of developing countries is such that, not infrequently, they also lack an understanding of actual conditions at the farm level.

Closely related to the foregoing problem is the lack of continuity in research personnel and programs with frequent adverse effects on the results achieved. It must be recognized that an individual with a specialized competence can often make a notable contribution in a short period of time, provided the existing staff is able to convey its experience and understanding of problems to the new staff member and in turn profit from his special knowledge and skills. All too often, the core staff, to provide the continuity and fruitful interaction, has been lacking. These problems are, of course, exacerbated when recruitment procedures, incentives offered, and working conditions fail to attract scientists of high caliber.

Ruttan and Hayami divide technology transfer into three phases: (1) material transfer; (2) design transfer and (3) capacity transfer or institution building¹.

¹ Ruttan, V.W. & Hayami, Y. Technology transfer and agricultural development. *Technology and Culture*, 14(2):124-5, apr. 1973.

The problem of facilitating international technology transfer as an instrument of agricultural development is, therefore, how to institutionalize a system of adaptative research and development which is responsive to the opportunities for technology transfer that exist in each developing country.

This system, once institutionalized, will be able to use problem solving capacity and know-how, existing at the international level, to solve local problems.

In general, as far as effective use of international personnel is concerned, one must delimit two major activities: institution building and problem solving, and define these two functions and the type of foreign technicians accordingly. Great care should be taken not to use these two groups interchangeably.

INTERNATIONAL INSTITUTION BUILDING SPECIALISTS

The major contribution of this group will be what Hayami and Ruttan defined as "Capacity Transfer"¹. They will build a capacity in a host country that will, with time, enable the production of locally adaptable technology, modelled on the prototype existing abroad, or might even create completely new prototypes in collaboration with local research technicians and supporting institutions.

These international technicians will create the capacity in their host country to select the proper plant varieties and animal breeds under local conditions until these varieties and breeds can be produced economically. They will show how to modify imported machinery designs in order to meet climatic and social requirements and factor endowments of the economy. By identifying or creating technology that makes sense economically to producers, they will create technology leading to induced innovation. By organizing research and by teaching social sciences applied to agriculture, such as agricultural economics and rural sociology, and by taking a stand on issues (which local technicians may avoid) these scientists, through their publications in international technical literature, may cause what Ruttan refers to as "institutional innovation" and identify social problems that hinder progress. They will suggest solutions and create awareness of the problems that will in turn create a proper environment for social change.

This group of foreign scientists is difficult to identify and recruit. Even with much practical experience, many poor choices are made. The reasons for these failures are varied, but among them one can mention the following:

- 1) Difficulty in recruiting established scientists for long periods of time and providing them with the necessary support which they are accustomed to in their own country.

¹ Ibid.

2. Creating a good working relationship with local professionals. One problem is that too often the salary scale of local professionals, having an educational level and experience similar to foreign personnel, is significantly less. The personal relationship in this situation becomes rather difficult. The only solution is to have a comparable salary scale, at least for those professionals working directly with international personnel.
3. The international specialist, with long years of experience, may have to respond directly to a local executive who is poorly trained professionally and may have problems communicating with him.
4. A major problem is that a large number of international personnel usually come on short-term assignments and are often able to propose solutions for a specific problem without sufficient time for its implementation during their term of residence.
5. The expertise gathered during short-term problem solving assignments is later considered as valid in selection for long-term assignments that include institutional development rather than problem solving proposal formulation.
6. The recruitment of long-term foreign personnel should be based on completely different criteria than for the short-term problem solving specialists.

Certain professional qualifications and other criteria to be considered in the selection of institutional builders are:

1. Ability to get along with others and work under unfavorable conditions. This capacity could be reinforced by prior experience in student jobs, military service, or peace corp-type experience, etc.
2. Ability to learn languages. This could be judged by grades obtained in college in courses in his native and in foreign languages and by supplementary skills acquired.
3. Athletic record, especially in group sports, could be indicative of his ability to work with various types of professionals in a team.
4. Family situation including wife's attitude and interest should also be considered.

5. In certain cases religious preference and country of origin may also have to be taken into consideration.

In addition, some positive characteristics and attitudes for the institution builder are:

1. He should give high priority to activities that strengthen the technical and institutional capacity essential for institution building of research and related systems.
2. His work should include giving some formal or informal in-service training to his local colleagues as part of his regular activities.
3. His major goal should be creation and adaptation of new technology as a way to develop appropriate methodology and capacity needed to produce this technology.
4. In seeking solutions for agricultural problems, he should dedicate his efforts to strengthening the research institution so as to build problem solving capacity rather than dedicating all his efforts to finding the optimum solution for a particular problem.
5. He will try to use local resources, whenever possible, rather than imported ones.
6. Finally, and most important, he will have to be able to "build" research programs on a national or regional scale. By organizing new research programs within the existing framework, he will build a permanent capacity to do problem solving research that will remain and be self-perpetuating long after he leaves the institution.

It is highly desirable that his contract be long-term, so that he can become completely involved with the problems of the country he is serving. Therefore, it must be established from the beginning, that his responsibilities and obligations are with the country that he is serving and not with the agency that pays his salary.

This type of specialist, when found in the areas of research administration, should have work experience in an on-going research institution. He should be proficient in research planning and budgeting, human resources improvement and training, program organization, project evaluation and in understanding the mechanisms of technology transfer.

The specialist in experiment station development can also be included here. He must be able to design, budget and construct the buildings and plant required in an experiment station as well as plan and develop the field sites, with irrigation and drainage, in an efficient manner, and to train personnel to run the experiment station.

In both cases, it is also important that international personnel take the responsibility of on-going projects and not simply act as advisers. In addition, they should understand that they must train people who will replace them later on.

It is advisable that the national institution which employs the international personnel help them to feel that they are welcome and useful. They should take part in all meetings, field days, etc., including social events. By clearly specifying what is expected of them, and then giving them complete freedom to work, the necessary relationship can be achieved. On the other hand, international personnel, who come only as advisors and refuse to get involved in other activities of the institution, should be immediately disposed of because they will adversely influence the entire institution.

INTERNATIONAL PROBLEM SOLVING SPECIALISTS

Most agricultural research should be highly applied and developmental. The success of this research depends on its problem solving potential.

The most efficient manner of utilizing advanced skills of various specialists available for short-term consultancy is to have local technicians along with administrators first define a specific research problem. After defining the problem, they review the approaches and study solutions which have been used in other countries, and identify professionals who have made important contributions to these solutions. Then, via various technical organizations, they contact a particular institution, asking for a specific research worker or a suggested substitute.

By properly emphasizing the selection of international personnel and by using, among other things, information systems to survey the existing bibliography and various reports on research in progress, the proper man for every job can be identified. When a country does not have its own research workers who can follow the work of colleagues in other parts of the world, and identify proper specialists, it can: (1) Define the problem and ask a specialized agency to find an appropriate specialist; (2) Call a specialist team to define research problems and formulate proper job descriptions for specialized technicians or prepare lists of potential candidates.

Knowledge has no organizational or national boundaries. Given the international character of science, the selection criteria for problem-oriented research personnel should be based on professional qualifications. Host country scientists working inside or outside of their countries should be considered together with foreign nationals, and multinational teams should be encouraged. Professional experience and publications could be used as major criteria. In the case of younger professionals, university degrees and academic records should be used in the selection process.

The so-called "foreign", "overseas" or "international" experience should not be considered more important than experience in one's native country unless it is directly applicable to the problems under consideration. This is due to the fact that what is foreign experience for one technician will be local experience for another.

The selection should not be limited to a rather small group of well-established and internationally travelled scientists often available for "short-term assignments".

Some international technicians who may not have the experience, know-how and *curriculum vitae* of the established professional elite, can be selected from the larger population of scientists. Out of this larger group, a selection could be made among those who by their academic records, including thesis or dissertation work, show high potential. This group will usually show higher motivation and a greater willingness to work than the already established internationally experienced group.

The work of international scientists should be done on the basis of cooperation and partnership. The visiting scientists will not be working "for" the host institution and its scientists, but rather will be working "with" them. This concept of assistance is in part due to the recognition of the mutual benefits of joint efforts.

Any publication resulting from the work of a visiting scientist should preferably be a joint publication with his host country collaborators. This will avoid the impression that the visiting scientist is mainly interested in collecting data and information so as to be able to make a contribution to professional literature. In some cases it may be preferable to have him sign an agreement not to use data and information gathered during a given period of time unless authorized by host authorities. This will aid the scientist in concentrating on finding solutions to problems rather than collecting interesting data for professional publication.

Sometimes it will be necessary for the host institution to protect the visiting scientists from their own sponsoring institutions in terms of writing reports which

may not be of interest to the host country, as well as to exempt them from other administrative formalities that may take a considerable amount of their available time. It should also do everything possible to help him with local formalities and see that a major part of his time initially is not spent finding lodging, dealing with customs formalities, purchasing an automobile, transferring money, getting a local driver's license, etc.

The potential language difficulties should be taken into consideration during the planning process. In this regard it is suggested that:

- a) In case of a long-term assignment, giving too much weight to the knowledge of the language may lead to the wrong choice in terms of professional qualifications. If language knowledge is essential, either host or sponsoring institution should provide the best available training during the initial part of the assignment.
- b) In case of short-term assignments, it is desirable that host country colleagues be able to speak the language of the foreign technician, or the host should provide a translator when needed. Otherwise the entire effort may be a failure due to communication problems. If the nature of the assignment creates a need for a review of the local literature, this literature should be collected in advance and put at the disposal of the scientist upon his arrival. It should not be restricted to a few reports written by other international personnel on short-term assignments. The work of national scientists should be given priority.

Interviews and the other contacts of short-term consultants should not be limited to foreign-trained and foreign language-speaking high-level authorities and university professors, but should include "shirt sleeve" technicians and active research workers. As a question of principle, even though not needed operationally, a certain number of visits to farms, markets, cooperatives or other agricultural institutions should be included in the program to give a visiting scientist a certain contact with the reality of the agricultural sector.

CONCLUDING REMARKS

The purpose of this paper is to identify and discuss principles involved in the effective use of international personnel.

In general we can classify the international personnel into two broad categories:

- a) Institution building specialists
- b) Problem solving specialists

The institution should be understood as a group of people united for a common purpose within an organization containing the necessary physical infrastructure needed to carry out this purpose. It is assumed that the institution fulfills certain basic needs of individuals and the society.

The comprehensive aims and scope of the agricultural research institution building concept naturally increases its visibility and the interest taken in it by politicians and their numerous constituencies.

Once institutional mechanisms are established to transfer, adapt and create agricultural technology, farmers in developing countries will be able to increase their productivity at a relatively low cost, and at much faster rates than farmers in countries that had to cope first with the problems of new technologies.

It would be a mistake to conclude that foreign expertise should be limited to trouble shooting and finding solutions to already identified and defined research problems. There are foreign personnel who, in view of the shortage of local trained technicians, can be pioneers of new developments and institution building. They can be thinking ahead of farmers and planners and spearheading agricultural progress in any part of the world.

In the case of the problem solving specialist, the situation is somewhat easier, because normally he is on a short-term contract to solve a specific problem. What is important is his degree of competence in relation to the problem.

Great care should be taken so as not to use the problem solving and institution building specialists interchangeably, except in special cases.