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RESULTS OF A STUDY OF ADOPTION OF BETTER FARM PRACTICES IN THE PHILIPPINES*

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This paper is based on a study of the farm and home development approach to agricultural development and increasing farm incomes in the Philippines. As in other under-developed countries of South-east Asia, the problem of low income among Filipino farmers is very serious. According to a 1955 survey[1] of 5,195 farm households in 25 of 53 provinces, *family farm labour earnings* averaged 375 *pesos*[2]; *family income from all sources* was 982 *pesos*. In a national sample survey conducted two years later, the National Economic Council of the Philippine government found practically the same low income of 989 *pesos* for rural households.[3] With six persons to a household, per capita income was 167 *pesos*, while net cash income per capita was little more than 100 *pesos*. The poverty of the farm family appears even more striking when their income is compared with other occupations (Table I). Self-employed farmers earn only 6.70 *pesos* per week, less than unskilled labourers. Even at this low rate, opportunities for gainful employment are limited. Many farmers are seriously "underemployed".

TABLE I—AVERAGE WEEKLY EARNINGS OF WAGE AND SALARY WORKERS, MAY, 1956

Occupation	Weekly Earnings
	Pesos
Managers, administrators and officials	44.30
Professional, technical and related workers	37.00
Clerical, office and related workers	28·90
Workers in operating transport occupation	21·70
Workers in mine, quarry and related workers	20·90
Craftsmen, factory operatives and related workers	17·40
Manual workers and labourers	16.00
Service and related workers	11.90
Salesmen and related workers	10.20
Farmers, farm labourers, fishermen and related workers	6.70
Average	14.10

Source: Philippine Statistical Survey of Households, Series 1, Vol. 1, National Economic Council, May, 1956.

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1. Horst von Oppenfeld, *et al.*: Farm Management, Land Use and Tenancy in the Philippines, Central Experiment Station Bulletin 1, University of the Philippines (1957).
2. Official rate of exchange was 2 *pesos* to $ 1 at the time of study; now is 3.85 *pesos* to $1.
3. Philippines Statistical Survey of Households, Series I, Vol. 1, National Economic Council, Manila (1956).

The discussion in this paper is based on the hypothesis which underlies the Farm and Home Development Project of the University of the Philippines, College of Agriculture launched four years ago. The hypothesis states that lack of technical and business know-how constitutes a serious bottleneck in the desired transition to a dynamic agriculture. This position was both convenient and logical, for it reveals a road along which an educational institution can make significant contributions to agricultural development. In this paper, an attempt is made to present briefly the objectives and methodology of the pilot study in farm development conducted in four barrios or villages, namely, Cale and Janopol in the Batangas province and Halang and Linga in the Laguna province of the Philippines in 1957-58 and to evaluate the results in the selected barrios. The study covered 275 farmers in the four barrios.

THE PILOT STUDY IN FARM DEVELOPMENT

The pilot study in farm development was initiated with the following objectives :—

(i) to investigate the farm management problems of incorporating on individual farms the results of present day research,

(ii) to study the effect of recommended farm practices on farmers' income, and

(iii) to train extension workers and subject-matter specialists.

To attain these objectives, a team of four young graduate-specialists—an agronomist, an entomologist, a livestock technician and an agricultural economist to advise on farm management problems—was constituted. The team worked under the guidance of a part-time project leader, an agricultural economist by training. He co-ordinated their activities, encouraged the testing of new ideas, developed relationships with resource persons within and outside the College, guided visitors and prepared reports.

One guiding principle marked the relationship between the technician and his farmer-co-operators. The farmer was required to pay for all materials, such as fertilizer, insecticides, medicine, feeds and seeds. Only technical advice was given free of charge. The underlying philosophy is not easily appreciated in the Philippines where government and foreign aid have in the past been provided in various give-away programmes.

A list of the technician's activities in the village does not differ widely from those recommended in an extension worker's manual. But there is probably a difference in emphasis. Through trial and experience, some of these activities appeared to be the key to the acceptance of recommended practices. These activities include initial meetings with farmers, a benchmark survey of farms and households, selection of primary farmer-co-operators, educational field trips with farmers, farm planning and intensive follow-up, applied field research, field days and demonstration of improved farm practices and organizing or reactivating farmers' associations. This list of activities in the village is by no means all-inclusive. The bundle of techniques and methods of an extension worker is much

broader. Those mentioned above have proved to be most effective in the pilot villages. Vital steps in the extension process are : (1) broadening the farmer's awareness of choices for alternative production possibilities ; (2) arousing his interest ; (3) providing him with facts and insights for the decision-making process ; (4) assisting him in step-by-step implementation and teaching him necessary skills ; and, (5) encouraging him to share his knowledge with others. The village worker's activities should be geared to assist farmers in each of these vital steps.

BRIEF EVALUATION OF RESULTS IN PILOT BARRIOS

In appraising the impact of the technicians' effort on the farming population in pilot villages, one must consider the actual duration of the pilot study. At the end of two years, the technicians were withdrawn ; contacts with pilot barrios were reduced to occasional visits, often at the request of former co-operators.

The study had earlier been contemplated to last for a three-to-five-year period. However, early enthusiasm and the effect of visible changes in the barrios on officials from government and private groups brought pressure on the College to engage the four technicians of the pilot team for the training of four complete new teams.

The question now arises, was a duration of two years of intensive contacts sufficient to generate sustained improvements ? On the basis of this experience, the question cannot be answered with certainty. It might have been desirable to compare barrios where workers were withdrawn after two years with barrios where intensive contacts were maintained for a longer period. Such an arrangement, however, would not have been feasible for two reasons. First, the four pilot barrios, originally selected to represent different types of farming, were too heterogeneous for designation of "treatment and control barrios". Second, neither personnel nor funds were sufficient to continue the pilot study and to initiate the training programme. Right or wrong, the choice was to abandon the pilot study while the technicians were shifted to the training programme.

In retrospect, the authors feel that two years of intensive contacts may not be sufficient for optimum impact on the economy of pilot barrios. Therefore, the following brief appraisal of actual impact, of farmers' reasons for adoption or non-adoption of certain practices, and of the continuity of innovations seems appropriate. This appraisal is based on a survey conducted in the pilot barrios four years after the project was started. It covered farmers originally designated as co-operators as well as other full-time farmers.

Reasons for Adoption or Non-adoption of Recommended Practices

A checklist was prepared of innovations or recommended practices which had been covered in farmers' classes, field days or contacts with co-operators. All full-time farmers in the pilot barrios were interviewed in this part of the survey. The practices were grouped under four headings, crop culture, pest and disease control, livestock and poultry, and economic practices. The list had five columns for the enumerators to check if the practice was followed now, one, two, three or four years ago.

Practices enumerated were :

Crop Culture

1. New crops and varieties
2. Asexual crop propagation
3. Fertilization
4. Crop rotation
5. Seed selection
6. Seed preservation and storage
7. Germination test
8. Weeding and cultivation
9. Thorough land preparation
10. Diversification in lowland
11. Soil testing
12. Manuring
13. Compost pit
14. Cultural and performance trials

Pest and Disease Control

15. Insecticides
16. Fungicides and antibiotics
17. Control of crop storage pests
18. Elementary diagnosis
19. Mechanical control of pests and diseases
20. Precautions on agricultural chemicals
21. Spray schedule

Livestock and Poultry

22. Hog housing
23. Improved stock
24. Artificial insemination
25. Natural selection
26. Immunization
27. Deworming
28. Complete rations
29. Improved feeding
30. Surgical castration
31. Continuous culling of poultry
32. Sanitation
33. Elementary diagnosis
34. Compost pit

Economic Practices

35. Farm planning
36. Crop timing
37. Co-operative marketing
38. Grading
39. Merchandizing
40. Record keeping
41. Commercial credit
42. Work simplification
43. Combination of enterprises
44. Buying and selling.

Almost half of the "adoptors" claimed that they were motivated by expectations of higher yield, income or profit (Table II). One might of course, take this response for granted. There are, however, some persons who try to minimize the importance of profit motivation among Filipino farmers. In the pilot barrios income was by far the most important motivating factor.

TABLE II—REASONS FOR OR AGAINST ADOPTING CERTAIN FARMING PRACTICES

Reason	Practice	
	Adopted	Not Adopted
	Per cent of Total	
Expectations of higher yield, income or profit	47	—
No confidence in higher yield or income	—	3
Lack of funds or magnitude of capital requirement	—	21
Availability of capital	7	—
Lack of facilities, materials, services	—	20
Physical characteristics of the plants and animals	17	1
Incidence of pests and diseases	12	6
Experience, preferences, motives and beliefs	6	15
Lack of awareness or lack of confidence on results	—	12
Availability of time and ease of operation	5	—
Time and effort involved	—	9
Appeal of landlord, other persons or groups	4	—
Landlord or institutional restrictions	—	8
Other reasons	2	5
Total	100	100

Farmers attributed 17 per cent of the adoptions to superior physical characteristics of crops and animals. Having planted a new crop or variety, recommendations for the more exacting practices were but logical steps to follow. Improved management practices on swine and poultry were also logical steps for those who acquired animals of improved breeds. The third major reason was the incidence of pests and diseases. Many contacts between farmers and technicians arise out of current insect or disease problems. A qualified technician can be very helpful in solving such problems. No other factor accounted for more than 7 per cent of practices adopted.

Important reasons for non-adoption were : lack of funds or magnitude of capital requirement ; lack of facilities, materials, services ; (unfavourable) experience, preferences, motives and beliefs ; time and effort involved ; and, objections of landlord or other institutional restrictions. No other single factor accounted for more than 7 per cent of non-adoption.

Some comments on reasons for non-adoption may be of interest. Lack of facilities or services was listed as a reason for not using artificial insemination. These services were newly introduced; communication and transportation problems between pilot barrios and the insemination center still defy a practical solution. The amount of capital required for establishing a swine or poultry project is often a critical factor. Tenant farmers have no access to commercial credit unless they find co-signers for their loan. However, the technicians have often been surprised how some of the "adoptors" could raise the capital to start a project although they were not visibly better off than the "non-adoptors".

Certainly, previous failure may be powerful deterrent. The farmer is less likely to risk poultry again if he has failed before. In much the same way he will not forget the time his carabao died because he used Endrin to spray his rice fields; or his low harvest because the fertilizer he applied induced the lodging of his rice crop.

Also, many innovations of benefit to farmers have actually failed to reach them. Although new research findings continue to be published, the farmer may never hear of them unless they are explained by an extension worker.

Rate of Adoption and Number of Improved Practices Adopted

The pilot barrios were chosen to represent different types of farming : diversified upland in barrios Cale and Janopol, Batangas province, one-crop lowland rice in barrio Halang and lowland rice and poultry in barrio Linga, both in Laguna province. Sources of income in Cale and Janopol are citrus, corn, rice, vegetables, swine, poultry and fruits. Data obtained in the benchmark survey show marked differences in size of farm, rate of tenancy, education of farm operators and income (Table III). Tenancy, for instance, ranges from only 27 per cent in barrio Janopol, to 98 per cent in Halang. Halang was also lowest in educational attainment (with operators averaging less than one year of school attendance), net cash income and family income.

TABLE III—SOME CHARACTERISTICS OF THE PILOT BARRIOS

Item	Pilot Barrios, 1957-1958			
	Cale	Janopol	Halang	Linga
Average farm size, hectares	2.7	2.9	3.7	2.4
Per cent of tenant farms	45	27	98	55
Operator's years in school	3.1	3.3	0.9	4.6
Net cash farm income (*Pesos*)	256	763	27	694
Family income from all sources (*Pesos*)	733	1,143	543	1,779

Keeping in mind the heterogeneity of conditions in pilot barrios, one will not be surprised to find a wide range in adoption of new farm practices, both in number and rate of adoption (Table IV). Of 44 practices to which the farmers were exposed through the technicians' activities, adoption ranged from 3.3 to 7.1 practices per farmer in Halang during the five crop years covered by the survey.

TABLE IV—NUMBER AND RATE OF ADOPTION OF 44 RECOMMENDED PRACTICES BY 275 FARMERS IN FOUR PILOT BARRIOS, HALANG, LINGA, CALE AND JANOPOL

Barrio and Crop Year	Practices per Farmer	Kind of Improved Practices			
		Crop Culture	Pests & Diseases	Livestock & Poultry	Economics & Farm Management
	Number	*per cent of highest possible number*[a]			
Halang					
1957-1958	3.3	17	8	*b*	4
1958-1959	5.0	20	14	2	9
1959-1960	6.1	23	16	4	12
1960-1961	6.4	25	17	4	12
1961-1962	7.1	26	22	6	13
Linga					
1957-1958	6.9	21	12	17	10
1958-1959	8.4	24	17	20	13
1959-1960	9.4	27	20	22	15
1960-1961	10.5	28	23	25	16
1961-1962	10.7	29	22	27	16
Cale					
1957-1958	10.5	46	11	*b*	28
1958-1959	12.7	48	24	*b*	36
1959-1960	14.1	50	34	7	38
1960-1961	15.2	52	42	8	39
1961-1962	15.9	52	44	10	41
Janopol					
1957-1958	12.4	48	23	2	38
1958-1959	14.5	50	38	6	41
1959-1960	17.5	52	42	21	45
1960-1961	19.1	53	44	30	47
1961-1962	20.0	53	44	37	48

a Hignest possible number equals the product of the number of responding farmers and the number of specific improved practices for the individual categories.
b Less than one per cent.

For Janopol, on the other hand, adoption increased from 12.4 in the first year to 20 in the last year. In terms of practices adopted per farmer, barrios Linga and Cale were intermediate between Halang and Janopol. Halang's relatively poor response is probably associated with factors like high rate of tenancy, low educational attainment, mono-culture single crop rice farming and other conditions in the barrio. Halang was chosen to represent large areas in the Central Luzon rice plain where similar problems exist. Experiences in Halang suggest that under these conditions, farmers may not be very responsive to extension programmes.

The rate at which recommended practices were adopted is also of interest. Barrios Cale and Janopol responded vigorously and exceeded 50 per cent of possible crop culture practices. In barrio Linga which borders on a large freshwater lake, many farmers are also fishermen and consequently, less interested in crop culture practices. Linga farmers responded well to changes in livestock practices. Livestock enterprises may be more compatible with fishing than crop farming. In barrio Cale where response was generally very positive to innovations, crop culture did not show marked response to livestock and poultry practices until the third year.

Intensive contacts in the pilot barrios were discontinued when the technicians withdrew at the end of crop year 1959-60. Neither number nor rate of adopted practices declined after their withdrawal. In other words, there was little or no back-sliding. However, equally significant may be the fact that after withdrawal of the technicians the number of practices did not increase substantially.

Rate of Adoption by Primary Co-operators and Other Farmers

One objection is frequently advanced against the "concentrated" approach. An extension programme, it is being argued, cannot afford to work primarily with selected farmer co-operators and disregard the need of other farmers. In response to this argument, it must first be stated that the needs of other farmers are not being overlooked. Primary co-operators are being selected in the expectation that they will be the most promising innovators, because of positive attitudes, interest and *resource combination.* It is very difficult to differentiate between responsive and less responsive farmers, particularly when the technician is not yet well acquainted with conditions in the barrio. Some farmers may state their keen interest and promise all-out co-operation. Soon the technician may discover that other farmers are perhaps more eager to start certain projects or to change practices than his formal or primary co-operators.

To gain some further insights into this question, the percentage rate of adoption was compared from year to year for co-operators and other farmers (Table V). Results show that the rate of adoption for other farmers lags behind that of the co-operators, both in time and in the highest percentage achieved in the fifth year. More important than this lag is the clear pattern of radiation from co-operators to other farmers. A successful farmer becomes the technician's most effective extension worker. Few farmers can keep their innovations to themselves. Farmers seem to share readily newly acquired knowledge and skills with neighbours, friends and relatives.

TABLE V—RATE OF ADOPTION OF 44 RECOMMENDED PRACTICES BY PRIMARY CO-OPERATORS AND OTHER FARMERS IN FOUR PILOT BARRIOS, LINGA, HALANG, CALE AND JANOPOL

Barrio and Crop Year	Crop Culture		Pests & Diseases		Livestock & Poultry		Economics & Farm Management	
	Co-operators	Other Farmers	Co-operators	Other Farmers	Co-operators	Other Farmers	Co-operators	Other Farmers
	*per cent of highest possible adoption**							
Halang								
1957-1958	21	16	21	5	0	*b*	2	4
1958-1959	26	19	31	10	5	1	13	9
1959-1960	28	22	33	12	15	2	20	10
1960-1961	31	24	36	14	14	2	13	11
1961-1962	31	25	40	19	12	4	18	11
Linga								
1957-1958	24	20	23	8	27	14	12	9
1958-1959	31	21	21	15	30	17	19	12
1959-1960	38	24	34	15	31	19	21	13
1960-1961	43	24	43	17	38	22	21	15
1961-1962	38	26	36	18	40	22	21	15
Cale								
1957-1958	55	46	16	11	4	3	34	28
1958-1959	61	48	55	22	16	4	57	35
1959-1960	62	49	64	32	29	6	56	37
1960-1961	65	51	64	41	33	7	54	38
1961-1962	68	52	63	43	37	9	54	40
Janopol								
1957-1958	54	48	16	24	2	2	43	37
1958-1959	58	49	49	36	2	7	56	39
1959-1960	61	52	47	41	32	19	61	43
1960-1961	60	52	49	43	45	28	63	45
1961-1962	62	53	45	45	49	36	63	47

* Highest possible adoption equals the product of the number of responding farmers and the number of specific improved practices for the individual categories.
b Less than one per cent.

In the "concentrated" approach of farm development it is important that the technician work intensively with relatively few farmers rather than all farmers of the barrio. They are either his pre-selected primary co-operators or other farmers who display keen interest in his specific programme.

Effect of Recommended Practices on Income

From the beginning, the pilot study was designed to test a basic hypothesis. If results of present-day research were properly applied on individual farms, in-

come would rise substantially. In one test for this hypothesis, farmers in three barrios for which the income analysis was completed were grouped under two major categories : good "adoptors", those who had adopted 18 or more recommended practices and poor "adoptors", those having adopted eight or fewer practices. Farmers who adopted more than eight but fewer than eighteen practices were excluded from this comparison (Table VI).

TABLE VI—LEVEL OF INCOME OF POOR AND GOOD ADOPTORS OF RECOMMENDED PRACTICES IN THREE PILOT BARRIOS, HALANG, LINGA AND JANOPOL

Item	Poor Adoptor	Good Adoptor
	Pesos	
Disposable farm income[a]		
Halang	561	—
Linga	566	1,682
Janopol	344	2,457
Income from all sources ..		
Halang	711	—
Linga	695	2,194
Janopol	809	4,988

a Returns to labour, capital and management.

In barrio Halang, not a single farmer could be classified as a good adoptor. In barrios Linga and Janopol the difference between the income of good and poor adoptors was very marked. It is sometimes held that extension workers in general and farm development technicians in particular are too innovation-minded. Results show that there seems to be little or no ground for this criticism of the technicians' effort in the pilot barrios. It paid to be a good adoptor.

Income of the co-operators was compared with that of the other farmers, at the beginning and at the end of the study period (Table VII). In all cases, the income of co-operators increased at least 100 per cent from 1957-58 to 1961-62. In Janopol, income increased four-fold. Income of other farmers increased likewise, but not as markedly as that of primary co-operators. The income difference appears so large that there is little room for doubting the basic income hypothesis.

Equally convincing as these statistics is a visit to the pilot barrios, a conversation with the farmers. However, more detailed and thorough evaluation is needed of extension methods, of farmers' general reaction, of their response to specific innovations, of the radiation process beyond the pilot villages. Preparations for such evaluation are underway. The person responsible for such evaluation has not been involved in the project and has a research grant from outside sources.

TABLE VII—GROSS PRODUCTION AND DISPOSABLE FARM INCOME OF CO-OPERATORS AND OTHER FARMERS IN THREE PILOT BARRIOS, HALANG, LINGA AND JANOPOL

Item	Co-operators		Other Farmers	
	1957-58	1961-62	1957-58	1961-62
		Pesos		
Halang				
Gross Farm Production	2,449	4,066	998	1,658
Disposable farm income	551	1,305	189	308
Linga				
Gross Farm Production	1,247	2,904	1,492	2,036
Disposable farm income	568	1,063	491	504
Janopal				
Gross Farm Production	1,381	5,439	1,496	2,355
Disposable farm income	734	4,088	1,022	1,221

CONCLUSION

One general conclusion can be drawn from the experience in the four pilot barrios. Many farmers can and will participate in agricultural development by changing farming practices and increasing output if technical information applicable to specific local problems is presented in an acceptable manner. It devolves upon the technician to employ suitable methods to motivate and teach the cultivators.

The scope of farm and home development stretches beyond the boundaries of the individual farms, farmers and villages. Results and experiences have enriched our knowledge not only about the work in the pilot barrios but also on implications in regard to widening the scope of the project.