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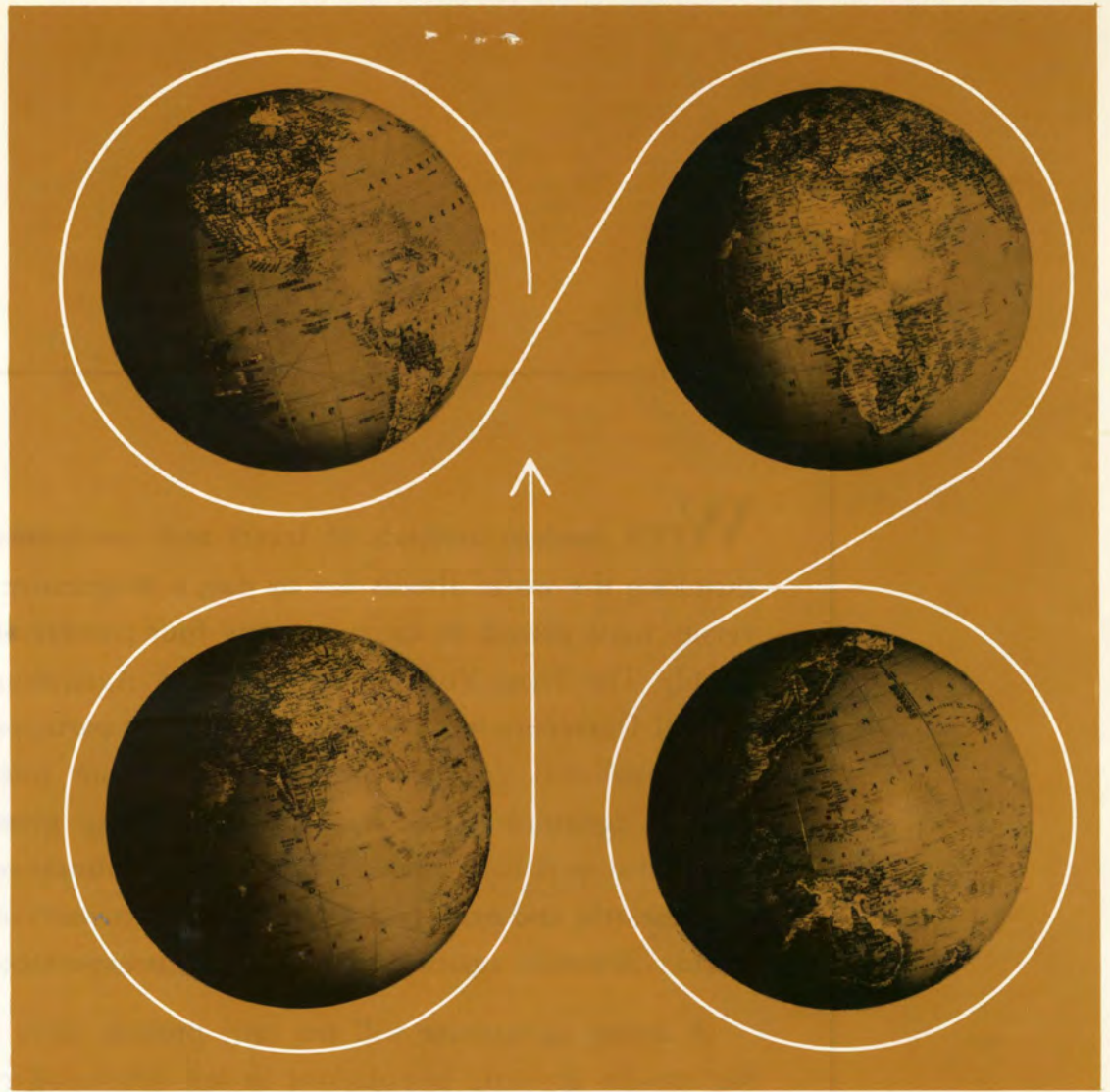


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**EXPERIMENTAL EXTENSION WORK –
ITS PLACE AND ROLE IN A
DEVELOPING COLLEGE OF AGRICULTURE**

Horst von Oppenfeld

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EXPERIMENTAL EXTENSION WORK - -
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By

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Washington, D.C.

July 1966

EXPERIMENTAL EXTENSION WORK - -

ITS PLACE AND ROLE IN A DEVELOPING COLLEGE OF AGRICULTURE

Horst von Oppenfeld^{*}

One of the most vital but difficult tasks involved in giving assistance to underdeveloped countries is that of establishing strong and effective agricultural colleges. A key part of this program is the instruction, for increasing numbers of scientists, administrators, farmers, and technicians must be trained in order to develop and sustain a thriving agriculture. It is evident then, that in the attainment of this goal the improvement of resident instruction is a matter of prime importance.

Participation in agricultural research is another essential function of an agricultural college for, in addition to its intrinsic value, research is the foundation of good teaching. Although some of the leading scientists are in these colleges, they cannot be expected to generate ideas and establish methods that are basic to agricultural development unless they participate actively in agricultural research.

But even high academic standards in teaching and research are not enough. Instruction must be based on the needs of farmers. Research objectives must be relevant to the problems. Results must be translated into recommendations that are applicable and in keeping with farmers' resource capabilities. To fulfill these conditions, a college must establish close working relationships with farmers.

Based on the experience of American land-grant colleges, it could be assumed that extension should complete the triangle of instruction-research-extension. The link to grass-roots farming would then be almost automatic, as it has been in the land-grant colleges. This approach might be appropriate in the few countries just beginning to organize their national extension services. However, most countries have established agricultural extension services and have incorporated them with other service functions of central and regional government.

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Author's acknowledgments: The author acknowledges the helpful suggestions and ideas contributed by Drs. M. C. Bond and Arthur E. Durfee who were closely associated with the evolution of experimental extension in the Philippines.

In spite of the obvious advantages that the responsibility for extension has brought to land-grant colleges in the United States and the resulting benefit to farmers, institutional changes of such far-reaching consequences are not always advisable. However, a strong case can be made for experimental extension activities, since they have a real place in a developing college of agriculture.

Experimental extension is defined as a sustained, long-term commitment that involves introduction; testing; demonstration on privately operated farms that are typical in size, ownership, and resource combination of larger areas; and diffusion and evaluation of farm practices. The term "farm practices" embraces farm management, marketing, and farmers' related group activities. The emphasis is more on direct working relationships with individuals or groups of farmers, coupled with systematic follow-up and evaluation, than on an indirect approach through mass media, which is an impersonal, non-continuing method.

Objectives and procedures of experimental extension differ from those of farm surveys, farm record keeping, and farm study activities. The latter are primarily concerned with the analysis and understanding of existing conditions, frequently with a view to recommending changes, but without subsequent action programs. Experimental extension, on the other hand, calls for an action program to be implemented and studied. The same initial steps of studying and analyzing existing conditions are required. Preliminary studies are necessary to gain an understanding of physical and human resource capabilities, and to determine certain benchmarks for an evaluation of the project's effect.

Before experimental extension can play a useful role in a growing college of agriculture, some fundamental requirements must be fulfilled. Does the college have an adequate staff and the budget to support its present activities? Does it have the attributes for growth in quality and in number of graduates?

Appropriate Conditions for Experimental Extension

In his paper on the role of educated people in agricultural development, Professor Richard Bradfield observes:^{1/}

^{1/} Bradfield, R. The Role of Educated People in Agricultural Development. Cornell Intnatl. Devlpmt. Mimeo. 6. 1964.

At the college and university level, there is a common tendency to set up several small, weak, impoverished, often isolated institutions, instead of pooling their limited supply of human and physical resources and building an institution large enough to be run economically and to provide the diversity and quality essential to a first class institution.

Obviously, the addition of experimental extension to such a "small, weak, impoverished" institution would merely add to the stress and strain on an already overburdened faculty and an inadequate budget. In such instances useful contacts of faculty and students with farms and farmers can best be established through class visits, study assignments of students to individual farms or markets, or through supervised farm management surveys carried out by students. While useful as training devices, these are mainly extractive and not experimental activities.

Pertinent questions are: Does the college have the resources to participate in the country's agricultural research program? Is there a worthwhile flow of experimental results that should be tested and verified under farm conditions?

Is the college faculty and administration aware of its responsibility for extending knowledge to farmers and other potential users? Do some faculty members have an interest in introducing and testing the results of their research on farms? Does the administration recognize these as legitimate activities?

Does the college have a significant share in the country's output of undergraduate and graduate students? Does it participate in pre-service or in-service training of personnel in government agencies? In other words, do some influential people in the government recognize its training function?

If most of these questions can be answered in the affirmative; experimental extension has a useful place in the institution.

Farm and Home Development in the Philippines

Several approaches to experimental extension may be pursued. Deciding which of these would bring optimum results in the initial phase, when staff and funds are very limited, needs careful thought.

What are the important farm production problems? What research from local or foreign sources is relevant? What efforts are being made by the government or by commercial companies? In what areas can the college offer practices that appear technically feasible and economically sound? For answers to such questions, one should rely on prudent judgment rather than what may be widely accepted.

The few concrete experiences cited have been drawn from the writer's close association with experimental extension in the Philippines. The activity is largely, though not entirely, identified as the Farm and Home Development (FHD) program of the University of the Philippines, College of Agriculture (UPCA). Started as a pilot study in 1958, FHD includes the activities that have evolved at the UP College of Agriculture through experimental extension in rural development. Originally the emphasis was on farm management, later it was shifted to training. Eventually, the program became more of a sustained action-research program with built-in evaluation when it was possible to keep change agents (college-trained technicians) in the same villages for an extended period. Through the years, the methods and techniques have undergone refinement and transformation but the principal objectives have remained the same.

The Setting

Extension field work of the College of Agriculture began in 1958. At that time the College, which was founded in 1909, was widely recognized as a leading educational institution in Southeast Asia. It had supplied the Philippines and even neighboring countries with agricultural leaders, administrators, teachers, and technicians.

In agricultural research, the College had a deserved reputation as the country's leading experiment station. Yet the results were more readily observable in the publication of papers in scientific journals than in their influence on farm practices and output.

Agricultural economists at the College had diagnosed the lack of technical and managerial knowledge of farmers as a principal bottleneck. Not satisfied with mere speculation about the limited effect of research on farmers' practices and incomes, they became interested in studying how to transfer technology to farmers more effectively. For the first time the College deployed technically competent change agents in selected villages on a sustained basis.

Learning to Work with Farmers - The Pilot Project

Objectives. The Pilot Study in Farm Development had the following objectives:

To investigate the farm management problems of incorporating the results of present-day research on individual farms.

To determine the effect of recommended farm practices on farmers' incomes.

To train technically competent change agents.

Accordingly, a team of 4 farm development technicians was organized. They were carefully selected on the basis of scholastic achievement, interest in research, and willingness to work with farmers. Each technician represented 1 of 4 fields of specialization: crop production, plant pest and disease control, livestock production, and farm management.

Each technician was assigned to a village. In dealing with farmers' problems, he had 3 principal sources of knowledge: himself, those team members who were more specialized in the relevant disciplines, and the professional staff of the College. Teamwork among the 4 was enhanced through efforts of a project leader who was an agricultural economist.

The field technicians received some pre-service and in-service training. They learned best when teaching was geared to problems and action in the field.

Budgetary appropriations at the time did not provide support for such field activities. Fortunately, it was possible to secure financial support for a 3-year period through grants from national and international sources. For example, matching grants were received from the National Rice and Corn Corporation of the Philippines and from the Council on Economic and Cultural Affairs, Inc., New York, (now called the Agricultural Development Council).

Technical backstopping and guidance from others interested in this work was as important as financial support. From the young instructor up to the full professor, from the department head up to the dean, many hours of service were readily contributed, either in consultation or on-campus training or in farm visits, usually on top of heavy teaching and research responsibilities. The project also benefited from consultations and field trips with interested Filipino and overseas visitors.

Looking back at early problems and rewards, two seemingly conflicting experiences are recalled most vividly: One was the difficulty in securing administrative approval for off-campus activities that differed from conventional research and teaching responsibilities. The other was the enthusiasm of the College staff and faculty which led them to contribute generously of their time and talent, once their interest had been aroused. Seeing their knowledge applied on farms and recognizing the influence on farm production, income, and on farmers' attitudes were their principal rewards.

Working with Farmers. In his assigned village, the project technician's first task was to learn about the physical and human resource potential. This was accomplished through a sample survey of farms and households that was conducted with the assistance of the other team members and the project leader.

The next task was to earn the confidence of village leaders and farmers. Meetings and informal discussions were held to explain the purpose of the project and the technician's presence in the village. In the meantime, he made his services, and often those of his teammates, available to individual farmers. He might teach the farmer how to deworm pigs or how to protect a crop from insect damage. A few such demonstrations of technical competence did more to establish farmers' confidence than hours of explanation.

Soon there was more demand for his services than he could fill. He had to program his activities of work with farmers at 3 levels of intensity and in accordance with development priorities.

First, he chose 5 to 10 farmers as primary cooperators and worked with them intensively. He assisted them in implementing innovations, in planning specific enterprises, in developing plans for the whole farm, and in keeping records for farm business analysis.

Then, a group of secondary cooperators was added, usually on a spontaneous, unplanned basis. These farmers had been inspired by the technician's activities with primary cooperators, and by discussions, demonstrations, or field trips. The technician did not visit them as frequently as he did the primary cooperators but he maintained an interest in their innovations or projects.

Other interested farmers in the village represented the third working level. They generally participated in group activities such as farmers' classes, demonstrations, or field days in the village or at the College.

As the technicians gained experience and earned the confidence of the farmers, it was possible to rely more on group methods and less on person-to-person working relationships. However, close technical supervision and guidance of primary and secondary cooperators remained crucial for a long time and were required at various steps of the innovating process. Finally, a follow-up was done to evaluate the project.

These continued personal contacts were time-consuming and costly, particularly in the beginning. But after a few months, the primary and secondary cooperators themselves became change agents through demonstrations on their own farms. At this point the technician reaped satisfaction from his intensive work with individual farmers.

Bringing the College to the Farmer. The subject matter covered and innovations used varied from village to village, according to the resources and interests of the farmers. Extension methods and techniques were frequently modified, since experience showed that it was not realistic to follow stereotyped procedures. The continuous search for more effective approaches and techniques was one of the exciting experiences in the project.

Some of the key features of the program revolved around fertilizer and variety trials, method and result demonstrations with farmers' crops and animals, field trips to the College and to projects of progressive farmers, village field days prepared with active farmer participation, farmers' meetings and classes in the village, and short courses at the College. None of these activities was considered sufficient in itself without systematic follow-up and supervision by the village technician.

Farmers who were cooperators in the project lived within a 25-mile radius of the College. They knew about the College but only a few among them had ever gone there to ask for information. They assumed the College was for scientists. The pilot project and subsequent activities attempted to bring the College to the farmers -- and their problems back to the College.

Direct and Indirect Results. Acceptance of specific innovations, results of changed practices and newly introduced farm enterprises, as well as the effect of such changes on farm income have been discussed in other publications.^{2/} For this paper, it will suffice to say that after 2 years the changes and development in pilot villages had stirred up interest beyond the College. Governors of neighboring provinces and directors of agricultural credit agencies approached the Dean to supply change agents who could work with farmers as they had seen project technicians work with their cooperators. They made grants to the College to cover the cost of training technicians for programs of their own agencies.

Having no staff experienced in training except the 4 project technicians, the College had to choose between continuing the original pilot project in the first 4 villages or a new training program. The technicians could only do one or the other. Sensing the opportunity for a vital new service, the Dean decided to discontinue the work in pilot villages and use the 4 technicians as training supervisors. In the ensuing phase of farm and home development, the emphasis was shifted to the training of change agents.

Training Change Agents

Modified practices and new farm enterprises observed on farms in pilot villages had generated a demand for college-trained change agents. Heads of agencies supplied grants for training wanted persons with qualifications similar to those possessed by technicians of the pilot project. Technical competence, ability to transfer knowledge, and farmers' readiness to transform new knowledge into action had impressed them. The agencies wanted persons with such qualifications.

In formulating objectives and procedures for the training program, the training staff considered the needs of various sponsors such as farm credit agencies, provincial governments, a sugar planters' association, and a Philippine

^{2/} Feliciano, G. D. The Farm and Home Development Project: An Evaluation. Community Dvlpmt. Res. Counc. Univ. Philip., Quezon City, P. I. 1964.

von Oppenfeld, H, de Guzman, L. P., Librero, F., and Sta. Iglesia, J. C. The Pilot Study in Farm Development. Univ. Philip. Coll. Agr., Laguna, P. I. 1965.

agency engaged in rural improvement in Laos^{3/} and the national government's extension services. The objectives broadly defined were:

To train young men and women to guide farm families in farm and home development.

To enhance technical knowledge and to develop competence in special fields.

To develop leadership qualities, communication skills, the ability to make informed decisions, and a philosophy for broader public service.

Two basic factors influenced the outcome of the training program: the quality of incoming trainees and the standards of the training program.

Selection of Trainees. To improve the chances of finding suitable trainees the College introduced a rigorous selection system. It solicited applications from graduates of several agricultural colleges. Transcripts of records indicated their scholastic performance. A written examination and personal interview made it possible to rank applicants according to (1) scholarship, (2) knowledge of agricultural technology in general and in their chosen field of specialization, and (3) leadership qualifications and attitudes essential for working with farmers.

Because employment in teaching, research, administration, and any desk work is generally ranked far above work in the village, many men and women sought extension work as a last resort. Consequently, a number of those accepting employment and remaining with extension agencies did not possess qualifications and attitudes essential for this challenging task. The selection process was designed to modify this prevailing outlook of students and graduates, so that when a 10-month FHD training program was announced, many applications were received, but only 1 in 4 was accepted. Those chosen had been honor students, had excelled in student activities, or had shown leadership in other ways.

Training offered no assurance of employment, although the prospects for subsequent employment with the sponsoring agencies were good. Rigorous screening

^{3/} Operation Brotherhood, sponsored by the Philippine Chamber of Commerce, has had medical teams in Vietnam and, later, medical and rural improvement workers in Laos. They hired one team of FHD trainees under a 2-year contract.

and selection according to performance and merit, as well as high morale among the early FHD trainees, contributed to a new outlook on extension work.

Training Schedule. In response to demand, more trainees had to be accommodated. The number rose from 16 to 20 in the first and second years to over 60 in each of the third and fourth years. Accommodating such numbers resulted in heavy pressures on training supervisors and other College resources. It required an appropriate organization and careful timing.

Training was accomplished in 2 locations: in training villages where trainees lived and worked with farm families 4 days each week, and on the campus where they spent the remaining 1-1/2 work days.

A full team, generally of 4 trainees, was assigned in each village, under a supervisor from the training staff.^{4/} Activities in the village remained similar to those outlined under the pilot study. The concentration of an entire team in one village enhanced team work.

During the days when the trainees reported back to the campus, they were engaged in 3 major activities:

Reporting and discussing the activities of the previous week and planning for the week(s) ahead.

Attending classes and seminars in their chosen specialization and/or in other technical departments.

Taking special courses in extension methods and communication skills offered in the Office of Extension and Publications of the College.

Technical subjects covered were tailored to the solution of problems encountered in the villages. In 1962, as work got under way in the newly established International Rice Research Institute, its staff contributed both to on-campus training and to experimental work in training and in project villages.

^{4/} When the number of trainees increased to more than 60, one supervisor was made responsible for 2 teams. For increased mobility, the supervisors used light motor bicycles.

The trainees learned about principles of rural leadership, program planning, preparation and use of visual aids, planning and organizing demonstration plots, result and method demonstrations, field days and field trips in their sessions on extension methods and communication skills. They were graded on performance in the classroom and in the field.

FHD trainees learned to appreciate much of the subject matter they had covered in undergraduate instruction. They added knowledge and skills useful at the farm level. They grew in competence and leadership abilities.

Introducing Home Management Technicians. In the Philippines as elsewhere, a notion prevails that it is neither proper nor practical for women to work as village-based change agents. Those girls who scored higher in the selection process than male applicants were appointed as trainees. They proved to work effectively as agricultural technicians.

Encouraged by this experience, the Dean authorized the appointment of home management trainees.^{5/} To hold the number of each team to 4, the functions of the pest and disease control technician were combined with those of the crop technician. The team then consisted of 4 technicians with specialized abilities in crops, livestock, farm management, and home management, respectively.

The FHD home management technicians worked under the guidance and supervision of the College Department of Home Technology. They added a new dimension to the team, especially as housewives were eager for information about home management skills, kitchen and home design, cooking, food preservation, serving, health practices, and other homemaking problems. Women cooperators were easily convinced of the desirability to add new income-producing enterprises to the farm business. They, in turn, motivated their husbands to try an innovation or a new project.

Developing Leadership Among the Training Supervisors. The expanding training program created urgent needs for new team supervisors. Trainees who had worked most effectively during their training and had shown the greatest

^{5/} The College received a grant from the Agricultural Development Council in New York to train 4 home management technicians.

leadership potential were later appointed as new team supervisors. Those with the longest experience (all 4 technicians from the original pilot villages) were encouraged to enroll for graduate study in their chosen field of specialization. Others followed their example after serving some years as supervisors, thus establishing a process that encouraged development of leadership among new supervisors.

Some senior supervisors already have M.S. degrees, and several of the younger team supervisors have begun graduate studies. Whether they remain in FHD activities or eventually engage in other professional work, they will have gained a practical orientation through training and supervisory experience in the villages. This is still a rare but urgently needed outlook among instructors, research or development technicians, and administrators.

Action Research with Built-In Evaluation

By 1963 the training program had become well established and was recognized as a going responsibility. Available manpower and financial support enabled the College to make a 3- to 5-year commitment to a new action-research program. The study consisted of 2 undertakings.

Inter-agency Approach. Two extension teams, each with 4 change agents, were assigned to 8 villages. Each team had 1 technician from the Council on Agricultural Productivity (CAP), 1 from Community Development (CD or PACD), and 2 FHD-trained change agents. These agencies represent 3 aspects of rural improvement: extension, community development, and higher education in agriculture. The College assumed overall responsibility and supplied the project supervisor.

Work was subject to overall policy directives and control by a steering committee on which the 3 participating agencies were represented. Each of the agencies had definite responsibilities and recognized capabilities for rural development. It was thought that village-level technicians would develop mutual understanding and respect, a necessary basis for team work and inter-agency cooperation. Efforts from the top to foster such coordination had never led to satisfactory results. There had also been much fruitless jealousy between the CAP and PACD.

A research component was provided at the outset with 2 research workers who were assigned to record and study the day-to-day development. They had access to the change agents' field diaries and to the families in the 8 villages.

Alternative Approaches and Levels of Intensity in Coverage. The College committed its resources to a second long-term project that engaged 20 change agents who were assigned to cover a total of 32 villages.^{6/} Efforts were made to describe and as far as possible to control such factors as type of farming, the change agent's training and specialization, importance of team work, as well as the ratio of change agents to villages. Four villages were to receive extension information through mass media (radio, film, slides, posters) rather than through direct contact with village technicians (table 1).

The objectives of this action program were:

To help farm families acquire needed skills, information, and attitudes necessary for the development of their resources.

To teach them the skills of making rational decisions and adopting new practices.

To provide information on improved farming practices, new discoveries, and market developments.

To develop an attitude of self-confidence.

A benchmark survey of farms and households was conducted at the outset, with the field technicians participating. Results, analyzed immediately, became the basis for program planning. Research workers were assigned in the villages to record and study program activities, as they had done in the inter-agency project.

At this writing the work is in its third year. A comprehensive evaluation report is still pending. These 2 sub-projects will lead to more profound insights than the first pilot study and the training program. Change agents

^{6/} The project is financed primarily by a Ford Foundation grant, but a substantial share of the financial burden is borne by the College from national funds appropriated to the University.

Table 1. Alternative Approaches in Extension and Numbers of Technicians Concerned and Villages Covered

Treatment	Technicians (number)	Villages (number)
I. 1 complete team in 4 villages: Lowland Area	4	4
1 complete team in 4 villages: Coconut Area	4	4
II. 1 complete team with each worker covering 2 adjacent villages	4	8
III. 4 generalist workers assigned one village each - separated	4	4
IV. 4 generalist workers assigned 2 adjacent villages each - separated	4	8
V. Mass media with no technician in the villages	0	4
Total	20	32

(FHD-trained) have achieved high levels of competence; supervisors have grown in leadership ability; research has become more pointed and research methods have been refined. Continuity of change agents in the villages, with built-in research, did not exist in the earlier projects. This is a great advantage for a study related to induced change.

Justification of Commitment to
Experimental Extension

The College is deeply involved through contributions of faculty and FHD staff time, equipment, funds, and administrative supervision. Benefits will accrue first to the rural families, second to staff and faculty involved directly in the field work, third to instruction and research as it relates directly and indirectly to agricultural development, and fourth to planning and implementing projects and programs for agricultural development. The justification is summarized in the following statement:

. . . . The ultimate effectiveness of any program depends on the ability of farmers to make sound decisions based on an understanding of the alternatives open to them Information and technology should be extended in such a manner that the farmer -- the man who puts the information into the production machine -- is himself improved by learning the "why," not merely the "what," or "how," of the innovation.

In view of this truth, the commitment of the College to experimental extension is fully justified. The investment will yield high returns in terms of augmented human capital for future planning and execution in the development of agricultural resources.

Pitfalls of Experimental Extension Activities

Potential benefits must be weighed against the dangers and pitfalls. Commitment to never-ending involvement in service functions is probably the greatest danger. Beyond the needs of training and research related to

^{1/} Hapgood, D., and Millikan, M. F. Policies for Promoting Agricultural Development, p.109. Center for Intnatl. Studies, Mass. Inst. Tech., Cambridge, Mass. 1965.

development, an agricultural college should not be trapped into supplying continued services, even if these urgently needed services are not forthcoming from other government agencies.

Failure to see the consequences of demand for staff time, transportation, and operating funds is another danger. Experimental extension requires sustained commitment. Neither the farmer nor the college has much to gain by plunging into the village with recommendations and innovations and then neglecting the necessary follow-up. It is impossible for such plans and proposals to be carried out without continued good management. On-farm development with the respective capital investment has often been started at the advice of extension experts. But frequently the result has been that farm sites abound with empty piggeries, poultry houses, deserted agricultural equipment, and misused irrigation schemes because there was no follow-up. Failure to recognize this point has caused much frustration in the rural development of the Philippines.

Related to this point is one problem of experimental research that has continuously bothered those involved in FHD activities. Barely had the technicians succeeded in gaining farmers' confidence, in arousing awareness and interest, in generating changed practices or new enterprises, when the training period would end and the technicians were pulled out to new assignments. Some innovations would stick, others would soon be abandoned. An obvious solution would be to arrange for follow-up and necessary services through government extension, community development, or private agencies. Because of apparent jealousies and misunderstandings, these arrangements have not been effective.

Jealousy and misunderstandings also have affected relations between the College and the agencies responsible for rural development. Technicians of these agencies may have inadequate resources, such as poor quality of undergraduate instruction (if they are college graduates); inadequate pre-service or in-service training; lack of support in terms of guidance, supervision, salary, and operating budgets. These causes of low efficiency and poor morale have been successfully eliminated in the FHD work of the College. Consequently, FHD technicians have been accepted among the villagers to a degree that workers of other agencies find hard to match.

The challenge for the College is to help these agencies upgrade the training level; to improve the conditions that tend to have adverse effects on performance and morale; to assist the agencies in implementing rigorous selection and promotion based on knowledge and performance, that is, to replace prevailing political patronage by a real merit system; and to provide information that is useful to farmers. If the College succeeds in this, it would not only avoid dangers of unfounded jealousies; it would finally realize its greatest overall potential for generating a real takeoff in the country's agricultural development.

A New Dimension for Experimental Extension

Being absent at present from day-to-day realities in the Philippines, the writer has little basis for mapping out the future place and role of experimental extension and FHD activities at the College. Opportunities for training and action research at the farm level have to be weighed against other alternatives and in the context of local and national objectives and needs.

Since he left the Philippines, the writer has observed agricultural development projects in several countries.^{8/} A substantial amount has been invested in the development of water resources for gravity or pump irrigation, in land development through settlement and other schemes, and in financing on-farm development through support of national credit institutions.

Engineering and other specialized knowledge is required for planning and preparing for the capital investment. When expertise is not locally available, it can be brought in through international agencies or through consultant firms. After feasibility studies have been made and detailed plans drawn up, capital investment proceeds accordingly.

When new resources are to be used for an intended purpose, farmers often fail to realize the benefit they can derive from them, when observed in the planning stage. The primary cause is not one of faulty engineering, but of the failure of those responsible for operation and management to supply farmers

^{8/} Mainly as an employee of the International Bank for Reconstruction and Development.

with adequate "packages" of knowledge, supplies, and services. Scarce investment capital and foreign exchange are thus wasted.

The resources of the College and the philosophy of public service developed through FHD would enable the College to contribute to better use of scarce investment capital. The College could train a task force of technicians and managers who would be responsible for operation and management. It could assist farmers to use the new resources efficiently and thus reap attractive financial returns. Moreover, the investment of scarce capital and foreign exchange in major development schemes would then yield satisfactory returns to the national economy.

A task force trained and guided in this manner could also operate as outlined by Dr. F. F. Hill.^{9/} He recommends that "countries with immediate and urgent food problems" assemble teams "well-balanced in respect to relevant fields of specialization," to be deployed as follows:

The objective of each research team should be limited and focused. Stated briefly, its objective should be to produce as quickly as possible substantially improved production technology for one or more of the country's major food crops for use in the area, country or region to which it is assigned.

The task force would embrace adaptive research and experimental extension. Sparked and supported by a strong college of agriculture, as in the Philippines or elsewhere, it would lend itself to flexible and effective operations and continuing re-evaluation. It could focus on specific production problems and attack broader problems of agricultural resource development. Properly aware of the needs of major investment schemes, the task force could help assure the right combination of knowledge, services, and capital. Developing countries would then discover that for well-prepared investment projects, with organization and management supported by an effective task force, development capital is readily obtainable.

^{9/} Hill, F. F. Some Viewpoints Concerning Agricultural Development. Talk before Amer. Farm Econ. Assoc., A.S.S.A. meetings, Dec. 28, 1965. (To be published in J.A.F.A.)

