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THE AID CENTRAL RESEARCH PROGRAM 1/

This paper is an attempt to describe a broad scale worldwide research effort that is approximately ten years, 100 million dollars, and about 150 projects of age. This description will make use of numbers to the extent possible. It will present facts and figures on the size of composition of the research program since the beginning, an explanation of management system, some discussion on evaluation preceding this review, and a few statements on the payoff of the program. Some history, of course, will be presented, but it is not intended to be a historical treatise. The purpose of this paper, in a word, is to expose the program to your view and review.

The research program manifests many of the stops and starts of the general AID program, as the charts indicate. On the other hand there are threads in the program that indicate a considerable continuity. There has been change in research problems, approval and review processes, Agency, participation, and other aspects as will be outlined, but they are evolutionary in nature and were made in efforts to improve the program.

PROGRAM SIZE

Section 241(a) of the Foreign Assistance Act authorizes expenditures for research and also establish a ceiling of nine million dollars. The Title X legislation, providing for the total population program, provides for research, but carries no ceiling on any component.

The size of the program has varied surprisingly little, not counting population research funded by Title X since 1969. In 1962, funding amounted to 7.7 million, falling to $5.6 million in 1963, and rising to 8.9 million in 1970. Counting Title X, funding reached 16.1 million in 1970. Funding in 1971, still uncertain, will probably slightly exceed 1970 levels in both categories. See Table 1 for total funding by year and Table 2 for project funding by subject matter fields since 1967.

Size has another measure, number of projects. The number of active projects rose steadily from 25 in the first year to 78 in CY 1970. However, if Title X funding is excluded, the number of active projects rose to 66 in 1967 and remained at that level for three years before dropping to 62 in 1970. By 1967, 59 projects had been completed. At present, of 158 projects authorized, 78 are active and 80 have been completed.

Charting the new starts shows an interesting pattern. The record number of new starts was set the first year, at 25, and was almost equalled with the help of seven new starts from Title X in 1969, at 24. Even

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with Title X funds, the 1970 new starts hit a low for the entire period, at 11, only 4 of which were from 241(a) funds. From 1964 to 1968, the number of new starts fell continuously. Table 3 shows number of new starts by year, and field.

PROGRAM COMPOSITION

Composition of the research program has varied considerably. Table 3-A to 3-H present the new starts by title, by field, and by year, which could be expected to reflect in some way the Agency's interest. Some configurations do appear, but how firmly inferences can be based on them is not clear. Six sectors started research projects in the first year of the program, but only four in 1964, including Nutrition for the first time, which meant no new starts in three fields active in 1962 -- Health, Education, and Industrial and Urban Development. No pattern can be detected. New starts were made in six sectors in 1965, but only three in 1966. The number rose to six in 1968 and again in 1969, fell to three in 1970 and rose again to six in 1971.

Perhaps the number of active projects by year gives a better picture of the research emphasis since some projects are long lived and others are short. Number of active projects by year is given in Table 4.

Although agriculture accounted for only 10 percent of the projects in 1962, it quickly became the largest sector in project number, a ranking it has held on to. In 1968, almost 40 percent of the active projects were in agriculture, and in 1970, almost 35 percent.

Dollar-wise, agriculture accounts for a little more than 33 percent of the total research funds, 33 million out of 84 million, and still holds first place, although it is surpassed by population in active projects funding.

Industrial and Urban Development started strong, five projects in 1962, but only two started later, both in 1965. A little more than one million dollars has been spent in this sector.

Institutional and Social Development started strong, at seven projects the first year, rose to 12 in 1964. Six new contracts were started in 1965, but the total was down, reflecting the short-range nature of projects in this field. Only two projects are active now.

Economics research has been one of the most stable of the sectors. Starting at six projects in the first year, the number of projects has varied between 8 and 11 since 1964. Slightly over 11 million dollars have been obligated in this field, which puts it in third place by sectors.

Health research has grown, starting with 3 and reaching 11 in 1970. Nutrition research was not initiated until 1964, rose to 11 projects in 1967, and completed 1970 with 10.

Education, starting with five projects in 1962, increased to 8 in 1965 and tapered off to three in 1970.

Classification by sector is not an adequate presentation of the composition of the program. One must look inside the sector. Table 5 gives the aggregate funding picture for the program and Tables 5A to 5H gives details by projects in each of the sectors.

Agriculture

Just about half (20) of the 44 agricultural research projects have been completed. While agriculture has consistently made up a large part of the research program, emphasis has changed from "soft" sciences to the "hard" sciences, although the evolution has not been in a straight line. In 1962, two of the three research were in land tenure, and the third was a status report of arid lands research. In 1963, four of five new starts were in biological sciences, but in the next two years, not one of 10 starts was in the biological or physical sciences, although one was in engineering. The others were in institutional development, administration of technical assistance programs, marketing, diffusion of innovations, and attitudes. The only two marketing studies of the program were started in these two years.

In 1966, the social science emphasis dropped out of agriculture, with the exception of agricultural economics, which accounts for eight of the 23 studies started since then.

Much of agricultural research is characterized by long term projects. The Latin America Land Tenure Research Project, started in 1962, continued for seven years. Four of the five projects started in 1963 are still active either as extensions or new projects closely articulated with the old. The longevity did not apply to social science projects. All were completed within four years.

Institutional and Social Development

Fourteen of the 16 research projects were initiated in the first three years of the research program. Only one project was active more than three years, and one ended at three months. Four of the six studies started in the first year were for AID's internal purposes, pertaining to such things as job performance, adjustment to overseas work, attitudes toward the Alliance for Progress, and a review of AID publications, and all were completed within two years. Another big year

was in 1965 with five new starts after only one project was approved in 1963. No other research project was approved in the area until 1969, when two were added, one for less than two years. Three of the seven research projects of 1965 were to stage symposia, but none resulted in a follow-on research project. A study on institution building was approved in this sector in 1964. In the same year, Agriculture initiated a research contract in Administration of AID Programs. Both formed a basis for the study of AID/University Programs in Rural Development, from 1965 to 1969, which has generated a considerable follow-up activity in utilization, especially relating to institution building. This study is in part responsible for the Institutional Development Agreement. A team leader's manual is now in rough draft, institution building is being worked into AID in-service training, at least five national and international conferences have been held by AID, and others are planned.

Health

In health, with about 80 percent of the health research funds, malaria research has been emphasized of two malaria projects approved in 1962, one is still in operation. In addition two specialized projects have been added, one in Central America and one in Thailand. Two of the malaria research projects are for more specific purposes and require research more basic in nature. One is for the development of a malaria vaccine, and the other is for a serologic diagnosis.

The malaria vaccine project is rather unusual for A.I.D. It is designed to study immunity to malaria and develop a vaccine. The odds were against coming up with such a vaccine, but the gains to be made if such a vaccine were possible were judged to justify the high risk and high investment involved. The project started in 1966 and will have received $1.5 million dollars by the end of FY 1971. Vaccines are now available that have a significant effect on lower level animals. The contractor, the University of Illinois, anticipates it will take five more years of work, budgeted at $2.8 million to develop the vaccine for humans. Odds are more favorable now, than at the beginning, but this project will receive a thorough review and study before the Agency commits itself to the further funding.

The health program has used a total of $10.6 million in research.

Economics

Economics research jumped off to a strong start and continues to be an important element in the research program. One research project in international air transport was launched in 1961. There was another

in transportation in 1962. Attention in the early years of the program was given strongly to planning, economic structure, models, and trade, and these elements are still strong in the program. Evaluative studies appeared to be somewhat stronger earlier than now, as judged by such studies as foreign aid and its impact both on the U.S. and the recipient nation. A study on the impact of food aid on development was initiated in 1968, the last of the evaluative studies. Six studies were launched in each of the years 1962 and 1964, with two in 1963. Only three studies, no more than one a year, were initiated in the 1965 to 68 period, but three were launched in 1969, and one each in 1970 and 1971. Four of the earlier studies were continued for eight years, but many were no more than two years.

In the economics program, there are indications that greater care has been exercised in recent years to select fewer and presumably better research projects. The subject matters may not have changed much, but the methodology and design have.

Nutrition

Nutrition research did not join the program until 1964 when one project was initiated. A single project was started in 1965, but in the next two years nine were initiated. Perhaps nutrition has a more narrowly focussed research program than any of the sectors. Of 15 research projects, 11 were specifically aimed at protein, with a considerable emphasis on fortification. It is also one of the smallest programs, having used about 3.5 million dollars in 15 projects. Nutrition projects average a little over $200,000 per project, the lowest average of the active sectors.

Education

Education research has had an erratic history. Only ten projects have been approved, and nine of them were started in three of the first four years of the research program. Two projects were evaluation studies, and one was for general support of a regional research center. Education has the largest average project cost, just over $900,000. None of the early line of research continues to the present. New research on educational technology has just begun.

Industrial and Urban Development

Under this classification, new starts were made in only two years, 1962 and 1965, and no pattern emerges. This field of research, as it was oriented in the beginning, was early abandoned in the research program. A total of seven projects were approved for $1.1 million. Work under this heading should not be attributed to the present Offices of Urban

Development and Science and Technology which have only two research projects included in this study, both funded first with 1971 funds. Activity can be expected to increase in these areas.

Duration of Research Projects

Another way to characterize research composition is by duration of project. A total of 40 projects have been of short duration, two years or less, and 16 of these were started in 1963. At the other end of the scale, 27 projects were active for more than five years, six for ten years. Since many of the on-going projects could be extended, the tendency to longer life could be greater than the figures show. The average of all projects is 3.7 years. On-going project have an average total life of 4.6 years counting present approval period. The average duration of completed projects is just over three years. Table 6 shows the number of projects by duration.

Location of Research Activities

Research activities are presently being carried out in 43 countries. In most of the countries more than one project is active. India leads the list with 12 project having some activity there. Colombia is second with nine projects, more than half in agriculture, and is followed by Brazil with eight projects and Pakistan and the Philippines with seven each. In many of these countries the research is being carried out in close collaboration with national scientists and institutions.

MANAGEMENT OF THE AID CENTRAL RESEARCH PROGRAM

The AID Research Program is Agency-wide, even though the Technical Assistance Bureau has the responsibility to see that it is executed. Before the TA Bureau, this responsibility was with War on Hunger and with Technical Cooperation and Research. The wide participation in the research program is manifest in the project approval process.

Project Approval

A project idea can literally come from anywhere. It becomes a viable proposal, however, in one of the Technical Action offices of the TA Bureau or the Office of Policy Development and Analysis of PPC. The idea may come from a written proposal by a contractor looking for business, it may be developed within the office, or it may come from suggestions from operating personnel from the Agency, or a combination of several of these. It becomes a concrete proposal, to which others can react, with the preparation of a Project Statement by the Action Office.

The proposal then enters into a process of review and approval involving at least three distinct groups before reaching the Administrator for approval or disapproval. In this process, specific tests are applied. Each of these tests can be associated with a group, but the fact is that each group can apply other tests as well. The first group is the Agency technical committee, made up of technical specialists in the Regional Bureaus and TAB. The task of this group is to look at the proposal from the viewpoint of program administrators in a specialized field, such as agriculture, education, or population.

The second test, applied also by an Agency committee on which all Regional Bureaus are represented, the Research and Institutional Grants Council (RIGC), stresses the relevance of the proposed research to action programs of the Bureaus and the relative utility of the proposals.

The final regular process is applied by an is applied by an external advisory committee, called the Research Advisory Committee (RAC). It considers such questions as soundness of the research design and methodology, probabilities of success, time and resources needed, capability of the researchers, and similar items. However, this committee is not precluded from judging a proposal on the basis of other criteria.

Finally, the Administrator must approve all research projects before they are funded.

The Technical Assistance Executive Committee (TAEC) does not ordinarily look at individual research proposals, but it has the right to do so if it wishes. Also, members of the RIGC can request that the TAEC review a project if felt necessary for some reason, including appeal of a RIGC or TAB decision. These review committees, seldom flatly reject a proposal, but they frequently send it back for major modification.

Considering the composition of the three review groups and the seriousness with which they conduct their business, one cannot seriously criticize the stem as such. However, there are certain procedural problems in making it function effectively, the main one is that we still have the research proposal-approval process tied so very closely to the programming-obligating cycle. This means that proposals have to run a complicated process to meet some hard deadlines. This frequently does not allow the thorough review and re-review of proposals that would be ideal.

The procedure does not provide a specific Mission involvement in proposal development and review. Personnel of the technical offices are in frequent contact with Missions, many of them have served in Missions, and they are in contact with Bureau technical personnel, who in turn can be expected to reflect Mission needs. It does appear that the procedure allows adequate opportunity for the field to have an input into the development of proposals, but the procedure does not specifically provide for it. In some cases, during project execution, the Mission personnel in direct contact with researchers will have another chance for input.

As to answering such questions as need for a project, probability that this project will satisfy the need, applicability of results, and return to investment, one must conclude that the procedure does provide the mechanism for applying the judgment of the Agency.

Execution of the Project

Once the proposal has the Administrator's approval, conventional procurement procedures are followed for contracting. Although technical offices go a great deal farther than simply reacting to proposals from contractors in putting forth their own proposals, there is a close collaboration with the possible contractor in developing the proposal.

The project monitor is responsible for execution of the research project, including seeing that plans of work are developed, that project objectives are achieved, that necessary reports and reviews are excuted, and that an official project file is kept. Annual reports are required of all projects, and all projects are subject to a periodic review procedure. Each project must be reviewed each year and upon

termination. A new manual order in process also provides for special reviews when such would be necessary, either for outstanding accomplishment or for problems.

Official program files are kept by the Research and University Relations Office, which consist of proposals, RIGC and RAC actions, review actions, annual reports, and other project documents. The contract office maintains the official contract files.

One could judge that this mechanism, most of the elements of which are in practice now, is adequate, and in general the mechanism functions relatively well.

Monitoring

One of the key functions in research management is that of monitoring, and monitoring encounters troubles of various kinds. Two important problems are press of other duties and frequent changing of monitors. Table 8 presents data on 23 monitors and 58 projects. Four monitors handle half the projects, including one person who monitors nine. At the other extreme 14 monitors have only one project, which indicates a small amount of time devoted to research.

Table 9 shows the average that the average monitor presently serving has monitored his project for 19 months, just about half the average time which their projects have been active.

Special Problems of Research Program Management

Research management under any circumstance presents its own peculiar problems, and in an organization such as AID other peculiarities are added.

In general, research is a risky undertaking. Research is essentially nothing more than a systematic, orderly means of inducing innovation. That introduces a double risk. One is that the project will not result in the innovation sought, and the second is that the innovation if achieved may not survive. Not all do, a fact which makes autonomous change so slow. Research can speed up the flow of innovations and it can increase their chances for survival. But it cannot eliminate risk. Risk reduction is one criteria of good research management, but if induced too far, chances for gain are reduced to the point that research is no longer justified. Management must somehow balance risk and pay-off probability.

Research that is aimed to support a worldwide, multi-sector development program doesn't have boundaries as narrow and will defined as other programs or research programs in many commercial and government agencies while an important function is to support present operations,

one of the essential characteristics of research is that it has the capability of opening opportunities for new and improved operations. Several research projects exemplify this point. One is the University of Illinois project to develop a malaria vaccine. Another is the research on prostaglandins to develop a once-a-month contraceptive pill. The Tsetse Fly project which seeks a way of sterilizing male flies to reduce the population is another. Any or all of these could change completely program possibilities. With the funds at its disposal, the AID research program cannot cover the needs. It does seek to be sure that projects selected have a reasonable chance for success in an area relevant to development.

The United States, of course, has a huge stock of research and research capability. Often an AID research project can take advantage of this by making a relatively small investment, at the margin, which capitalizes on all former investment of others. The Oregon Weed Control project, The Department of Interior Vertebrate Pest Control Project, and the plant breeding projects are examples. These have good chances of pay-off.

On the other hand, some areas are so new, that AID has to do some of the more fundamental research. The work in prostaglandins, for example, is aimed at a specific, applied end, and indications are favorable. Yet, in order to get there, much of the basic work must be done by AID.

The Tsetse Fly project falls between these last two examples. It is based on a very successful program of control of the screw worm in cattle in Southern United States which in turn was based on extensive research. But the Tsetse Fly and screw worm are enough different that much more research has to be done, even though the United States experience can be utilized.

The management procedures and processes must somehow bring the program judgments, technical judgments, and intuition of the Agency to bear effectively on the decision. We are developing the system to assure, to the extent possible that these inputs result in good decisions on research investment.

EVALUATION AND EVOLUTION

Only one comprehensive review has preceded the current effort, that was done in 1966 by the Research Advisory Committee. However, there has been a continuous evaluation, from the Congress on down, and these evaluations have resulted in many of the characteristics of the present day program. The external Research Advisory Committee (RAC), the ceiling placed on research funding, and the practice of the Administrator approving each research project grew out of the Congressional review early in the program. In contrast to this kind of evaluation have been those informal ones growing out of the normal management function. There was a careful internal analysis of the program during the reorganization that resulted in the creation of the Technical Assistance Bureau.

Research was initiated in the Agency at about the time it assumed its present name. Previous to that time research was simply not considered necessary and in effect was prohibited in many operations. This was based on the belief that the technology already existed that would solve many of the world's problems and all that remained was to diffuse it. Simply providing for research funds did not change attitudes built up over a decade. Nor did it thrive automatically in an agency geared to achieving short-term results.

The process of getting a project approved was much simpler in the earlier days than it is now, and many of the projects started in the first few years were short run. Project selection was largely on an ad hoc basis in which the Agency either accepted proposals from outsiders or rejected them. When a proposal was received, a committee was called together to discuss it, a group was asked to review and comment, and the decision was made. At one time, the research organization was largely self-contained, with its own technical people and contracting mechanism. PPC had a separate research program.

The RAC was organized in 1964 to give proposed projects a careful scientific review by outsiders. Apparently the basis for this decision was the relative scarcity of research people in an Agency as oriented to action programs and short-run objectives as the AID and its predecessors had been. Shortly after RAC was organized, PPC initiated an internal review process. This was followed by the Technical Assistance Review Committee (TARC) organized when War on Hunger replaced the Technical Cooperation and Research Office. In this move the responsibility for research was placed in the same technical offices who had responsibility for other technical assistance activities, and the research office became the Office of Research and Institutional Grants, with programming and coordinating functions.

It seems relevant to comment on three evaluative processes that have apparently had significant impact on the program. One was the RAC review of 1966. The next was the organization of the Technical Assistance Bureau in 1969, and the third is the functioning of the program since 1969, with particular attention to the Research and Institutional Grants Council, the internal group that replaced TARC when TAB replaced WOH.

RAC Evaluation

The 1966 RAC evaluation can best be appreciated by some excerpts from its review, reported in the minutes of its meeting of September 27-28, 1966, and supplemented by a latter to Administrator William Guad from the chairman of RAC, Professor Welch McDermott of the Cornell University Medical College.

> 1. "In respect to coverage of projects. Although the balance between agricultural and non-agricultural research appears acceptable, the magnitude of the A.I.D. research effort in this area is hopelessly inadequate. There is no work on such key problems as land-water and surface-water use, land reclamation and erosion; almost none on tropical soils, on the production of better varieties of tropical products, on farm equipment and tools; nothing on livestock genetics, poultry improvement, fish-farming -- all very promising means of increasing high-quality protein intake in the LDC's. Livestock research alone could absorb the entire re-research budget. The amount available is ridiculously small; the program could be easily extended to another 40-50 projects, and the total amount multiplied by a factor of five."

This recommendation had an important impact on the program, or at least came at about the same time that important changes in direction were taking place in agriculture from the social sciences to engineering and biological sciences. Work in water and soils has received important attention since then.

> 2. RAC also expressed strong reservations on the quality of the projects in the field of "Institutional and Social Development" with the observation that 5 out of the 8 completed projects were actually service or support activities and not research. A new approach was recommended for this area, "possibly the development of centers of interest and competence following the pattern of the Land Tenure Center."

Apparently AID had arrived at this same conclusion several years earlier. The last big year for these kinds of projects was FY 1965, and this recommendation was written in FY 1967. Agriculture has reduced its emphasis on social science, and the number of social science projects in the total program is mow lower in the second five years than in the first five.

> 3. In respect to originating proposals, RAC suggested that A.I.D. take more initiative in originating research proposals and depend less on the unsolicited proposal approach. The reasoning was that a research program based on unsolicited requests outsiders simply could not support and complement the action program of the Agency.

The trend has definitely been to greater participation in research project development and more effort and leadership on the part of AID to develop research that supports action, although numbers cannot be cited.

> 4. RAC was pleased with PPC's Economic Studies projects in terms of professional quality, 6 of 13 were rated excellent. In terms of usefulness to the Agency, 4 were rated highly useful, 4 generally useful and 5 uncertain. This was considered reasonable success in view of the inherent uncertainties of research and a conclusion was that the program should be larger to allow for bolder risk-taking, as research under this program seemed on balance to be rather on the conservative side.

Unfortunately funding limitations have prevented action on this recommendation.

> 5. In regard to the Health program, one committee member criticised that "until 1965 there seems to have been no central theme, no analysis of the problems, and no sense of priorities." Other members felt that this was too drastic an assessment, and pointed rather to the four major areas that had been defined as of 1966--health manpower, nutrition, population and disease control.

Since then separate offices have been organized in Nutrition and Population. In the health field as defined today, most research effort has been in malaria, about 80 percent.

> 6. RAC identified several projects that had proved disappointing, but said the "number was gratifyingly small." RAC held no hope that disappointments could be prevented but urged a surveillance that could detect the disappointments early and terminate them.

7. RAC found "The staff far too small to provide the proper degree of supervision and contact with the individual projects which a mission oriented research program requires." It didn't specify a norm for supervisory personnel, but would likely find that the condition had not changed much since then.

8. Finally, RAC felt that its own role should be more than to analyze, advise on, and approve research projects. It felt it could have a meaningful role in identifying research questions, ensuring balance in the research program, and helping to feed the developing results into operations. RAC's principal role still is to review proposed projects, although it is used extensively to revise and review progress.

Organization of TAB

The second evaluative process was that which resulted in establishing the Planning, Analysis and Utilization Division of the Research and University Relations Office in the new Technical Assistance Bureau. This was the first overt attention paid to utilization of research results by the program administration. That division will be in full operation within a couple of months. It has published a catalog of all projects in the Central Research Program, initiated an airgram series for diffusing of results and made initial contacts with the Science Information Exchange and the National Technical Information Service to develop programs of information management.

RIGC Continuing Evaluation

The third evaluative process is in the function of the RIGC. This group has decided it is considering individual project without adequate knowledge of the total research program and has requested overall strategy statements from the offices proposing research. It has also felt that its functions, as well as those of the RAC, are too closely tied to the programming-obligating cycle, a situation which puts its actions under too much pressure and does not always leave time for reworking proposals when needed. Efforts are being made to de-cycle the proposal function. A new format has been developed for the proposing offices to follow in putting proposals before the committee. The format, by standardizing proposal presentation, makes proposal review more efficient for all groups and allows for more effective comparison among proposals when such is necessary.

The RIGC has also found that the research efforts have not been involving LDC research entities to the extent needed and are strongly

encouraging, or even insisting, that where appropriate a research project involves LDC entities as full collaborators in the research. Such involvement in many cases will improve the research and especially the utilization of results once the research is completed. RIGC is now considering what role it should play in following research projects once approved so as to assess progress.

UTILIZATION AND PAY-OFF

The most important question is "What has been the pay-off"? It is also the most difficult. One of the major problems in management of the AID research program which involves a wide array of contractors, working in many professional fields and with foreign collaborators a variety of countries is simply the process of intelligence. The AID program organization is only one channel by which research results are put to use. The scientific-professional networks, long strong in the U.S. and increasingly strong on the international scene, one is an important channel and one almost impossible to monitor. Libraries, Journals, and participant trainees are others. Activities of contractors provide another channel, but one hard to assess. Try as we will, we simply can't keep current on all utilization resulting from a contract.

We have some knowledge of episodes. I personally know, because I was in the mission at the time, that the results of the Weed Control project in Colombia were widely diffused in publications, in field days, and in professional societies. We don't know how much the project increased production. Up until now or how much it will be in the future. From Colombia experience, I also am confident that results of the Utah Water Research Project will be used in Colombia if they are good, because the Colombia research was planned in collaboration with the USAID Rural Development Office and the research and action groups with which it was working. We feel the same about the Vertebrate Pest Control Project, because the problem of bird damage on soybeans in the Cauca Valley was so great that the Ministry of Agriculture specifically requested AID Mission to arrange for this project to work in Colombia. We know that in these three cases there is likely to be a considerable institution building impact in all three cases the Colombian agencies built the research into their own programs and put their own personnel to work along with the U.S. researchers.

Just before going to Colombia, I was a professor of agricultural economics and taught one of the courses that were springing up around the country at the time in foreign agricultural development. About the only real empirical analysis we had to put into these courses came from AID sponsored research. I'm sure a similar situation prevails in general economics. In the letter quoted earlier from Chairman McDermott of RAC to Administrator Gaud, he states, "Pointed studies on various aspects of the three-way interactions among population, food, and health are badly needed and many of the most important immediate questions in these three fields are not being studied elsewhere in the U.S. research establishment. This was particularly

brought home to me last week on hearing a report of the PSAC (President's Science Advisory Committee) food panels. For, it was perfectly clear that a large portion of what they had in the way of new knowledge to work on was derived directly from this AID research program." (October 4, 1966)

Beyond the fact that we have insufficient intelligence on the utilization of the research results, the question of what is adequate pay-off and when is not subject to simple analysis. Cost-returns analysis rides over a lot of problems. One project can strike it rich and pay for the entire program, such as hybrid corn did for agricultural research in the U.S. scene. This could happen almost at random, given a large number of research projects, and not be any criterion at all of management. And even if a few projects do pay-off big enough to justify the entire program, such pay-off does not justify bad management in the other projects. On the other hand some projects in a program probably will have very little pay-off. If a program lacks projects with no pay-offs, it is probably a sign it is too cautious.

Another problem in analyzing pay-off is time. There are two important time lags in research. The one comes between the time funds are obligated and the research begins to produce results. In all the simplest of projects this will take several years. Following this lag comes the time required to move the results into programs. It's interesting to think of the long history behind the miracle wheats and what pay-off analysis would have shown several years before all the pieces fell into place. But if the pay-off comes, time works in your favor, because the innovation will continue to pay-off. A University of Chicago study concluded the annual return to hybrid corn research investment at 700 percent.

Many projects need further investment before the pay-off. Two research projects in program administration -- one in agriculture and one in PPC -- apparently had little impact, until a later study on Universities and Rural Development, contracted by a consortium of universities resulted in the present interest in institution building, the several international conferences on the subject, and in part in the development of the Institutional Development Agreement now being tested. The question of further investment presents a real problem to research management. How can one tell whether he is putting the capstone on a research program, or simply sending good money after bad?

The interesting analysis is one we haven't done. What do we have already completed that with a little work, either additional research or work by program developers, would have a high pay-off?

Much more attention is being given to utilization aspects of current research than formerly, which means that the completed projects may be the potentially valuable ones.

SUMMARY

I've tried to sketch in broad surveys the size and composition of the 10 year old AID research program, its present management, some of the evaluations that have already occurred and look at some issues in pay-off utilization. I have slighted the last subject in this paper because the rest of the review will emphasize this aspect.

TABLE 1. Funding of Research Program by Year and Funding Authority, 1962 - 1971
(in 000's Dollars)

Fiscal Year	Funding Authority		Total Obligation
	Section 241(a)	Title X	
1962	7,736		7,736
1963	5,674		5,674
1964	5,956		5,956
1965	6,347		6,347
1966	8,699		8,699
1967	8,056		8,056
1968	7,787		7,787
1969	7,612	6,770	14,382
1970	8,927	7,258	16,185
1971 (est.)	9,000	7,708	16,800
Total	75,794	21,728	97,622

TABLE 2. Funding of Research Projects by Years and by Sponsoring Office, 1967-71
(000's Dollars)

Fiscal Year	Agric. & Fisheries	Health	Nutri-tion	Popula-tion	Educ. & H. Resources	Inst. & Soc. Development (Title IX)	Ind. & Urban	Economic Studies	Science & Tech-nology	Small Project	Total
1967	3,193	570	1,255	543	765	68	27	1,193	0	0	7,614
1968	3,478	1,922	329	251	761	0	15	579	0	0	7,335
1969	3,461	1,719	224	6,770	504	262	0	867	0	0	13,807
1970	4,604	2,012	601	7,258	559	407	0	128	0	0	15,569
1971 (est)	4,532	1,843	739	7,708	239	153	0	889	167	40	16,310
Total	19,268	8,066	3,148	22,530	2,828	890	42	3,656	167	40	60,635

TABLE 3. Number of New Research Projects Started, by Year and Sector, 1962-71

Sector	Year									
	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Agriculture and Fisheries	3	5	5	5	7	2	6	6	3	3
Institutional and Social Development	6	2	7					2		
Economics	6	2	6	1		1	1	2	1	1
Nutrition			1	1	4	5	1	3		2
Health	3	2		1	3	1	1	4		
Population						2	2	7	7	
Education and Human Resources	2	3		4			1			1
Industrial and Urban Development	5			2						
Science and Technology										2

TABLE 3A. New Starts - Agricultural Research Projects by year 1962-1971

1962

- Status, Arid Lands Research (2)
- Land Tenure, Puerto Rico(2)
- Land Tenure, Latin America

1963

- Cereal Crops, Africa(10)
- Pulses, NESA, AFR, EA(10)
- Tsetse Fly Control(13)
- Ag. Productivity, LDCs(7)
- Soils in Latin America(7)

1964

- Ways to Improve Agr., LDCs(1)
- Research Requirements of PL 480(1)
- TA Program Administration, AG.(3)
- Ag. Credit Institution Development(3)

1965

- Rice Farming Equipment(7)
- Food Marketing, Latin America(3)
- Turkish Peasant Attitude, Behavior (3)
- University Programs in Rur. Dev.(4)
- Marketing in Tropical Africa(4)
- Diffusion of Agr. Innovations(4)

1966

- Protein Improvement, Sorghum(6)
- Protein Improvement, Wheat(8)
- Control of Weeds(6)
- Seed Industry Development(2)
- Ag. Prices and Econ. Development(4)
- Demand for LDC Agr. Exports(4)

1967

- Control of Vertebrate Pests(5)
- Agr. Sector Planning Models(4)
- Accelerating Agr. Productivity(4)

1968

- Water Management, LA(5)
- Water Management, NESA(5)
- Hemoprotozoa in Cattle(5)
- Fish Product Conservation(3)
- Capital Utilization(1)

1969

- Fertility of Savannah Soils(5)
- Tropical Soils Research Needs(2)
- Cassava Research Plan(2)
- Cattle Feeding in Tropics(4)
- Capital Formation in Agr. (5)
- Foot-Mouth Vaccine Testing(1)
- Fertilizer for Rice(4)

1970

- Protein Improvement, Maize(5)
- Agron-Econ. Research in Soils(5)
- Impact of Tech. on Income(3)

1971

- Agricultural Diversification(1)
- Applications of Sector Model(2)
- Employment in African Agr.(1)

Numbers in parentheses indicate duration of project in years.

TABLE 3B. New Starts - Institutional and Social Development Research Projects by year, 1962-1971

1962

Political Attitudes of Youth(7)
Review, AID Publications(0)
Attitudes toward Alliance(1)
U.S. Employees Overseas(2)
Job Performance (2)
Diffussion via Radio(3)

1963

Comparative Social and Cultural Change(3)

1964

University and Political Change, Latin America(3)

1965

Development of Admin. Capacity Symposium(2)
Comparative Social Change, Symposium(2)
Communications Research Symposium(2)
Case Studies, Institution Building(3)
Social and Economic Impact of Electrification(3)
Social Values and Political Responsibility(3)

1966

1967

1968

1969

Implementation of Title IX(2)

1970

Participation Patterns in Modernizing Societies(3)

1971

Numbers in parentheses indicates duration of project in years.

TABLE 3C. New Starts - Economics Research Projects by year 1962-1971

1962

Development Digest(2)
Transportation Research(8)
International Air Transport(1)
Foreign Trade Patterns(1)
Planning and Aid Criteria(8)
Econ. Structure and Growth(8)

1963

Foreign Aid and U.S. Balance of Payments(1)

1964

Foreign Aid and Econ. Growth(2)
Analysis, Development Planning(2)
Venezuelan Development(2)
Regional Cooperation,Asia(3)
Relation of Housing to Econ. Growth(5)
Planning and Allocation of Aid(6)

1965

Capacity Expansion Planning Factors(1)
Import Substitution and Economic Policy(8)

1966

1967

Comparative Studies, Resource Allocation and Econ. Growth(5)

1968

Effects of Food Aid on Development (3)

1969

Indian Income Compared to Japan, U.S.(2)

1970

Exchange Control Liberalization in Econ. Development(2)

1971

Distributions of Gain, Wealth, and Income and Econ. Development(3)

Numbers in parentheses indicate duration of project in years.

TABLE 3D. New Starts - Nutrition Research Projects by Year, 1962-1971

1962	1963	1964
		Processing Oilseed Protein(4)
1965	**1966**	**1967**
High Protein in Philippines(6)	New Protein Source Evaluation(10) Protein Extenders for Children(4)	Wheat Fortification(4) Extrusion Process and Nutrition(4) Nutritive Value, Cereals(5) Rice Milling and New Products(1) Soy-based foods(3) Nutrition and Cognitive Development (1) Liver Diesease and Nutrition(2)
1968	**1969**	**1970**
Rice Fortification(8)	Calories and Protein Use(3) Corn Fortification(1)	Coconut Protein(2)
1971		
Sub-Clinical Malnutrition(3) Maternal Diet and Offspring(3)		

Numbers in parentheses indicate duration of project in years.

TABLE 3E. New Starts - Education Research Projects by year 1962-1971

1962

English Teabher Training(8)
Math Curriculum, Africa(8)

1963

AID Participant Training, U.S.(1)
AID Participant Training,LDCs(3)
Education Research Center, L.A.(3)

1964

1965

Science Curriculum, Africa(6)
Literacy Training, Guatemala(2)
New Educational Media and LDCs(2)
Aptitude Testing in LDCs(3)

1966

1967

1968

Educational Planning and Efficiency(2)

1969

1970

1971

Low-Cost Instructional Technology in the LDCs(2)

Numbers in parentheses indicate duration of project in years.

TABLE 3F. New Starts - Industrial and Urban Development by year 1962-1971

1962

Use of Latin American Woods(1)
Local Power Shortage(1)
Solar Powered Battery(1)
Indigenous Enterprise, LA, AFR.(2)
Foam Plastic Housing(4)

1963

1964

1965

Urban Infrastructure for Industry(4)
Urban Housing, LA(4)

1966

1967

1968

1969

1970

1971 (Office of Science and Technology)

Earthquake-Resistant Buildings(1)
Genetic Control of Aedes Aegypti Mosquito(3)

Numbers in parentheses indicates duration of project in years.

TABLE 3G. New Starts - Health Research Projects by year, 1962-1971

1962	1963	1964
Malaria Eradication(10) Malaria Insecticides(2) Health Manpower Planning(6)	Health Investment in Economic Development(6)	Mid-Level Health Manpower(3)
1965	**1966**	**1967**
Health Center Activities(5)	Malaria Immunity and Vaccine(6) Childhood Mortality(6) Water Pump for LDCs(4)	Central America Malaria Research(5)
1968	**1969**	**1970**
Serologic Diagnosis of Malaria(4)	Schistosomiasis Engineering(2) Small Water System Design(3) Food Malabsorption(2)	Thailand Malaria Research(5)
1971		

Numbers in parentheses indicate duration of project in years.

TABLE 3H. New Starts - Population Research Projects by year 1962-1971

1962

1963

1964

1965

1966

1967

Family Planning Research, Evaluation Center(4)
Post-partum Evaluation, Family Planning Programs(4)

1968

Monthly Contraceptive Pills(5)
Determinants of Fertility Patterns (2)

1969

Outcome of Pregnancies(3)
Corpus Luteum Function(3)
Reversible Sterilization(3)
Anti-Progestational Contraceptives(5)
Family Planning Attitudes, Practices(3)

1970

Fertility Determinants(2)
L-H Inhibitors(3)
Prostaglandin Research(3)
Contraceptive Steroids(3)
IUD and Controlled Release Devices(3)
Venereal Disease-Prophylactic Contraceptive(3)
Demographic Methodology(2)

1971

Migration and Fertility(2)
Synthesis of Prostaglandins(3)
Once Month Contraceptive Pill(3)
International Fertility Patterns(3)
Reversible Sterilization(3)
Fertility Control Engineering(3)
Fertility Behavior(3)
Prostaglandin Action(3)
Prostaglandins and Reproduction (3)

Numbers in parentheses indicate duration of project in years.

TABLE 4. Number of OnGoing Research Projects by Substantive Area and Calendar Year, 1962-1971

Substantive Area	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Agriculture and Fisheries	3	8	13	16	21	23	26	27	27	24
Health	3	5	5	5	8	8	9	12	11	9
Nutrition	0	0	1	2	6	11	11	8	10	9
Population	0	0	0	1	1	3	4	10	16	24
Education and Human Resources	5	5	4	8	6	6	5	4	3	2
Institutional and Social Development (Title IX)	7	7	12	9	9	5	1	3	2	1
Industrial and Urban Development and OST	5	4	2	3	3	2	2	2	0	2
Economic Studies	6	6	10	11	11	8	8	10	9	7
	29	35	47	55	65	66	66	76	78	78

TABLE 5. Aggregate Project Funding, AID Central Research Program, by Sectors, (7/1/62 - 5/19/71)

Substantive Areas	TOTAL PROGRAM		Active Projects		Completed Projects	
	No. of Projects	Amount Funded (thru 3/15/72)	No.	Amount Funded (thru 3/15/72)	No.	Amount Funded (thru 3/15/72)
A. Agriculture and Fisheries	44	$32,881,892	24	$19,122,024	20	$13,759,868
B. Health	15	10,991,363	9	9,581,229	6	1,413,164
C. Nutrition	17	3,495,013	9	2,283,202	8	1,568,187
D. Population	26	22,035,350	24	21,821,860	2	213,490
E. Education and Human Resources	11	9,299,165	2	2,976,662	9	6,322,503
F. Institutional and Social Development (Title IX)	16	2,508,096	1	326,401	15	2,181,695
G. Industrial and Urban Development (incl. OST)	9	1,303,373	2	167,000	7	1,136,373
H. Economic Studies	20	11,507,996	7	3,397,725	13	8,116,271
Total Projects	158	$94,022,248	78	$59,676,103	80	$34,711,551

TABLE 5A. Agricultural Project Funding
AID Central Research Program, (7/1/62-5/17/71

A. Active Projects	Contractor	Duration	Amount and Period Funded
1. Soil fertility requirements for efficient production of food crops on the extensive deep, well-drained but relatively infertile acid soils of the humid tropics.	Cornell University (csd-2490)	6/30/69-6/29/74	$ 586,400 (12/30/71)
2. Determination of research needs of soils of the tropics.	National Academy of Sciences (csd-2505)	6/30/69-6/29/71	124,200 (6/29/71)
3. Water management research in arid and sub-humid lands of the LDCs.	Colorado State and Utah State Universities (csd-2162 & 2167)	6/28/68-6/28/73	2,436,714 (3/31/72)
4. Development and use of improved varieties of the major cereal crops of Africa.	Agricultural Research Service, USDA (PASA RA-4-00)	4/16/63-6/30/73	2,051,849
5. Improvement of grain legume (pulse) production in the Near East-South Asia; East Asia and Africa regions.	Agricultural Research Service, USDA (PASA RA-3-00)	6/25/63-6/20/73	2,384,492 (6/30/71)
6. Inheritance and improvement of protein	Purdue Research Foundation (csd-1175)	6/30/66-6/29/72	933,102 (3/31/72)
7. Improvement of the nutritional quality of wheat through increased protein content and improved amino-acid balance.	University of Nebraska (csd-1208)	6/29/66-6/28/74	919,615 (3/31/72)

Table 5A continued

A. Active Projects	Contractor	Duration	Amount and Period Funded
8. Preparation of a plan for orientation of research on cassava.	University of Georgia (csd-2497)	6/30/69-6/29/71	$ 84,366 (6/29/71)
9. Research on farm and equipment power requirements for production of rice and associated food crops in the Far East and South Asia.	International Rice Research Institute (csd-834 & 2541)	6/28/65-1/28/72	750,755 (1/28/72)
10. Tailoring of fertilizers for rice.	National Fertilizer Development Center, TVA PASA RA (qa) 5-69	7/1/68-6/30/72	316,500 (6/30/71)
11. Control of weeds in the LDCs.	Oregon State University (csd-1442)	6/30/66-6/29/72	1,751,502 (3/31/72)
12. Control of vertebrate pests.	Bureau of Sport Fisheries and Wildlife Dept. of Interior (PASA RA (ID)-1-67)	4/5/67-4/4/72	1,657,861 (6/30/71)
13. Research on the sterility method of tsetse fly control (Africa)	Agricultural Research Service, USDA (PASA RA-1-00)	6/14/63-6/30/76	1,075,389 (6/30/71)
14. Research on hemoprotozoal diseases of food-producing livestock in LDCs.	Texas A & M University (csd-1947)	6/30/68-6/30/73	784,199 (3/31/71)
15. Survey and analysis of the problems of cattle feeding systems and nutrition in the wet/dry tropics of Latin America	University of Florida (csd-2498)	6/27/69 - 6/27/74	175,238 (6/29/71)

Table 5A. continued

A. Active Projects	Contractor	Duration	Amount and Period Funded
16. Rural development analysis Agricultural sector planning models.	Michigan State University (csd-1557)	6/30/67-6/29/71	$ 402,325 (6/29/71)
17. Analysis of capital formation and technological innovation at the farm level in LDCs.	Ohio State University Research Foundation (csd-2501)	6/30/69-6/29/74	979,249 (6/30/71)
18. Development of conservation processes for fish by-products.	Agrarian University Lima, Peru (csd-1904)	4/30/68-4/30/71	64,000 (4/30/71)
19. Inheritance and improvement of protein quality/content in maize.	Purdue University (csd-2809)	6/30/70-6/29/75	547,666 (3/31/72)
20. Agronomic-Economic research on tropical soils.	North Carolina State (csd-2806)	6/30/70-6/29/75	339,000 (12/28/71)
21. Impact of new agricultural technology on rural employment-income.	Cornell University (csd-2805)	6/30/70-6/29/73	379,151 (3/31/72)
22. Agricultural Diversification and Trade	U.S.D.A.		65,000
23. Application of Agricultural Simulation Model			262,500
24. Income and Employment in Africa			50,000
		Sub-Total Active	$19,123,024

Table 5A continued.

B. Completed Projects	Contractor	Duration	Amount and Period Funded
1. Factor analysis for accelerating agricultural productivity in LDCs.	International Marketing Institute (csd-1467)	10/1/66-3/31/70	$ 297,342
2. History and current status of arid lands research in the U.S.	American Assn. for the Advancement of Science (thru NSF grant, in part from A.I.D.)	6/30/62-4/30/64	40,000
3. Land tenure and reform in Puerto Rico	Economic Research Service USDA (PASA 12-17-0017-41)	1/1/62-6/30/64	60,000
4. Study conference on means to increase agricultural productivity in under developed countries	Center for International Studies - M.I.T. (csd-452)	5/29/64-2/1/65	146,172
5. Mapping for research requirements for the Food-for-Peace Program.	Michigan State University (csd-677)	6/26/64-12/31/65	124,040
6. Appraisal of the administration of technical assistance programs, with special reference to T.A. in agriculture	Syracuse University (csd-289)	6/25/64-12/31/67	355,475
7. Analysis of program for the development of agricultural credit institutions and services.	Ohio State University Research Foundation (csd-463)	6/25/64-12/31/67	636,821
8. Comparative study of food marketing systems in Latin American countries in early stages of economic development	Michigan State University (csd-786)	4/15/65-9/30/68	395,162

TABLE 5A. continued.

B. Completed Projects	Contractor	Duration	Amount and Period Funded
9. Analysis of data on development-related attitudes and behavior of a national sample of the Turkish peasantry.	Center for International Studies (M.I.T.) (csd-811)	6/1/65-9/30/68	$ 33,340
10. Diffusion of innovation in rural societies.	Michigan State University (csd-735)	12/10/64 12/31/68	1,217,340
11. Technical and economic factors associated with establishment of a seed industry in the LDCs.	Missippi State University (csd-1203)	6/30/66-12/31/68	40,680
12. Analytical study of AID/University Programs in agricultural education.	Purdue Research Foundation (csd-840 & 754)	2/4/65-6/30/69	1,372,431
13. Research and training in land tenure and reform in Latin America.	University of Wisconsin (Repas-3)	5/11/62 6/30/69	3,503,275
14. Study of farm marketing facilities and practices in Tropical Africa.	Stanford Research Institute (csd-801)	5/28/65-6/30/69	564,037
15. Analysis of factors associated with differences and changes in agricultural production in LDCs.	Economic Research Service, USDA (PASA-2-00)	3/20/63-6/30/70	1,953,501
16. Analysis of capital utilization in LDCs.	Ohio State University Research Foundation (csd-1937)	6/28/68-9/30/69	97,790
17. Analysis of data on the nutrient status of soils in Latin America.	North Carolina State University	6/25/63-	1,367,197

TABLE 5A. continued.

B. Completed Projects	Contractor	Duration	Amount and Period Funded
18. Laboratory and field testing of a newly developed foot-and-mouth disease vaccine for potency, viability and immunity duration.	National Academy of Sciences (csd-2273)	6/30/69-6/29/70	$ 49,322
19. Role of agricultural prices in economic development.	Cornell University (csd-1438)	6/30/66-6/29/70	286,857
20. Analysis of demand prospects for agricultural exports of LDCs.	Economic Research Service, USDA (PASA RA-2-66)	6/1/66-6/30/70	1,219,086
		Subtotal completed	$13,759,868
		GRAND TOTAL PROGRAM	$32,881,892

Table 5B. Health Project Funding,

AID Central Research Program, 1/1/62 - 5/17/71

	Contractor	Duration	Amount and Period Funded
A. Active Projects			
1. Malaria eradication research (in support of worldwide program).	National Communicable Disease Center - USPHS (PASA RA(HA)-7-00)	1/17/62-6/30/72	$4,005,322 (6/30/71)
2. Malaria immunity and vaccination.	University of Illinois (csd-1432)	6/30/66-6/29/71	1,828,150 (6/29/71)
3. Serologic diagnosis of malaria.	National Communicable Disease Center - USPHS (PASA RA(HA)-5-68)	4/1/68-12/31/72	292,473 (6/30/71)
4. Central America malaria research station.	National Communicable Disease Center - USPHS (PASA RA(HA)-2/67)	3/1/67-6/30/72	1,754,719 (6/30/71)
5. Investigation of engineering aspects of schistosomiasis control.	University of North Carolina (csd-2487)	6/30/69-5/30/71	13,861 1/31/72
6. Inter-American investigation of mortality in infancy and childhood.	Pan American Health Organization (csd-1431)	6/30/66-3/31/72	1,085,556
7. Development of methodology for determination of optimal design capacities of small water supplies	University of North Carolina (csd-2494)	6/30/69 6/29/72	39,935 (6/29/72)

Table 5B - Continued

		Contractor	Duration	Amount and Period Funded
8.	Measurement of nutrient loss from the intestinal tract due to malabsorption.	Nutrition Program USPHS/HEW (PASA RA(HA)-9-69	5/9/69-12/20/71	$ 231,675 (6/30/71)
9.	Thailand Malaria Operation Research Unit.	National Communicable Disease Center, USPHS/HEW (PASA RA(HA)-1-70	8/29/69-8/28/74	323,577 (6/30/71)
		Subtotal Active		9,581,229
B.	Completed Projects			
10.	Malaria insecticide research.	National Communicable Disease Center, USPHS/HEW (PASA #5903-7)	5/1/62 6/30/64	200,000
11.	Study of methods for improving the training and use of middle-level health manpower.	Medical College of Virginia (csd-312)	8/1/63-12/31/66	130,200
12.	Research in health manpower planning for selected LDCs.	Johns Hopkins University (Contract #1883-1)	6/25/62-6/30/68	234,684
13.	Feasibility study of the relationship of health investment and social and economic development.	Harvard University School of Public Health (csd 297 & PASA RA-11-00)	6/29/63-3/31/69	226,322

Table 5B - Continued

	Contractor	Duration	Amount and Period Funded
Completed Projects - Cont'd			
14. Functional analysis of health center activities in developing countries.	Johns Hopkins University (csd-832)	6/24/65-6/23/70	$ 553,690
15. Development of a water pump for developing countries.	Battelle Memorial Institute (csd-1434 & 2174)	6/30/66 12/31/70	68,268 (12/31/70)
		Subtotal Completed	$1,413,164
		Grand Total Program	

Table 5C. Nutrition Project Funding,

AID Central Research Program, 7/1/62 - 5/17/71

	Contractor	Duration	Amount and Period Funded
A. Active Projects			
1. Clinical evaluation of new protein sources for the prevention of malnutrition.	British-American Hospital-Lima, Peru (csd-1433)	6/27/66-	$ 335,471 (3/31/72)
2. Lysine enrichment of wheat flour	British-American Hospital-Lima, Peru (csd-1805)	6/27/67- 6/26/71	96,016 (6/26/71)
3. Effects of extrusion processing variables on the nutritional quality of inexpensive high-protein food mixtures.	University of California, Davis (csd-1587)	6/30/67- 6/29/71	193,273 (6/29/71)
4. Improving the nutritive value of cereal-based foods.	Kansas State University (csd-1856)	6/30/67 6/29/72	666,584 (3/31/71)
5. Nutritional improvement of rice by fortification with synthetic amino acids and vitamins	Harvard University School of Public Health (csd-2170)	6/30/68- 6/30/76	381,229 (3/31/72)
6. Subclinical Malnutrition			84,144 (5/14/73)
7. Influence of Maternal Diet on Offspring			104,725 (3/31/73)

Table 5C - Continued

	Contractor	Duration	Amount and Period Funded
Active Projects - Cont'd			
8. Dietary Caloric intake to protein utilization.	Massachusetts Institute of Technology (csd-2808)	6/30/70-6/29/73	$ 164,834 (3/31/72)
9. Coconut protein products for use in foods.	Texas A&M University (csd-2804)	3/10/70-3/29/72	256,926
NOTE: Two new projects (RAC approved 1/29/71) are in process of implementation			
		Subtotal Active	2,283,202
Completed Projects			
10. Study of the influence of early nutrition on cognitive development in the young child in Peru.	Cornell University (csd-1209)	11/23/66-11/22/67	16,424
11. Evaluation of high-protein supplements in child-feeding programs in the Philippines.	National Institutes of Health, USPHS (PASA RA-1-65)	6/28/65-6/30/68	64,177
12. Research on new processing technology for oilseed proteins.	Agricultural Research Service, USDA (PASA RA-12-00)	6/26/64 6/30/68	682,349
13. Adaptation of an integrated rice milling process and development of resultant food products for use in Southeast Asia.	Riviana Foods, Inc. (csd-1583)	6/30/67-6/30/68	159,580

Table 5C - Continued

	Contractor	Duration	Amount and Period Funded
Completed Projects			
14. Study of liver disease and nutrition in Uganda.	Harvard University (csd-1435)	9/7/66-9/6/68	$ 26,330
15. Extending protein concentrates for child feeding by addition of inexpensive simple nitrogen sources.	Massachusetts Institute of Technology and INCAP (csd-1441)	6/30/66-12/31/70	184,967 (12/31/70)
16. Development of soy-based foods of high nutritive value for sue in the Philippines.	Cornell University (csd-1815)	6/30/67-12/31/70	411,000 (12/31/70)
17. A practical approach to the lysine and tryptophan supplementation of lime treated corn.	Rutgers University (csd-2500)	6/29/69-12/31/70	23,360 (10/31/70)
		Subtotal Completed	1,568,187
		Grand Total	3,851,389

Table 5D. Population Project Funding

A.I.D. Central Research Program (7/1/62-5/17/71)

A. Active Projects	Contractor	Duration	Amount and Period Funded
1. Family Planning Research and Evaluation Center.	Pathfinder Fund (csd-1573)	6/30/67-6/29/71	$1,483,000 (6/29/71)
2. Evaluation studies of an international postpartum family planning program.	Population Council (csd-1565)	6/30/67-6/29/71	600,000 (6/29/71)
3. Research for development of a once-a-month contraceptive pill	Worcester Foundation for Experimental Biology (csd-2169)	6/30/68 2/28/73	108,500 (6/30/71)
4. The epidemiology of outcome of pregnancy in diverse cultures in selected countries	Johns Hopkins University (csd-2246)	5/1/69-4/30/72	193,855 (6/30/71)
5. Research into the corpus luteum function.	National Institutes of Health, NICHD (PASA RA(HA)-8-69)	5/7/69-5/6/72	1,562,752 (May, 1972)
6. Research on reversible sterilization.	University of North Carolina (csd-2504)	6/27/69-6/26/72	78,731 (6/26/71)
7. Contraceptive development: A method to prevent pregnancy by direct or indirect anti-progrestational activity.	Population Council (csd-2491)	6/30/69-6/29/74	3,000,000 (6/30/72)
8. Determinents of family planning attitudes and practices, Phase II.	Harvard University (csd-2478)	6/30/69-6/29/72	106,105 (6/29/72)
9. Utilization of family planning services.	Bowman Gray School of Medicine, Wake Forest University (csd-2512)	6/30/69-6/29/72	395,042 (6/29/72)

Active Projects - Cont'd.

		Contractor	Duration	Amount and Period Funded
10.	Fertility Determinants - A Theoretical Inquiry.	Rand Corporation (csd-2533)	1/5/70-1/4/72	326,445 (7/29/71)
11.	Development of inhibitors of L - H releasing factor as contraceptive factors.	Salk Foundation (csd-2785)	6/30/70-6/29/73	2,254,550 (6/29/73)
12.	Prostaglandin and contraceptive research development.	Worcestor Foundation (csd-2837)	6/30/70-6/29/73	2,980,000 (6/29/73)
13.	Safety of contraceptive steriods.	Southwest Foundation (csd-2821)	6/30/70-6/29/73	912,792 (6/29/73)
14.	Development of IUD - controlled	Battelle Memorial Inst. (csd-2819)	6/30/70 6/29/73	150,000 (6/30/71)
15.	Combined VD - Prophylactic contraceptive.	University of Pittsburgh (csd-2822)	6/30/70 6/29/73	581,198 (6/30/73)
16.	Fertility Rates and Earnings Capacity of Rural Migrants in IA.	University of Wisconsin (csd-2863)	7/15/70 7/15/72	$ 226,100 (7/15/72)
17.	Studies on Synthesis of Prostaglandins	University of Wisconsin		230,250
18.	Research for Development of Once a Month Contraceptive Pill			98,875
19.	International Fertility Research			3,106,000
20.	Reversible Sterilization			135,000
21.	Surgical and Engineering Research on Means of Fertility Control	Battelle Institute		830,370

Active Projects - Cont'd.	Contractor	Duration	Amount and Period Funded
22. Cross Cultural Research in Fertility Behavior			853,164
23. Development of IUD and Controlled Release Contraceptives	Battelle Institute		495,000
24. Side Effects and Mechanism of Action of Prostaglandin	Washington University		292,593
25. Research on Prostaglandin in Relation to Human Reproduction	Makerere University		821,538
	Subtotal Active		21,821,860
B. Completed Projects			
17. Development of methodology for estimating Birth Rates, Death Rates, and Population Change from Interview Data.	National Center for Health Statistics, USPHS (PASA RA-1-66)	12/2/65 8/31/67	70,565
18. Determinants of Human Fertility Patterns.	Rand Corporation (csd-2151)	6/28/68 9/30/70	142,925 (9/30/70)
	Subtotal Completed		$ 213,490
	Grand Total Program		$22,035,350

TABLE 5E. Education and Human Resource Project Funding
AID Central Research Program, (7/1/62-5/17/71)

A. Active Projects

	Contractor	Duration	Amount and Period Funded
1. Research and development in beginning science curricula for English-speaking tropical Africa (African Primary Sceince Program)	Educational Development Center, Inc. (csd-772)	2/17/65-6/30/71	$ 2,736,962 g/ (6/30/71)
2. Low Cost Instructional Technology	Stanford University		239,700 (12/31/72)
		Sub Total Active	$ 2,976,662

TABLE 5E continued

B. Completed Projects	Contractor	Duration	Amount and Period Funded
1. Research on new techniques for training teachers of English.	American Institutes for Research (csd-1555 & repas-13)	6/30/62-2/28/70	$ 1,441,517
2. Evaluation of A.I.D. participant training facilities in the U.S. (pilot study)	American Institute for Research (repas-11)	6/25/62-6/30/63	37,797
3. Overseas Evaluation of the participant training program.	Bureau of Social Science Research, Inc. (ICA-1891)	6/16/62-11/15/65	326,000
4. Development of an educational research center for Central America.	Michigan State University (repas-7)	6/29/62-3/28/65	610,000
5. Impact of literacy on a Guatemalan peasant community.	University of South Florida (csd-843)	6/24/65-2/28/67	65,129
6. Research on the feasibility of applying new educational media in developing countries.	International Institute for Education Planning (csd-844)	6/29/65-5/31/67	224,772
7. Research and development of aptitude testing.	American Institute for Research (csd-798)	5/27/65-8/10/68	585,993

TABLE 5E continued

B. Completed Projects	Contractor	Duration	Amount and Period Funded
8. Mathematics curriculum development in Africa.	Educational Development Center, Inc. (csd-1567 & res-21)	5/31/62-12/31/70	$ 2,875,375
9. Research on practical uses of cost analysis to improve educational planning and efficiency.	International Institute for Educational Planning (csd-1950)	6/30/68-6/30/70	173,920
		Subtotal Completed	$ 6,322,503
		Grand Total Program	$ 9,299,165

TABLE 5F. Institutional and Social Development Project Funding, AID Central Research Program, (7/1/62 - 5/17/71)

	Contractor	Duration	Amount and Period Funded
A. Active Projects			
1. Research on participation patterns in modernizing societies.	Harvard University (csd-2502)	6/27/69-6/26/72	$ 326,401 (3/31/72)
		Subtotal Active	$ 326,401
B. Completed Projects			
1. Study of political attitudes of youth as a factor affecting economic development.	Brandeis University (csd-824)	6/15/62-12/31/69	$ 250,594 (completion)
2. Review of A.I.D. publications (C-2412)	A.I.D. and American Institutes for Research	3/22/62-6/30/62	9,068
3. Evaluation of changes in attitudes toward progress of the Alianza in Selected Latin American Countries (62-100-82)	USIA (Sub-c's: International Research Assoc. Inc., National Institute of Soc. and Econ Studies)	6/29/62-3/31/63	120,000
4. Research on factors contributing to maladaptation of U.S. employees overseas (joint A.I.D./State/USIA/Carnegie Foundation Study).	Department of State (Repas 99-020-9)	6/26/62-6/30/64	7,500
5. Research on job performance standards (A.I.D.) employees overseas).	American Institutes for Research (Repas-10)	6/25/62-6/24/64	284,030
6. Research into the implementation of Title IX objectives	Northwestern University (csd-2236)	2/3/69-9/2/70	89,300 (9/2/70)

TABLE 5F. continued

B. Completed Projects	Contractor	Duration	Amount and Period Funded
7. Diffusion of information through radio and supporting media (pilot project in Ecuador)	American Institues for Research (LA-27/Repas-18)	6/25/62-	$ 74,075
8. Development Research Digest.	National Planning Association (Repas-6)	6/21/62-7/31/64	53,520
9. Comparative studies of social and cultural change.	Cornell University (csd-296)	6/1/63-8/31/66	621,722
10. Research symposium on the development of administrative capacity in emerging countries.	Brookings Institution (csd-733)	11/23/64-5/22/66	27,000
11. Research symposium on comparative social change in developing countries.	Foundation for Research on Human Research (csd-756)	12/23/64-11/22/66	35,000
12. Symposium on communication research and the development process	Michigan State University (csd-732)	10/26/64-12/31/66	37,880
13. Research on the process of institution-building: Four case studies of educational and training institutions.	University of Pittsburgh (csd-763)	12/31/64-3/31/67	158,380
14. Universities and political change in Latin America.	Brookings Institution (csd-672)	6/19/64-6/18/67	21,385
15. Socio-economic impact of electric power on rural development in Colombia	American Institutes for Research	12/31/64-8/31/67	217,267

TABLE 5F. continued.

B. Completed Projects	Contractor	Duration	Amount and Period Funded
16. Interaction of social values and political responsibility.	University of Pennsylvania (csd-719)	10/23/64-10/22/67	$ 317,849
		Subtotal completed	$ 2,181,695
		Grand Total Program	$ 2,508,096

TABLE 5G. Industrial and Urban Development Project Funding, AID Central Research Program, 7/1/62 - 5/17/71

A. Active Projects (OST)	Contractor	Duration	Amount and Period Funded
1. Building Technology for Earthquakes	National Bureau of of Standards	4/15/71 6/30/72	$ 15,000 (6/30/71)
2. Control of Aedes Aegypti Mosquito	Notre Dame University	7/1/71-6/30/74	152,000 (3/31/73)

B. Completed Projects	Contractor	Duration	Amount and Period Funded
1. Research in the utilization of Latin American woods (exploratory study).	Forest Service, USDA (AID-25)	4/12/62-10/11/62	15,000
2. Research on problems of shortage of power at the local level.	General Electric Co. (Sub-c's: MIT,SRI, CARE) (Repas-1)	3/26/62-2/28/63	159,077
3. Development and performance test of a solar-powered battery recharging center.	Hoffman Electronics Corporation (GS-005-29802)	5/25/62-5/14/63	30,025
4. Study of U.S. public and private cooperation in stimulating indigenous enterprises in Latin America and and Africa.	National Planning Association (thru Dept. of Commerce) (C-4756)	5/25/62-5/1/64	122,000
5. Research on foam plastics for housing.	University of Michigan (csd-288)	6/25/62-4/21/66	301,700
6. Cost of urban infrastructure for industrial development as related to size of urban center.	Stanford Research Institute (csd-802)	5/28/65-1/27/69	238,603
7. Urban housing in Latin America.	Cornell University (csd-817)	6/1/65-6/30/69	269,968
		Subtotal completed	$1,136,373

TABLE 5H. Economic Project Funding, AID Central Research Program, (7/1/62-5/17/71)

A. Active Projects	Contractor	Duration	Amount and Period Funded
1. Comparative studies of resource allocation and development policy.	Harvard University (csd-1543)	5/31/67-1/21/72	$ 1,557,344 (1/21/72)
2. Import substitution and economic policy in economic development.	Williams College (csd-736 & 2475)	12/31/64 6/30/72	315,899 (6/30/71)
3. Growth and development effects of food aid shipments under Food-for-Peach Act of 1966	Iowa State University (csd-2163)	6/29/68-6/28/71	330,000 (3/28/71)
4. Comparison of Indian real per capita income and currency purchasing power with the U.S. and Japan.	Univ. of Pennsylvania (csd-2481)	6/16/69-12/31/71	31,433 (12/31/71)
5. Employment and unemployment in the develop ing countries.	Yale University (csd-2492)	6/30/69-6/29/73	643,000 (6/30/71)
6. Exchange control, liberalization and development.	National Bureau of Econ. Research (csd-2783)	6/29/70-	389,000 (3/31/71)
7. Distribution of wealth and income on development.	Rice University	6/14/70-6/14/73	131,049 (6/14/72)
		Subtotal Active	$ 3,397,725

Table 5H continued

B. Completed Projects	Contractor	Duration	Amount and Period Funded
1. Transport research program.	Brookings Inst. (Repas-5)	6/12/62-1/11/70	$ 1,494,720
2. International air transport study (A.I.D. and other U.S. Government agencies).	Robert Nathan Associates Inc., Systems Analysis & Research Corp. (thru BOB) - (EB-87)	10/23/61-8/27/62	50,000
3. Projection and analysis of foreign trade patterns.	Yale University (Repas-4)	5/1/62-8/31/63	38,800
4. Development of planning and planning assistance criteria.	National Planning Association (Repas-9)	6/22/63-8/31/70	2,223,440
5. Effects of foreign aid on the U.S. balance of payments.	Haverford College (csd-275)	5/31/63-8/31/63	5,405
6. Analysis of certain effects of foreign aid on the economic growth of selected countries.	Johns Hopkins University (csd-445)	5/27/64-3/31/66	19,408
7. Improved analytical methods for development planning.	Center for International Studies M.I.T. (csd-467)	6/16/64-3/31/66	72,160
8. Capacity expansion planning factors.	National Planning Assoc. (csd-753)	1/15/65-4/14/66	41/991
9. Venezuela development study.	Stimulmatics Corportaion (GMI 1-63)	3/6/64-9/30/66	349,000

Table 5H continued

B. Completed Projects	Contractor	Duration	Amount and Period Funded
10. Study of regional cooperation in South and Southeast Asia.	University of Wisconsis (csd-355)	3/23/64-12/31/67	$ 312,770
11. Relation of investment in housing go economic growth.	University of California at Los Angeles (csi-464)	6/3/64-8/31/69	169,298
12. Research on improved methods of planning	Rand Corportation (thru U.S. Air Force) - (PASA RA-1-00)	11/1/63-8/31/69	1,481,234
13. Quantitative study of economic structure and growth.	Yale University (Repas-12)	6/28/62-6/30/70	1,858,045
		Subtotal Completed	8,116,271
		Grand Total Program	$11,507,996

TABLE 6. Duration of Research Projects in Years

Years[1/]	Completed	Ongoing	Total
One	22	1	23
Two	21	7	28
Three	17	15	32
Four	10	8	18
Five	2	16	18
Six	4	2	6
Seven	5	3	8
Eight	5	0	5
Nine	0	0	0
Ten	0	6	6
	86	58	

1/Includes present period for which project has RAC approval.

TABLE 7. Number of Active Projects with Research Activity in LDCs, by Country and Sponsoring Office, May 1970

Country	TA/AGF	TA/POP	TA/N	TA/H	TA/EHR	PPC	Total
Afghanistan				1			1
Argentina				1			1
Bolivia	1			1			2
Brazil	3			2		3	8
Ceylon		1		1			2
Chile	1	1		1		2	5
Colombia	5			1		3	9
Costa Rica	1	1				1	2
East Africa					1	1	2
Ecuador	1	1		1			3
El Salvador	2			2			4
Ethiopia		1		1			2
Ghana		1				1	2
Guatemala			1				1
Greece						1	1
Haiti				1			1
Hong Kong		2					2
India	3	1	1	2		5	12
Indonesia		1				1	2
Iran	1	1		2		1	5
Israel		1				1	2
Jamaica		2					2
Korea						2	2
Mexico	1	1		1			3
Morocco			1				1
Nepal				1			1
New Guinea				1			1
Nicaragua				1			1
Nigeria	1	1					2
Pakistan	2			1		4	7
Philippines							6
Peru	1		2				3
Rhodesia		1					1
Sierra Leone		1					1
S. Vietnam				1			1
Taiwan		2		1		1	4
Thailand		2	1	1			4
Turkey		1				3	4
Uganda		1		1			2
Upper Volta				1			1
Venezuela	1	1					2
Yugoslavia		1					1

TABLE 8. Number of Projects Per Monitor of Ongoing Research Projects

Number of monitors with		Total Projects
1 project	14	14
2 projects	2	4
3 projects	1	3
4 projects	2	8
5 projects	0	0
6 projects	2	12
7 projects	0	0
8 projects	1	8
9 projects	1	9
Total	23	58

One conclusion: Four monitors handle half (29) of the ongoing projects.

TABLE 9. Average Duration of Selected Ongoing Projects and Length of Service of Present Monitors

	No. of Projects	Average Duration (months) to 3/15/71	Average time on project of present monitors (months)
Agriculture	18	40	21
Education	1	72	1
Institutional and Social Development	1	21	21
Economic Studies	6	35	8
Health	9	49	39
Nutrition	8	33	19
Population	15	19	11
	58	40	19