

RP
630.9914
T128

Southeast Asia I
THE ASIA SOCIETY, 112

RP Agricultural Innovation and Patterns of Rural Life...
630.9914 Southeast Asia Development Advisory Group
T128 (SEADAG)
Agricultural Innovation and Patterns of
Rural Life; Focus of the Philippines. Gelia
Tagumpay-Castillo. June 1969.
58 p.
SEADAG discussion paper.

1. Innovations in Agriculture - R.I. 2. Agricultural
development - P.I. 3. Sociology, Rural - R.P. 4.
Tagumpay-Castillo, Gelia. II. Title.

73420
70

PN 7155-180

AGRICULTURAL INNOVATION AND PATTERNS OF RURAL LIFE
(FOCUS ON THE PHILIPPINES)

by Gelia Tagumpay-Castillo

Presented for discussion at a
meeting of the SEADAG Inter-
national Research Conference,
held at Asia House, New York,
on June 24-27, 1969.

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AGRICULTURAL INNOVATION AND PATTERNS OF RURAL LIFE

(FOCUS ON THE PHILIPPINES)

By Gelia Tagumpay-Castillo

INTRODUCTION

Today is an era of revolutions, some of which are "cultural," some "black," some "green" and some *young*. In any revolution, innovations big and small merge into a general theme which eventually acquires momentum that is hard to contain. What we are witnessing now in our countryside may not qualify as a revolution by Latin-American or New York standards so it will suffice to state that: *Changes are taking place*. Unlike other analyses of such changes, this paper does not ask whether the "Green Revolution" is Cornucopia or Pandora's Box¹ because it brought Cornucopia; otherwise there might not have been any "revolution" to talk about. Predictably, any innovation, but particularly a revolutionary one, ushers in or is ushered by a new set of behavioral and institutional requirements and as it is more fashionably expressed nowadays--these give rise to a series of *second-generation* problems which create a *generation gap*.

This paper is an attempt to sketch out the role of agricultural innovations starting from the environment of a traditional world to the emergence of second-generation problems. Patterns of communication, adoption, response and adjustment to innovations will be identified and described as far as they are relevant to rural life. To accomplish this objective, data from published and several unpublished researches have been reviewed. In addition, observations and experiences accumulated over the years as a student of rural life have been brought to bear on the subject.

I. THE "TRADITIONAL" WORLD

As a take-off point for discussing the impact of agricultural innovation on rural

life, one has to begin with an idea of what is changing. Excerpts from anthropological-sociological writings are therefore presented to somehow describe the traditional world. Covar, in his 1958 study of the Masagana/Margate System of Planting Rice gives us an excellent start. This system of rice cultivation includes the usual nine basic steps which Filipino farmers follow except that more careful and intensive operations are involved. In his prognosis of the Masagana/Margate system's prospect for adoption by our rice farmers, Covar has this to say:

The Masagana/Margate system is a product of specialists or experts in agriculture. The older method, on the other hand, has been polished and hallowed by tradition and experience. The gap between the new and the traditional is large enough to create a situation whereby the new can be misunderstood. Furthermore the relationship between those who are introducing and those who are going to accept the innovation is not on equal plane in terms of age, education and other socio-cultural factors. It may be assumed that there are socio-cultural barriers, such as respect for old age and farming experience which very much affect acceptance.

The farmers accept only within the framework of their viewpoint as conditioned by their experience. Thus their readiness to accept is definitely limited. In connection with this, there should be an identification of a need and the meeting of such a felt need should be the basis of any program of community development. Do the farmers feel a need for the Masagana/Margate system? Again the farmers respond only within the limits of their training, experience, and understanding A case which seems to be relevant is cited as an analogy. If, for instance, a beautiful pamphlet is given to a primary grader and his response is recorded, one would notice that the pupil will only scan the pages and then put it aside. The case is identical to that of the farmers. They have been given pamphlets with instructions for a new way of planting rice. However they only become interested in looking at the pictures, never applying what they have seen and read.²

It should be kept in mind that the setting of Covar's study in Laguna Province, the same setting for several of the studies which will be reviewed later. Fortunately, another anthropological study is available to provide us a description of a village from another part of the country--the Visayas. Before his analysis of economic development and cultural change in this barrio begins, Jocano leaves a note of caution:

. . . To talk about acceptance of modern technology in terms of demonstrating its economic advantages is to be naive about the dynamics of human study. One needs to view acceptance in terms of the meanings people have of economic advantages. . . .

Given this caution, Jocano proceeds to describe the Malitbog farmer's reaction to leasehold arrangement, cooperative labor and scientific farming practices:

. . . the rental is fixed and risks are borne by the lessee alone. When farming is dependent only on the vagaries of an uncontrolled natural environment, these risks are indeed great. This unpredictability of nature is one of the major elements in Malitbog's general ecology that yields an overriding influence on local agricultural activities. In a word, lack of technological control over nature, like irrigation makes farming a gamble. It is thus understandable why the farmers do not appreciate the value of risk in agricultural management or on the spot decision-making in any agricultural activity. On the other hand, they have learned to be slow in their actions and have developed elaborate planting, caring, and harvesting rituals to help them determine and control the behavior of nature. One miscalculation means dislocation of the annual economic income which is in any event very small. Moreover, credit is difficult to obtain and if it is available the interest is indeed exorbitant. . . .

. Farming is a nuclear family affair with members as the basic working unit. This does not mean that other forms of cooperative labor are ruled out in the process but that full cooperation of an extended household in the production of staple food or of any crop is relatively rare. They help one another in many agricultural endeavors--like plowing and transplanting but they cultivate different fields and feel solely responsible only for their own fields. There are cooperative labor patterns in the barrio which involve the participation of non-kin.

. Other factors which need to be considered in talking about land use and production in Malitbog are the financial resources of the people and the market prices of crops they produce. Given the chance, the farmers would prefer scientific farming over the traditional because they are aware that it would bring better harvests. However, they are also aware that acceptance of modern technology would entail more expense than they could afford. Fertilizer and insecticides are needed. Measured-spacing during transplanting is time-consuming and labor-demanding. The seeds have to be selected. All of these have to be purchased in addition to labor expenses which have also to be met. Thus the limited financial resources of the farmers at the beginning of the planting season prevents them from accepting modern farming as the means of resolving their economic problem this pressure of limited economic opportunities has led to conservatism in outlook and preferences for traditional methods in farming in that tried ways are more assuring and more predictable than new alternatives which have greater elements of risk, the farmers are not quite prepared to take.

Not only do financial resources but also the possible market price of the crops enter into this pattern of decision-making at the beginning of the planting season. Prices of crops planted, harvested and sold during the

previous year are reviewed and the lower priced crops are avoided. For example when the wholesaler in the town in 1964 lowered the price of new varieties of rice--Manila rice, BE-3 etc., because of poor milling return, the farmers did not plant these varieties in 1965. In the nearby barrio of Igsuli there was a rush for sugarcane cropping in 1963-64 because the price of sugar went up in 1962. In fact, many rice fields were converted into cane fields.

. Rituals, prayers and other ceremonies are performed during the planting and harvesting seasons in order to hasten the growth of rice, to ward off evil spirits from the field and to insure a good harvest. The observance of these rituals follows the agricultural cycle.

In emphasizing the significance of rituals and sympathetic magic on the economic activities and social behavior of the people, I do not imply that they are not aware of scientific tested methods of farming. They know that when commercial fertilizers are used their crops will give them a rewarding yield. They also know that they have to take good care of their fields if they expect to have a good harvest. It is only within the realm of recurrent events in which their technological knowledge cannot effectively operate that rituals are used. The farmers are aware that there are certain culturally sanctioned ways of reinforcing their agricultural knowledge. The use of sympathetic magic is an important one. As one of the farmers reasoned: I lose nothing if it does not work; I have everything to gain if it does.³

It is into this kind of an environment (as seen by the social scientist) that agricultural innovations have to make their way. The task of this paper is to find out how farmers and the rural community in general have responded to these "incursions" into their traditional life.

II. COMMUNICATION PATTERNS

Strictly in non-Freudian terms, it does not take much wisdom to postulate that an innovation to be accepted has to be brought first to the attention and consciousness of the potential acceptor. In modern day language, this means the message has to be communicated. From several studies which have investigated the channels and process by which information on agricultural innovations reach the farmer, certain patterns have emerged.

A. Sources of Information and the Adoption Process

In all of the studies reviewed for this paper, agricultural information was obtained predominantly from personal sources. This was so regardless of stage in the adoption process. This general observation does not coincide with the U. S. findings in two aspects: (1) the minimal use, if at all, of mass media as first source of information and the importance of extension or institutional sources in this respect, and (2) the differential role of various personal sources and of mass media in relation to type of innovation, place and level of development.⁴ For example, in a more economically advanced area, most farmers heard of new varieties from neighbors although the earliest adopter got his information from the extension worker from a managing landlord.⁵ Dealers provide more information for insecticides, rodenticides, rotary weeders, and fertilizers than for other practices. Seed selection is an age old practice which was first learned from parents and ancestors.⁶ By contrast, U. S. studies have shown mass media (TV, radio, newspapers and magazines) as the most important source of information at the awareness and interest stages.⁷

In trial and adoption stages, the Filipino farmer usually finds himself on his own.⁸ Clues as to what most likely happens from awareness to adoption are presented in Lu's study. Of 395 farmers 88 per cent were aware of the extension worker's presence in the barrio since he was expected to hold office in his barrio of assignment. When asked how frequently farmers have had contact with the extension worker, 45 per cent said *seldom*; 22 per cent, *never*; 18 per cent, *often*; and 15 per cent *very often*. *Often* meant once or twice a month. The reason cited for farmers' inability to see the extension worker in the barrio was that his assignments changed quite often and therefore did not stay long enough in the barrio to get acquainted before a new assignment was made. As one extension

worker remarked "What is the use? Tomorrow I may go to another barrio." In terms of actual advice received from the extension worker by 395 farmers, only 30 per cent received advice on the use of fertilizers, 39 per cent on use of farm chemicals and 47 per cent on cultural practices.⁹

Even in the case of first distribution of IR-8 seeds in the Bicol region which was done mostly through offices concerned with rice production, only half of the initial recipients were given any technical assistance. The rest trial-planted IR-8 on a purely "self-help" basis. As a matter of fact one farmer expressed surprise when asked about technical assistance received. "I did not know there should be someone to give us that kind of assistance."¹⁰

The frequent mention of extension personnel as a source of information therefore can not be interpreted as a sign of their overriding influence. Perhaps they function most as first sources of information or of awareness. The self, neighbors, and co-farmers apparently play a significant role in the actual trial and eventual adoption of the innovation.

Bueno classified personal sources into *personal cosmopolite* (extension workers, agricultural storeowners, landlords, other farmers all of whom come from outside the barrio) and *personal localite* (other farmers, neighbors, relatives and other people from within the barrio). Early adopters tend to get information from cosmopolite personal sources.¹¹ They also use more sources, either persons or mass media.¹² Once the innovation has entered the barrio, localites become the predominant sources especially in the light of "To see is to believe."

Regarding the role of mass media, Frio found that in spite of IR-8 information broadcast over two radio stations aimed at the communities studied and posters

and billboards placed at strategic places only 2.5 per cent of 80 farmers mentioned hearing about IR-8 from the radio broadcast. This was so even if there is a very high percentage of radio ownership and listenership.¹³

Pablico's study of the adoption of the hand tractor also revealed personal sources as neighbors, tractor renters, salesmen, dealers as major sources of information in spite of mass media publicity for hand tractors. A total of 1255.5 square inches of advertisements on the hand tractor was published in the *Liwayway* magazine from October 29, to August 23, 1965, 172.74 square inches in the *Philippine Farms and Gardens* from March to June 1966 and 327.25 square inches in the *Agricultural Industrial Life Magazine* from March to June 1966. In addition, 11 large billboards advertising different brands of hand tractors were displayed along the highway. This lack of impact of mass media publicity may be attributed to the low education of these farmers which most likely precludes greater use of the printed media.¹⁴

Feliciano's findings are along the same trend except that in cases where there was change-readiness in the farmers i.e., there existed a keenly felt need for a specific practice, the mass media was able to trigger off immediate trial and/or adoption. Eighteen respondents out of 198 reported adopting a new practice after reading or hearing about it in the print and electronic media. Thus a farmer who had long wanted to own a knapsack sprayer decided to buy one after having heard about its merits over the radio. In like manner a farmer who had accepted the idea of fertilizing for greater crop yield, bought *Atlas* fertilizer right away after he read an advertisement about it in *Liwayway* magazine.¹⁵ In other words mass media tend to function more as *reinforcers* or *triggers* for action after personal sources have made them aware and interested in the innovation. Perhaps too, the unavailability or inaccessibility of extension personnel and the like during these later stages give salience to information from the mass media as

immediate precipitators of decision to try or adopt.

Incidentally, Pablico also found that contrary to the Western model of the adoption process which postulates that farmers go through five distinct stages of awareness, interest, evaluation, trial and adoption, after obtaining initial information about the hand tractor, farmers most frequently proceeded directly to adoption with less frequently occurring instances of passage through some of the other stages. This short-circuiting of the adoption process could be a reflection of authoritarian tendencies of Filipino farmers. They may adopt on the mere say so of people whom they perceive as positive authority sources. The farmers studied also sought more information about the hand tractor after adoption. Mediating personal sources like tractor renters, salesmen, dealers, etc. were major sources of information throughout. Apparently they were perceived as persons of utility who are in position to give the information they need and are credible because they are competent as far as matters of hand tractors are concerned.¹⁶

Another violation of the adoption process model is evidenced among some tenant farmers who planted IR-8 because of the landlord's decision. Only after trial or adoption did they evaluate the innovation and seek further information.¹⁷

B. Flow-nonflow of Agricultural Information

To those responsible for introducing agricultural innovations, it is considered desirable to facilitate and encourage the flow of information regarding the innovation. Farmers, however, may not necessarily subscribe to this notion. In the traditional barrios included in Feliciano's case studies, if the news is agricultural, farmers do not as a general rule tell their wives because they believe that "the woman has no secrets." This was indicated by 56 out of 199 farmers interviewed. In these barrios, farmers who obtain new technological information

from initial sources such as Extension Workers tend to *hold on* to the information rather than pass it on to their wives and to their fellow farmers. From reasons given by the farmers themselves, this hoarding of newly obtained information seems to derive from:

The farmer as a *segurista*; he cannot take the risk of being embarrassed/ridiculed if the new practice fails; the farmer is a doubting Thomas; he is not sure it is really good until he has tried it; further, the farmer is not sure it is important enough to others until he tries it and succeeds and sees the other farmers' favorable reactions to his success; also being recipient of new technological information bolsters the farmer's ego; he's got an edge over the other farmers now, so why tell them? Furthermore, it's the farmer's "suerte" or good fortune, his neighbors will have it too for life is a wheel of fortune anyway, so why not let them wait, for they'll have their turn.

On the other hand, news concerning politics or social happenings in the barrio, farmers, traditional or not share it readily and therefore news such as Mang Huse having more than one wife, old bachelor Karo's elopement with Felisa and items on deaths, births, good fortune etc., travel thick and fast. According to 8 out of 10 male respondents and 7 out of 10 females, news of this sort disseminate quickly because of women "carriers" in the barrio.¹⁸

Other reasons for hoarding agricultural information are so different from a *business man's trade secret* in a competitive market. The desire to be first to get earliest releases of most recent rice varieties is directly related to the opportunity to plant it for seed purposes which command premium price in the community. The farmer who succeeds in getting even a handful of these early seeds is not about to share it with every one. Of course after the first harvest, his secret is automatically shared.

Fear of glut in the market and drop in price with mass growing of certain crops is another reason for wanting to have a monopoly on the innovation. Such is the

case of sweet corn seeds introduced in a barrio that grows and sells green corn as a cash crop. Seeds obtained from the extension worker were kept within the immediate family until the middleman who purchased the previous season's harvest spread the word around that the first adopters made so much money from sweet corn. A previous experience with pop corn which "popped" everywhere when the seeds diffused brought about an abrupt price slump precipitating the non-flow of sweet corn seeds.¹⁹ At any rate, hoarding of agricultural information is usually a temporary situation and if practiced with impunity is liable to provoke social sanctions from the community. After all, who knows whether the hoarder will always be the pioneer recipient or bearer of new information. No one has a monopoly of channels.

But perhaps a more general communication behavior pattern among farmers should be examined. Using the farmer as point of reference, the communication pattern is one of *information-receiving and seeking* and *less of information-giving* hence there are "doorstops" in what should otherwise be an exponential rate of information flow. Unfortunately researches conducted fail to distinguish whether or not information reaching the farmer was brought to him by the extension worker or he deliberately sought it out. It is important to know who takes the initiative in the information flow--the farmer or the extension worker? When the farmer is in possession of the information whether or not he simply received or purposely sought it, does he pass on the information?

Hamada's study which asked farmer-respondents to name person or persons they most often talk to about farming, observed that farmers sought other farmers for their discussants and for information dissemination, the movement was that of seeking rather than of giving, whether on farming or non-farming matters. The information seekers tended to speak to fellow seekers more often than they spoke to new publics.

This may imply that they seek to reinforce, clarify or relate information to individuals of their own information category rather than passing on information to new audiences. Thus these information-seekers are potential information dead-ends unless some other people gravitate to them for information.²⁰

Additional evidences on this information-receiving rather than information-giving tendency were indicated in data from 7 barrios where the new rice varieties were introduced.²¹ One-hundred eighty seven farmers adopted these new varieties mostly from the crop technicians assigned in their barrios. Only 42 out of 187 or 22 per cent discussed the innovation with neighbors or other farmers. Although there is no doubt that information will flow, the process is slowed down by the fact that only a few of the receivers passed on the information and even at that, it is not known whether this was a voluntary sharing by the recipient or this was sought by the next potential receiver.

C. Awareness--Adoption Gap

The movement of farmers from the awareness of innovation to its actual adoption is not a smooth and easy transition. To understand the nature of this process and all its complexities, the following data are presented: Out of 395 farmers included in a study of farm level implementation of a rice production program, 178 were aware of the existence of certified seeds. 127 were aware of the source; 41 were able to obtain the seeds by only 36 actually used certified seeds. The 359 non-user farmers gave a total of 609 reasons for not using certified seeds. These reasons are distributed as follows:²²

- | | |
|--|-----|
| (1) Never heard about it | 48% |
| (2) Not available locally, limited supply and stocks arrive late | 36% |
| (3) Prohibitive price and no money | 6% |

(4) Not interested, not applicable, haven't tried it yet	6%
(5) Planting seeds provided by landlord or overseer	3%
(6) Poor germination	1%

To look at another innovation, commercial fertilizer was not used by 156 farmers for the following reasons:

(1) Not available locally, stocks arrive late and limited supply	43%
(2) Not interested because their farms were fertile	19%
(3) No money to buy and prohibitive price	22%
(4) Unavailability of irrigation water and belief that fertilizers produced no good effects on the farm	10%
(5) Landlord or overseer does not allow the use of fertilizer	3%
(6) No reasons given	3%

The two examples above show the gap between awareness and adoption. This gap is probably best described as an *inverted pyramid* indicating steep decline in the number of farmers participating from awareness of the innovation to actual use. In the first example cited on certified seeds about which only 178 out of 395 farmers were *aware*, the 217 farmer "*unawares*" represent the *communication or information gap*. The difference between 178 "aware" and 36 actual users represent the *awareness-adoption gap*. The difference between the number of potential users of information (those aware of the innovation) and the actual effectors dramatizes the magnitude of development effort which is needed to unfreeze the institutional or infrastructural constraints which paralyze or prevent a higher percentage of innovation implementation at the farm level.

Another aspect of this farm-level implementation is the influence exerted on the farmer's decision-making by other individuals.

Data from Lu's study show who exerts this influence:

No. of farmers who would consult with:

<u>Decisions on Farm Business</u>	<u>Wife</u>	<u>Landlord</u>	<u>Extension Worker</u>	<u>Other Specialists</u>
	Total N = 395			
1. Buying fertilizers	62	52	37	5
2. Where to sell agricultural products	69	4	-	-
3. Engaging in a new enterprise	78	2	2	-
4. Buying a carabao	83	7	0.2	-
5. Buying farm tools and equipment	75	6	6	-
6. Buying farm chemicals	67	41	48	4
7. Where to borrow money	84	25	12	-
8. Changing new varieties	60	52	40	3
9. Changing new rice cultural practices	58	50	40	8

The wife's role in decision-making regarding farm operations ranges from fertilizer purchase to marketing of agricultural products. Feliciano's findings confirm this active participation of the wife in decisions relevant to the farm. Only about half of the farmer respondents said they make decisions by themselves without consulting the wife. Needless to say, where wives participate in decision-making, husbands share "farming secrets" with them.²³ In Guerrero's study, buying land, borrowing money for the farm, and decisions on what to plant are regarded more as

joint husband-wife rather than husband-only decisions. Buying farm tools and deciding how large an area to plant are largely husbands' domain.²⁴ The pervasive influence of the wife in farm business decisions derives from the Filipino wife's role as family treasurer with facilitative or veto power on expenditures. Landlords affect decisions which required financial outlay for fertilizers, chemicals, new varieties and new cultural practices. This is an important factor particularly where tenants and landlords share expenses in order to implement changes in farming practices.

III. ADOPTION PATTERNS

Farmers' response to an agricultural innovation is nowhere better revealed than in what they do with it. Perhaps no single piece of agricultural technology can tell this story more dramatically than the new rice variety.

A. *The Miracle-Rice Package Pattern*²⁵

When IR-8-288-3, (more popularly known as miracle rice) was introduced, it was emphasized that full yield potentials could be attained only if everything were done right. Man was held responsible for its favorable growth with indispensable assistance from such things as: irrigation, fertilizers, insecticides, weeding, and "tender loving care." It was made clear that the production of IR-8 could not be left to God. The very nature of the variety generates or even compels certain changes and IR-8 is constantly referred to in this paper not just for itself but because it is the prototype of a revolutionary plant type, numerous variations of which are being developed. This rice plant which is short, stiff-strawed, early maturing, non-seasonal, non-photoperiod sensitive, responsive to nitrogen and therefore high yielding has no doubt affected farmers' response to it.

First, because of its short stature IR-8 has such a physical visibility that even a non-farmer will have no trouble recognizing it in the rice paddy. This "dwarfness" only serves to draw attention to the heavy load of grains in its upright stems. The fact that it is physically different from traditional varieties is virtue in itself because it is easier to maintain purity of the seeds. Anything which stands taller is either another variety or a weed. The position of its leaves is also such that birds are kept out. As has been frequently observed, there are few rice birds in areas planted to IR-8. Its stiff straw proved to be quite a selling point when plants remained upright even after a raging typhoon. While all other varieties went down, IR-8 held up and again demonstrated its versatility.

Second, it takes about 120 days to grow IR-8 as against 140 to 160 days for traditional varieties. This early maturity forces some group agreement at least among farmers cultivating adjacent fields to plant the same or similar varieties. Otherwise, if late maturing varieties are planted side by side with IR-8 the former will be left to ripen in the fields by itself and will be the concentrated object of birds, insects, rats, and disease. Early maturity also contributed to its faster diffusion because it shortened the "wait and see" period. But more important is the relatively exacting *time* requirements with respect to its cultivation. With every release of IR-8 seeds there were accompanying instructions as to timing of operations with respect to seedbed preparation, transplanting, fertilization, spraying, etc. This calendar of operations indicating *when* the farmer should do *what* involved a new rhythm in rice production, a greater precision in timing of operations. The growth pattern of the plant relative to the weeds, the life cycle of the stem borer and the effectiveness of insecticides, all involved time synchronization of cultural practices which farmers had to comply with to some degree in order to succeed. In this regard, IR-8 was a pace-setter.

Third, because IR-8 can be planted any time of the year, it can also be ready for harvest even on a rainy day. A delay in harvesting could result in germination of the seeds in the panicle when the rains come. A corresponding drying and storage problem results especially with the increase in yields. The bamboo baskets under the nipa house no longer suffice.

In adopting IR-8, farmers did not only adopt a new rice variety but also accepted a more general concept of modernization in other cultural practices. IRRI studies have shown that level of inputs was considerably higher for IR-8 than for local varieties--three times as high on the average for fertilizer and insecticide and more than 50 per cent higher for labor. For all three of these inputs, there is a positive correlation observed between level of input use and yield.²⁶

The "tender loving care" given to the new high yielding varieties is expressed in the observation that: Farmers were in the fields even during Sundays, early in the morning and late in the afternoon and so were their wives and children. As a matter of fact it has been facetiously argued that because of the energy input required to produce IR-8, this variety offers the same potential as the controversial "pill" perhaps with additional blessings from the Vatican.

In a study of one hundred sixty-one IR-8 seed recipients from two cities and 4 provinces in the Bicol region,²⁷ the phenomenon of "special variety deserves special treatment" was very much displayed. For four cropping seasons and 12 rice production practices analyzed, there were more IR-8 adopters than *other variety users* applying recommended practices. This observation assumes greater significance when one notes that IR-8 adopters and other-variety users are in

most instances the same set of farmers. In other words the same farmers planting both IR-8 and traditional varieties gave the former preferential treatment. The adoption scores for other-variety users before IR-8 were higher than after IR-8. The trend was for traditional varieties to be left to nature much more after IR-8 as shown by a drop in adoption scores. For all 4 cropping seasons, IR-8 adopters registered no zero scores while if they used other varieties, 10 to 14 per cent of them applied none of the recommended practices.

Unpublished data on 75 IR-8 adopters and 114 non-adopters from 7 villages likewise indicate greater adoption of 12 cultural practices among the former than the latter. IR-8 enjoyed more pampering even in comparison with other relatively recent varieties.²⁸

Adoption scores of Adopters and Non-Adopters of
IR-8 During Dry Season 1967

BARRIOS	ADOPTERS			NON ADOPTERS		
	Number : Reporting	Total : Adoption	Average : Adoption Scale	Number : Reporting	Total : Adoption	Average : Adoption Scale
1. Bagumbayan	14	92	6.57	12	50	4.16
2. Talangka	12	92	7.66	5	12	2.4
3. Coralan	27	190	7.03	25	136	5.44
4. Paagahan	2	11	5.5	26	100	3.84
5. Cambuja	14	101	7.21	19	104	5.47
6. San Antonio	2	7	2.5	8	20	2.5
7. Nanguma	4	18	4.5	19	47	2.47
TOTAL	75	511	6.81	114	469	4.11

SOURCE: Unpublished data from Pilot Study of a Cooperative Approach to Rural Development, College of Agriculture, University of the Philippines.

Practices Adopted for IR-8 and for Other
Varieties Planted Before and After the
Release of IR-8

Source: B.R. Sumayao, *op. cit.*

PRACTICES	Before	After release of IR-8			
		First	Second	Third	Fourth
- P E R C E N T -					
1. Seed treatment	IR-8	56	70	63	69
	Other varieties 43	43	39	35	41
2. Spraying or soaking seedlings in chemicals before transplanting	IR-8	80	79	73	68
	Other varieties 61	66	47	49	54
3. Dapog method	IR-8	41	38	38	35
	Other varieties 7	8	10	8	13
4. Application of fertilizer before transplanting	IR-8	30	43	38	37
	Other varieties 14	14	13	15	16
5. Application of fertilizer any-time after transplanting	IR-8	39	67	55	54
	Other varieties 41	29	24	26	23
6. Making and application of compost	IR-8	15	4	3	3
	Other varieties 7	10	5	3	3
7. Straight row planting	IR-8	93	93	91	89
	Other varieties 60	61	58	54	54
8. Hand weeding	IR-8	62	69	75	70
	Other varieties 43	37	43	39	44
9. Rotary weeders	IR-8	32	70	63	64
	Other varieties 49	49	42	43	44
10. Weedicides	IR-8	31	38	39	40
	Other varieties 41	37	25	27	27
11. Spraying against rice insect pests	IR-8	89	81	80	76
	Other varieties 76	69	62	57	59
12. Rat control	IR-8	39	77	72	80
	Other varieties 75	77	72	66	73
	N = IR-8	70	96	132	121
	= Other varieties.	65	104	89	70.

On the other hand, what looks like a spill-over effect from the successful experience with package of practices associated with IR-8 were reported by Barker in the sense that the yield of certain premium varieties went up. This was illustrated in the case of Malagkit, a glutinous rice used in preparing native delicacies. This variety which is not grown extensively but only in a few local areas received a price approximately double that of IR-8 for the years 1966 and 1967. Because of this high price, farmers who planted Malagkit gave it more care and inputs than what was customarily given to other local varieties.²⁹ From interviews with a big owner-operator in Pampanga and a tenant farmer in Bulacan³⁰ they have obtained better yields from Wagwag (a high-priced fancy variety) than what was usually achieved in the past by using many of the modern cultural practices which accompany IR-8. Although Wagwag yields are nowhere near the IR-8 levels the high price it commands relative to IR-8 compensates for the lower yields with less bulk to handle, process and transport.

B. The Demonstration Effect

One of the most frequent generalizations on the nature of developing societies is the slow rate at which change takes place but in the case of IR-8, rapid adoption was its unexpected character. An illustration of this dramatic response at the village small-farmer level is the following: From the first planting season to the next, the number of farmers who planted IR-8 shows such trend as: 1 to 10 to 16 to 60; 6 to 77; 3 to 44; 5 to 56; 8 to 42;³¹ 7 to 49 to 70; 9 to 50; 15 to 113;³² 70 to 96 to 132 to 121.³³ In another study done in another province, IR-8 was introduced in May 1966. Forty-seven cooperators scattered in 18 towns planted it for seed purposes. By October 1967, of the 8 barrios in one town called Morong, six planted a dry season crop of IR-8. Two did not because they were not easily reached by irrigation water. In the six barrios, 194 out of 645 or 30 per cent planted the variety for the first time.³⁴

There was this dramatic shift from the local to the new variety even among small, share-tenant farmers, in spite of predictions to the contrary. It was said that IR-8 is a "Cadillac" variety with ultra-modern requirements which small farmers could not meet.³⁵ However the latest indications point to the impending exit of IR-8. But this is to be expected and is more a manifestation of a *change-orientation* rather than of retrogression because those who drop IR-8 tend to pick up the newer varieties rather than reverting to the traditional ones except where the latter command a higher price for eating quality that compensates for lower yields. But this latter trend will probably fade away too because newer varieties of comparable eating quality as the traditional have been developed by the IRRI and the College of Agriculture and are also rapidly gaining acceptance. As the 58-year old toothless Filipino Farmer of the Year replied when asked upon his return from Washington, D.C. last year as to what variety he was going to plant the next season: "I don't know. I'm still waiting for a newer variety."

The influence of "seeing is believing" on this pattern of response cannot be discounted. Follow-up studies for 6 seasons in 7 villages (3 dry and 3 wet seasons) from 1964 to 1967 picture the rise of the new varieties and the fall of the traditional not only in terms of number of farmers but also in area planted.³⁶

Plantings of Traditional or Non-Recommended
Varieties (Dry Season)

	<u>1964</u>	<u>1965-66</u>	<u>1966-67</u>
No. of farmers planting	163	151	84
Hectares planted	304.66	272.36	116.20
(Wet Season)			
No. of farmers planting	155	96	29
Hectares planted	242.04	148.81	39.5

Plantings of Recommended Varieties
(Dry Season)

	<u>1965</u>	<u>1966</u>	<u>1967</u>
No. of farmers planting	29	41	142
Hectares planted	30.41	54.23	172.84

(Wet Season)

No. of farmers planting	25	81	220
Hectares planted	46.91	144.83	257.10

Source: S. L. Pahud

Although there were eight varieties classified as recommended varieties, the most conspicuous change was in IR-8. Only one farmer planted it in an area of 0.75 hectare for the 1966 wet season. In the dry season of 1967, sixty farmers planted a total area of 68.85 hectares. Trial plantings of IR-8 were made extensively and were usually done with technical supervision by knowledgeable persons and its performance therefore was its own advertisement. Adaptability of the variety to different areas was another advantage hence there were many evidences of success which farmers could refer to for its credibility.

The supportive function of these widespread evidences is illustrated in one village where the planting of IR-8 was considered a "failure" because the yield they obtained was only 70 cavans per hectare. While such yield has hardly been experienced before, the farmers' point of reference was not their former yield but the reputed and expected yield of IR-8 which is 100+. And in spite of this "defined" failure, the next season more farmers planted IR-8 because they in fact know of many other instances where farmers have obtained higher yields under similar circumstances.³⁷ The "failure" as defined by the farmers relative to what was expected of IR-8 did not have inhibitory repercussions on farmers'

decisions to adopt the next season. This was unlike in the past, when there were not many demonstrations of success to dispel doubts on the potentials of the innovation being introduced. In the case of IR-8 there were few negative demonstrations and they were usually explainable in some ecological or technical terms.

C. The Risk-distribution Pattern

In accepting anything new, the farmer assumes certain risks and he responds to change in ways which enable him to reduce risks. However, given any group of farmers there are those who are more prepared than others to take risks.

1. *Gradual adoption and multiple-variety planting.* Liao's study categorized 155 farmers on the basis of two criteria:³⁸

- a) Per cent of their farm *area* planted to new varieties and
- b) *Time* of adoption. On the basis of the first criterion, three categories were arrived at:
 - (1) *Full adopter* - farmer who planted 100 per cent of his area to the new varieties;
 - (2) *Partial adopter* - farmer who planted only a portion of his farm to the new varieties.
 - (3) *Non-adopter* - farmer who continued planting the old varieties.

The proportion of farmers who belonged to each category use 39%; 31%; and 30%.

According to time of first adoption relative to time of awareness Liao classified the farmers as *earliest*, *relatively early*, *relatively late* and *latest adopters*. The earliest adopter took 4 months; relatively early, 7 months; relatively late,

13 months; and latest, 19 months. From the first to the fourth category of adopters, the average percentage of farm area planted to new rice varieties for the first time gradually increased from 42 per cent for the earliest adopters to 66 per cent, 74 per cent and 83 per cent for the latest adopters. This indicates that the first adopters although more immediately responsive to the change had greater risks and were therefore less inclined to go all the way than the latest adopters who had considerably minimized risks since so many others had tried the innovation before them.

Multiple variety planting was also observed by Dimaano and de Guzman.³⁹ Only 15 out of 45 farmers planting recommended varieties for the first time planted their fields to only one variety. Of the thirty, 24 planted one recommended variety in combination with local varieties while 6 planted two or three different recommended varieties. For four seasons the trend was for one-recommended-variety planters to increase and then decline because they switched to 2 or more recommended varieties and not back to the local variety. The most frequently cited reason for the multiple-variety planting is their desire to find out which will give more yield. In the earlier stage, multiple-variety planting including the old ones even to as many as six was done for insurance purposes just in case the new one fails. In the later stage when confidence in the new has been established, multiple-variety planting is more of an experiment to test which one does better. Such farmers have moved up one more step toward modernization.

In some non-rice areas diversified farming is practiced in a uniquely enterprising and yet security-oriented fashion. As one village describes it:⁴⁰

Upland rice is for assured food supply; corn is for animal feed and supplementary income; vegetables are marketed for everyday expenses; garlic is a favorite cash crop just like a piggy bank because it can be stored and sold at a later date to meet school and emergency expenses. "Business" consists of poultry, swine or fattening cattle after they have been used as work animals.

The strategy is definitely one which says: "Do not put all your eggs in one basket."

2. *A Seasonal Pattern.* A seasonal pattern for adoption of recommended rice varieties has been reported by Pahud in studies done among 179 farmers in 7 barrios from 1965 to 1967.⁴¹ The number of farmers adopting new varieties is higher for the wet than for the dry season. Barker saw the same trend. This strategy of choosing separate wet and dry season varieties seems particularly appropriate on those farms with uncertain or limited dry season water resources. Farm operators in this situation can ill-afford the risk associated with the high levels of fertilizer input needed to maximize profits for IR-8 during the dry season. On the other hand, local varieties respond to medium input levels of nitrogen during the dry season without lodging.⁴² However, when supply of irrigation water is more assured there is a preference for planting IR-8 during the dry season to avoid the problem of drying.⁴³ Even in the case of corn, the crop is planted in both the dry and the wet seasons but for different purposes. During the wet season, corn is harvested during its dough stage and sold as green corn which is relished as a vegetable or as boiled corn on the cob. In the dry season, corn is primarily grown for livestock. The corn crop is left to mature in the field; then it is marketed and the stalks are stored for feeding cattle.⁴⁴
3. *Rainfed-irrigation response pattern.* Closely related to the seasonal pattern is the differential treatment given to rainfed and irrigated areas. In the former, little or no fertilizer is used and there is a greater tendency to plant traditional varieties.⁴⁵ As far as yield from new varieties is concerned, there is an observed decrease as the number of adopters were fully irrigated. This level dropped to 50 per cent for the late adopters. Because

of the uncertainties involved, poor irrigation facilities are associated with lower input levels, lower yields and lower farm profits.⁴⁶

D. *Change in Cropping Pattern*

Agricultural innovations take many forms and perform different functions in terms of inducing other changes. Cropping patterns, which includes *planting to harvesting, when and where*, are established in the village and are usually pursued from year to year with little or no deviation. However, now and then, certain things occur which disturb these routines either deliberately or by *force majeure* such as droughts, typhoons and floods. Change in cropping pattern takes the nature of a structural change. It is not just a change in technique. It is not a small change. Availability of water with respect to the growing period of the rice plant is a basic element in this pattern. With the advent of new varieties which mature earlier than local varieties, a readjustment had to take place. In some cases the change in cropping pattern was strategic for introducing a whole package of practices. In other instances, the new variety in combination with development of irrigation system have forced the change from 1 to 2 or even 2-1/2 crops a year. Pressures to prepare the land the next crop become more urgent, hence hand tractors either bought or hired have been employed to speed up the work. A *flood-avoidance* strategy has also been effected in certain areas by changing planting season from June-July to November-December. Farmers were amenable to the change since they grow only one crop a year anyway without irrigation.⁴⁷

Recognition of the need to change cropping pattern has almost always come from technical advice from outside the village. From a detailed case study of this type of change, several elements are present:⁴⁸

- (1) Considering that change in the cropping calendar meant missing almost one crop, convincing the farmers to follow this would have been greatly resisted except that the previous season yielded practically nothing. Individual interviews with farmers revealed severe virus infestation as the culprit but related to this are a host of other factors. Insufficient water supply prevented straight row planting, use of rotary weeders and application of fertilizers. Weeds grew taller than the crop and became a favorable environment for leaf hoppers transmitting the virus. Of the 20 initial farmer cooperators of the preceeding season only 9 were able to follow some practices the next season because of the water problem. An examination of rainfall distribution and irrigation water readings for two previous years showed that farmers were planting when the supply of irrigation water was inadequate. All told, there was a crisis, a sense of urgency and a measure of receptivity to change resulting from desperation rather than from a real positive incentive.
- (2) The crop technician's proposal to change planting time in order to take advantage of periods with more abundant water supply was presented to the farmers on a *majority* or *not-at-all* basis if the change is going to be effected. Although the nature of the problem and the prospect of a solution were explained to the farmers individually, commitment to the change was sought in a group meeting and social pressure to conform was brought to bear on the reluctant ones by the farmers themselves particularly if they were cultivating adjacent fields. Although 15 of them were willing to go along with the plan, the approval of the farmer who has the biggest area was critical in this approach because his farm was large enough for the change to be initiated even if other farmers did not immediately agree.

- (3) Planting at about the same time also meant planting similar or the same varieties over a wide area. Small, scattered changes would not accomplish the objective. Meanwhile this development became a perfect entree for new varieties. Mass planting of varieties with similar maturity is a *must*, if one is to avoid someone's crop being left alone in the field for birds, rodents, pests and disease.
- (4) Initial agreement among most, though not all, farmers led to intensive lessons via a barrio rice school and a new calendar of farm activities prepared and followed up by the technician:
- (5) Effects of the change in cropping pattern can be seen in the before-after increase in adoption of farm practices and in the adoption scores of adopters and non-adopters of the new cropping pattern. Almost twice as many among those who followed the change adopted new practices compared to those who did not. The practices which decreased after the new cropping pattern were seed selection because seeds of the new varieties were obtained from outside the village; compost making, because more commercial fertilizers were used; rat control, because mass planting and clean culture reduced infestation. Initially those who did not follow the change had higher yields but those who changed either caught up with or even outyielded them. In one village the yield was even doubled. After adopting the new cropping pattern, farmers also visited their farms oftener (at least once a day) than those who did not follow the change. As the farmers themselves remarked: "We became more industrious."

E. Acceptance, Rejection, and Discontinuities in Adoption

In spite of all the exciting developments in rice production the past three years, the adoption process has not been a uniformly linear climb. Observations to this effect were made by Sumayao⁴⁹ who classified IR-8 adopters as *initial planters*, those who received and planted the seeds when they were first distributed; *persistent planters*, those who planted IR-8 for the first time after the first IR-8 crop; *drop-outs*, those who stopped planting IR-8 the following season; and *replanters*, those who planted IR-8 the first season, dropped it the second season and picked it up again during the third season. Adoption graphs for 12 practices studied for 4 seasons show zigzag steps rather than smooth upward increase. Pahud⁵⁰ found the same trend for six cropping seasons and classified farmers into *early persistent adopters*, farmers who adopted 50 per cent of all the recommended rice practices during the first 3 seasons and continued to do so for the last 3 consecutive seasons; *late persistent adopters*, who adopted 50-60 per cent of all the practices during the last three consecutive seasons; *late adopters*, who adopted 60-70 per cent of the practices during the last two seasons; *re-adopters*, who adopted, dropped, and picked up practices irregularly during the six seasons (the largest group of farmers belonged to this category) and *drop-outs*, farmers who adopted 40 per cent or more of the practices during the first 3 seasons but adopted only 10-20 per cent for the last 3 seasons.

Only a season-by-season analysis would indicate these discontinuities. A long-term trend does not reveal this zigzag. Liao's comparison of farm practices in 1954-1955 and in 1965-66 show only the increase such as 32 out of 87 farmers using hand tractors for land preparation while 10 years before, all the tillage, harrowing and levelling were done by carabao and man-labor. Transplanting then was all by the ordinary and broadcast method; ten years later, 49 out of 87 farmers practice straight row planting. Number of farmers applying fertilizer increased from 61 to 78 and average per

hectare application increased by 43 per cent. Chemical weeding which was unknown then is used by 75 farmers. Forty-five farmers apply insecticides and pesticides.⁵¹ By the way, Follidol, Dol granule, BHC, Basudin, have become part of the farmers' vocabulary although their words may not sound exactly the way we say them.

To understand better the patterns of acceptance, rejection and discontinuities in adoption, farmers' reasons were analyzed in a number of studies. Attributes of the innovation as perceived by the farmer stand out as the most frequently cited reason for its adoption. These reasons are expressed in terms of demonstrated superiority or effectiveness of the innovation,⁵² expected high yield,⁵³ desire to increase production, minimize loss and facilitate farming operations;⁵⁴ relative advantage of the new practice over the old.⁵⁵ In the case of IR-8, besides general expectations of high yield, specific varietal characteristics were cited such as dwarfness, non-lodging, non-seasonal, early maturity, bigger seeds, ease in threshing, etc.⁵⁶ Early in the history of IR-8, expected high price was an important reason because of good market for seeds. Even in the adoption of sweet corn, the high price it commands and its saleability compared to the old White Flint was the major attraction for the farmer.⁵⁷

Specific institutional, personal or group pressures for adoption such as desire to follow the neighbors, to comply with landlord's wishes or with the change agent's recommendations were cited by some farmers with landlord's influence playing a significant role which will be discussed in another section of the paper.⁵⁸

The non-adoption of innovations was very much conditioned by farmers' perceived incompatibility of the practice with existing conditions in the farm and in the

village as indicated in such reasons as: Fertilizers could not be used because the fields are always flooded; rat control measures are of limited usefulness unless neighboring farmers adopt the same measures; straight-row planting cannot be done because skilled planters are not available or there is lack of water hence rotary weeders cannot be used. Anticipation of undesirable effects, lack of resources, ignorance of the practice and limited comprehension of cause-effect relationships as expressed in objections to fertilizers because its constant use would lead to "fertilizer-addictedness" of the soil. They hesitate to spray insecticides for fear of killing their chickens, pigs and carabaos. Rotary weeders agitate the soil and cause the rice plants to wilt; empty grains are due to highly concentrated chemical solutions used for spraying. Lack of capital to buy fertilizers and chemicals and ignorance of proper fertilizer application are other reasons. The stereotyped image of the Filipino farmer is not reinforced in these findings. Only *two* farmers specifically referred to superstitious beliefs as their basis for rejecting rat control. Instead of applying rodenticides, one farmer set aside a field solely for the rats and begged them to take their share and leave the rest alone. The other farmer believes that rats are God's creation and therefore must not be harmed.

An innovation's failure to demonstrate its superiority or effectiveness is a major reason for discontinuing a practice such as: "I sprayed my field with 2,4-D, it did not control the weeds in my field."⁵⁹ Most of the time, this conclusion of ineffectiveness is a result of improper application of the innovation. All of these reasons for non-adoption or discontinuance of a practice require the constant presence of technical assistance from some competent person or information source so that the whys, how, and wherefores of each innovation could be comprehended. This is doubly important when an expected outcome does not materialize or even the opposite results. The complex interactions among relevant variables in

the farm needed to be unravelled, particularly after failures have been experienced.

Drop-outs from IR-8 were due to low selling price but high cost of production, landlord's objection, and lack of irrigation water.⁶⁰ In spite of reversals along the way, it is worth noting entire villages shifting to new varieties in less than three years.⁶¹ The communication and adoption patterns described above stimulate one to reexamine the validity of the Beal-Bohlen model of the adoption process which consists of awareness, interest, evaluation trial and adoption. It is a psychological model which assumes a social structure, environmental control and a level of institutional development which enable a farmer to make his own choices and act in his own behalf. In our setting, where the physical and institutional infrastructure is underdeveloped, indiscriminate application of the model might only lead to the unwarranted generalization that farmers who do not adopt new practices are tradition-bound. Actually it is the model which could be irrelevant although doubtless useful as a point of departure in the search for concepts with greater explanatory power.

IV. VILLAGE LIFE AND PROBLEMS OF LINKAGE WITH THE OUTSIDE WORLD

A. *Modern "Corruption" of Traditional "Virginity"*

1. Increased mobility. Once upon a time about six years ago in what was then a virgin barrio relatively untouched by the promise of Development Program X, Y or Z, Coralan was a typical poor village with miserable-looking rice fields, dwarfed rice plants not as a product of genetics, but of virus locally known as "low waist," houses almost waiting to be blown down; and barrio folks going to town on foot all the way either through the mud or the dust. Now the village is still poor but less miserably so. There are

14 recently constructed or renovated houses made of hollow blocks and galvanized iron roofs and 16 hand tractors doubling as passenger jeepneys with a roofed body, big hind wheels and 2 rows of seats. For 20 centavos, one can easily get to town in this tractor-jeepney. As the villagers themselves remarked: "Nowadays people here do not want to walk anymore." The housewives have ceased marathon hikes just to do their "grocery" shopping. Sacks of rice find their way to the market more readily and even children find greater pleasure in going to the high school in town. Actually, these tractor-jeepneys are better suited to the dirt road than the ordinary jeep especially during the rainy season.

2. *Growing contractual relationships.* Besides doubling as *means of transportation*, these hand tractors are also used for custom plowing and harrowing hence the beginning of more *business-like relationships* with a definite hiring price either in cash or in palay for tractor services rendered. This side income helps raise the cash needed to cover the installment payments. When asked if tractors are borrowed for the traditional mutual exchange of labor, farmers smiled and said: "Only if one's own tractor breaks down does he attempt to borrow somebody else's." The tacit understanding is that at some future time, the other party would reciprocate. This implies that if one does not have a tractor, he has no basis for the exchange. These new pieces of agricultural machinery which are quite expensive have led to *new norms governing* their use. As a consequence there is a very apparent *decline* in the *bayanihan* system (mutual exchange of labor) and *paid services* in the use of carabaos are also becoming customary. Even in the case of sprayers, a friend, relative, compadre or neighbor usually has enough nerve to borrow the equipment for free only once or at most, twice. There is a general

consciousness about the sizable investment in these gadgets and the resulting depreciation from constant use. The net effect is for farmers to want to purchase their own equipment or to rent for a fee so that they can use it regularly without embarrassment.⁶² Sprayers have additional inhibitions on lending and borrowing because carelessness and confusion about its use for either insecticides or herbicides can be disastrous for both borrower or lender. Where tractors have replaced carabaos there is a greater receptivity to rodenticides, insecticides, etc. because there is not more danger to their work animals. But chickens and pigs still have to be properly housed to protect them from the same danger.

To investigate further, the implications of tractor use, the results of a hand tractor survey among lowland rice farms in Laguna are presented. There was an increase in the number of tractors per farm from 1.25 for crop year 1964-65; to 1.44 for 1965-66; and 1.66 for 1966-67. An increase was also noted in the average horse power per tractor 4.6 to 4.8 to 5.0 and the purchase price per tractor went up from ₱2,544 to ₱2,935 to ₱3,225. Although the size of the farm remained the same, yield increase was considerable and so was the cost of production and use of inputs of fertilizer and chemicals. Of greater significance is the fact that during the first year of the survey, there was some sharing of tractor purchase. By the second year, each farmer owned at least one tractor and 50 per cent of the operators owned two or more tractors in the third year. On the other hand, there was a decreasing percentage of the tractors used for contract hire. The reason given was that repair and maintenance costs were often more than the income derived from tractor hire. An important side effect of tractor ownership is the skills farmers have acquired in the operation and repair of machinery.

The pattern of tractor introduction in the province of Laguna is shown in these figures:

<u>YEAR</u>	<u>No. of tractors purchased</u>	<u>Cumulative Total</u>
Prior to 1959	5	5
1959	4	9
1960	4	13
1961	12	25
1962	33	58
1963	35	93
1964	55	148
1965	88	236
1966	93	329
1967	102	431

Purchase price ranged from ₱1,1000 to ₱4,900.

About one-third of the farmers owning the tractors worked between 2 to 3 hectares of paddy land, another third between 3 to 4 hectares; the rest had 5 to 8 hectares. Contract work away from the owner's farm was done for 15 to 30 days. The contract rate was between ₱25 to ₱35 per hectare. Lower rates required meals to be provided for the two operators of each tractor.⁶³

All these point to the *growing contractual relationships* between tractor owner and farmer. Lending and borrowing under the old rules of exchange are breaking down. Despite these developments, however, carabaos are proving to be the most enduring traditional fixture regardless of ultra-modern varieties etc. Even the International Rice Research Institute continues to employ the carabao for some of their land preparation. The beast is still unmatched in coping with certain terrains where tractors bog down, in interior fields where there is no right of way and no access roads and for plowing close to the

levees which could not be done with the tractor. In several instances it is not a case of either carabao or tractor but both with specialty jobs for each particularly when more than one crop is grown. The carabao may be used for the wet season and tractor mainly for the dry seasons.

3. *Disappearing local practices.* To dwell on a romantic village practice "contaminated" away by modernization, planting rice accompanied by guitar music has disappeared. Of course this practice could have been romantic only to the tourists taking pictures by the roadside. Guitar music was actually provided for a very functional reason, that of keeping time and rhythm to regulate the spacing of the rice plants as they are being transplanted. At present, planting boards, strings and specifications such as 20 x 20 or 25 x 25 distancing between plants have taken over the music of the guitar. Haystacks which had been the setting for local movie love scenes are also fast disappearing. There is no place for them in the rush to prepare the land for the second crop.

4. *Aspiration, expectations and perceptions.* 1963 benchmark data gathered from 692 farmers in 8 villages show that improved farming was not perceived as the avenue to increased income. Twenty-seven per cent of the farmer-respondents said that to remedy their low-income, they would *work harder* and an equal number said they would *look for another job*. Only 1 per cent each would *try new methods of farming* and *consult technicians*. Nine per cent admitted *not knowing* what to do with the problem.⁶⁴ In the same villages. farmers were also asked for a general evaluation of their rice yield. 14% said their yield was *good*; 33% O.K.; 63%, low; 4% had no yield evaluation. Production per hectare for those whose yield was good: 32 cavans; O.K., 31; low, 22; no yield evaluation, 15. From these figures it is apparent that their yield evaluation is realistic but this realism becomes

more impressive when their explanations for low yield were sought. The reasons mentioned in the order of their frequency are as follows: Attack by pests and diseases, unfavorable weather conditions, soil either very fertile or very poor, improper care and time of planting, plenty of weeds, poor seeds, low tillering capacity, lodging and plenty of empty grains. It is evident from these responses that farmers perceive a direct relationship between yield and actual procedures involved in rice-growing.⁶⁵

Three years later, after the change in cropping pattern, experience with better yields and greater faith in technical assistance from crop specialists, farmers were asked if it is still possible to increase yield beyond what they had obtained in the three immediately preceding seasons, 90 per cent said *Yes*, 8 per cent said *No more* and 2 per cent were uncertain. By what means were they going to increase yield? The responses were: weeding, fertilizer application, spraying against pest and disease, fertilizer irrigation, planting good seeds, etc. At that time their average yield was about 50 cavans, almost 20 cavans more than their average yield in 1963.⁶⁶ About two months ago (1969) conversation with some farmers in front of their new dryer and warehouse in Barrio Coralan brought out the following: "In 1963, our highest yield was 40 cavans but now unless one has had 4 successive harvests of at least 100, a farmer still has a lot to learn. He better go back to school (the barrio rice school they have periodically.)" Besides this *heightened ceiling* for their yield aspirations, the village has also *changed their definition* of what constitutes a "*ridiculous*" farming practice. In 1964, the farmer who pioneered in straight-row planting was laughed at. It was regarded as a waste of money. Now, the farmer who does not plant in straight rows is the butt of jokes. The same form of ridicule was applied to the farmer-hold-outs who continued with the traditional variety after the

majority had dropped it. Today, this barrio has 100 per cent conversion to the new and the race for the newer ones has begun.

This *change-orientation* is related not only to the *social pressure to conform* to the new behavioral pattern but also to the *demonstration effect* in the sense that the modern practices have actually contributed to higher levels of achievement. Another study done elsewhere found very high positive correlations between farmer's actual, expected, and aspired for yield and the highest possible yield and actual yields obtained in the barrio. These findings suggest the role of actual achievement in the setting up of yield aspirations and expectations stated in concrete terms. Actual performance both of the farmer himself (in terms of yield) as well as of the barrio becomes reference point for the expectation. Apparently, recognition of what is possible and knowledge of what has actually happened influence aspirations.⁶⁷

Regarding more general perceptions of their state of livelihood, farmers in the 1963 benchmark study believe that their present state is worse than that of their parents but they expect their future to be better than what their parents had and better than their present.⁶⁸ Considering the expanding ceilings of expectations and aspirations, this "better" future can only be expected to move upward not downward.

For another insight into the proverbial revolution of rising expectations in another setting, findings from an agro-industrial community are presented. The Canlubang Sugar Estate has 7,356 hectares stretched out into portions of 5 municipalities with 3,935 hectares of sugar cane, 2,467 hectares of coconuts

and the rest of the area planted to coffee and upland rice. Other agricultural enterprises are poultry, piggery, and beef cattle. The total population is 12,718 with 2,161 family heads and 1,800 additional laborers during the milling season. By way of facilities and fringe benefits, the Estate has two elementary schools, two high schools, an adult school, a public market, bakery, cooperative store, medical and hospital facilities with free hospitalization, medicine and dental service; a church and a parish priest; community library, outdoor free movies twice a week, baseball, softball, volleyball, bowling alleys, tennis courts, public TV sets, reading centers, free quarters, light and water; subsidized rice and sugar; Xmas and crop bonuses annually; free college scholarship for 4 deserving high school graduates every year to take agriculture, forestry and chemistry etc. Given what looks like Utopia in comparison with villagers in other parts of the country, 75 per cent of the industrial workers and 84 per cent of the agricultural workers expressed contentment with their jobs but only 20 per cent of the former want their children to work in the same place. Sixteen per cent wanted their children to work in the same place but in a different job (more professional and white collar than what parents have). Among agricultural workers, 51 per cent wanted their children to work in the Estate but only 19 per cent in the same occupation as the parents. They wanted some other job for their children (32 per cent) and 49 per cent specified white collar job. It should be pointed out that industrial workers had higher incomes, higher education than the agricultural workers. Ninety-two per cent of them as against 56 per cent of agricultural workers aspire for college education for their children. With respect to actual education expected for their children, the number aspiring for college education was reduced to 58 per cent and 39 per cent respectively for the two types of workers.⁶⁹ It is very evident that those who have more, aspire and expect

even more, if not for themselves, for their children. Incidentally, the Canlubang Sugar Estate employs a great deal of modern technology to streamline operations, make their investments pay which enable them to provide such benefits to workers. Of course, the sugar quota and the price of sugar has been a tremendous help.

5. *Entrepreneurial behavior.* While it is true that certain aspects of rural life have been eroded by adoption of innovations, some new behavioral patterns emerge as a direct or indirect consequence of the innovation. One of these is *entrepreneurial behavior*. To illustrate, just recently in two places, centrifugal pumps drawing irrigation water from the river have been installed and land previously idle for lack of water has been brought into cultivation. Some enterprising individuals in the community have purchased such pumps on an installment basis. They entered into a contract to provide water for a fee to farmers cultivating neighboring fields. Since the fee is a definite percentage of the yield, the entrepreneur has further incentive to introduce high-yielding varieties and other modern inputs in addition to supervising farming operations for the purpose of increasing yields. They also provide credit to enable farmers to purchase inputs such as fertilizers and chemicals. Promising though this may seem, a negative note comes from the possible violation of water rights by these entrepreneurs. If they want to get away with it, would they resort to little acts of corruption? Who knows?

But for a longer history of entrepreneurship at the village level, it is impossible not to mention a barrio which has been covered by the Farm and Home Development Project of the College of Agriculture for almost 12 years now. Because

it has been an excellent place for visiting VIP's, it has been facetiously referred to as a *tourist* barrio but in a more serious vein it is more appropriately named *Economists' Barrio* dedicated to the pursuit of profit. It is economists' dream and the home economists' frustration. The prevailing norm is one of *conspicuous investment* rather than conspicuous consumption. The former term was used to characterize Gorokan investment activity in the Eastern Highlands District of New Guinea. As Finney describes it:

Expenditure on costly consumption goods like radios or private automobiles is not particularly valued by Gorokans but the purchase of a truck for carrying cargo and passengers or a trade store for selling goods, is. And, it seems, the more highly visible the capital asset involved. . . the more investment is esteemed. The prestige Gorokans derive from such conspicuous investment and the consequent increment to the investor's status are primary goals behind Gorokan investment behavior. But other motives are also involved. Gorokans expect to gain service benefits from their investments. . . Last but not least Gorokans want their investments to earn profits. . . ."70

Barrio J has all the predispositions toward *conspicuous investment*. For some time, hog houses were better looking than their own houses because the latter is considered a *dead*, if not a crazy investment. It does not earn money. People who are very knowledgeable about the village claim the place is worth half a million pesos but one does not see it displayed. Their preoccupation is with finding worthwhile investments. Those who raise poultry sell everything and buy dried fish for their viands instead of eating some of their chickens and eggs. They are constantly looking for profitable enterprises. Typical of the questions they ask of agricultural specialists who visit the place are: Which enterprise would give faster returns, swine or poultry? Which poultry project has faster returns, broilers or layers? Breeding or fattening pigs? Which enterprise entails the least risk and the surest profit? Barrio J is the rare village which has a Credit Union, a cooperative

marketing association, a service cooperative, a civic association, a waterworks system and recently, a feed plant. Big trucks and jeepneys for hauling both produce and passengers are an everyday sight. As a matter of fact because there are so many jeepneys in the village, they go out only on alternate days in order to give all of them a chance to earn. For the use of water from their Waterworks System, poultry and swine raisers pay a fee per animal to the Service Cooperative. It is also the village where change has originated and spilled over to the *poblacion* or town proper instead of the other way around. Needless it is to say, they are not only receptive to innovations, they become the source of new practices themselves.

On the debit side, because of their intensive involvement with their "business"-- swine, poultry, cattle, vegetables, garlic, and rice, housewives and children all participate in farming operations. Those who do not own land or have their own enterprise work as wage laborers. These labor-intensive requirements prevent the wives from devoting more time to meal preparation, household chores etc. Their meals therefore suffer. As the student-extension trainees assigned to the barrio described: "Their meals are mostly red and white (tomatoes and rice)". Lately, problems have arisen in the functioning of their cooperative associations. But if their past achievement is any gauge, they should be able to weather any storm.

6. The need for collective action. As has been previously discussed, group agreement or entire community action is called for in matters of change in cropping pattern or in rice variety. This type of collective action is also required for effective rat control, irrigation, marketing, etc. For a country which has proudly characterized itself as a *bayanihan* society (mutual help) the pains of many a Filipino extension or community development worker lie in getting farmers

organized for collective action. Farmers themselves, barrio leaders, and landlords frequently complain of factionalism, lack of cooperation, etc. within the barrio.⁷¹ Innovations which require individual decisions are relatively easy to bring about but community-wide or group-wide changes are harder to come by. For example, preliminary data on 12 communal irrigation systems reveal the minimal existence of a sense of community responsibility and the virtual absence of established operational procedures for maintaining, managing the system and distributing water. Farmers' organizations which were put up in some cases to enable a community to qualify for grants-in-aid or other forms of assistance from government agencies are paper-facilitating organizations rather than actual social machineries set up to manage the irrigation system. In practice, at least three types of modus operandi have been identified:

- (a) By *tradition or inheritance* someone has been assigned the *honorary position* of being in charge of the irrigation system and people look up to him for leadership.
- (b) Where there are constant disputes among the farmers themselves regarding water use, they seek the assistance of an *authority figure* outside their group e.g., a policeman, a mayor, a landlord, in order to help *all* cate water and assign maintenance functions to different members of the community.
- (c) The person in the worst position with respect to water supply takes the initiative in calling the farmers together for the periodic cleaning of canals, water distribution, etc. On an *ad hoc* basis, whenever absolutely necessary, farmers can be mobilized immediately for group action in a *bayanihan* fashion but an organization for sustained, regular, and systematic management is hard to find in these so-called communal irriga-

with respect to community action and rat control, the manager of an active Farmer's Cooperative Marketing Association (FACOMA) in Cotabato, asserts that if one examines the map of the province, areas of heavy rat infestation tend to coincide with communities where there are no cooperatives or where the cooperatives are not active. In other words, where the tradition of collective action is weak, rats thrive because their extermination required joint action. A rat control expert has also observed that in predominantly Ilocano migrant communities where a high degree of solidarity exists, it is easier to carry out rat control campaigns. In this connection, a research project using experimental and control barrios had to give in to demands from the latter that they be given the experimental treatment which they felt had been "denied" to them. On the other hand, in mixed regional and ethnic barrios, mobilizing for community action is no minor task especially when combined with the planting of rice varieties which mature at different times.⁷³

On the brighter side of village life, one could see in Coralan where six years ago it was "every man to himself," the beginnings of community action. A farmers' association has been organized; an idle piece of land is being cultivated by members themselves as a seed production plot with farmers assigned responsibilities for its cultivation. Before this organization was set up, there was a constant one-upmanship as to who could wangle the most recent rice variety from the crop technician because early producers have a chance to grow the crop for seeds which get a premium price. With the farmers' association, the seeds are produced by the group and sold to the members with profits retained for the entire organization rather than for individual farmers. They bought an irrigation pump to provide water for their production plot, a dryer, and small warehouse to help meet the needs of their wet season yields. Although

this is a big step away from where they used to be, such a village-centered, local-oriented farmers' association is bound to prove inadequate in the near future.

7. *Linkage with the outside world.* As soon as the farmer adopts modern agricultural innovations and begins to produce more than what his family can actually consume, he increasingly becomes dependent on the world outside of his farm and his little village. Past efforts in community development which focused on *self-help felt needs*, and *start where the people are* emphasized local effort, local resources all revolving, around the village do-it-yourself philosophy. one wonders now whether such programs had not been "anti-development" in certain aspects. They were certainly anti-revolutionary. Present day farmer-demonstrations, either self-generated or led by non-farm sectors of society are almost completely opposite that of community development approaches which preached self-help, decreasing dependence on the government and extolled the virtues of being able to do things for themselves within their existing resources and social structure. The current demands by the Filipino Agrarian Reform Movement (FARM) for example, are for wider coverage of the land reform program, land to the landless (each Filipino is entitled to a God-given 2 hectares of free land from the government,⁷⁴ passage of the land tax deleted from the original land reform code, inclusion of sugar and coconut lands in the coverage of the land reform code, condominium housing, restoration of operational outlay of ₱8.7 million for land reform, overhaul of the entire banking system such that the credit be available to everybody and not the exclusive preserve of the rich landed etc. Even Benquet, Mt. Province vegetable farmers are urging the passage of a bill limiting to Filipino citizens the privilege of engaging in vegetable farming.⁷⁵

This turn of events is quite a shift from the past; it is a call for structural *changes*. Socio-psychological approaches no longer enjoy the same potency which they were thought to have.

To this development, agricultural innovations' have not been innocent bystanders, because in various ways they have contributed to the demise of the farmer's isolation. Although there are many other innovations which point out the practical impossibility of a farmer's complete independence from the outside world, IR-8 (and its kind) is most illustrative because it changed the picture of rice which has been a traditionally subsistence crop grown with a minimum of involvement with the outside--either in terms of input or disposal of output. By contrast, IR-8 has a plant type which is anything but a felt need of farmers although they were the intended recipients of the change. It was designed by scientists who studied and analyzed what structure would best suit the hot, humid tropics. It was the product of the scientific approach to problem-solving. The seed itself and the ingredients which would enable it to realize its potentials such as fertilizers, weeders, insecticide, technical assistance, credit and even the transplanters who would follow the straight row method come from outside the farmer's usual spatial and institutional orbit. With the increased yields and surplus from consumption needs, he is faced with problems of drying, storage, marketing low price and perhaps even the demand for high quality rice for the world market. He is no longer immune to the politics of international trade, the consequences of government policies and decisions of those who influence the inputs and outputs to and from his farm. Recent developments in rice production gave rise to more agricultural supply dealers, warehouses, dryers, millers, etc. in the town center. The farmer will have to learn to relate to a wider range of factors he has not been used to and

most of which are beyond his control as an individual farmer. The magnitude of the task involved in organizing farmers to cope with problems generated by the achievements in the physical biological production process can be gleaned from the Report of the Agricultural Cooperative Development Committee:

In spite of recent revitalization efforts, the status of agricultural cooperatives has not significantly improved. In the case of palay, FACOMAS only 40 per cent (of 234) are active, 7 per cent semi-active and the rest inactive. Membershipwise only 16 per cent of the members (188,071) of palay FACOMAS are active. As of June 30, 1968 only 67 (out of 94 active) palay FACOMAS had net savings and 23 reflected positive networth. Altho there are 152 warehouses owned by the FACOMAS in the 15 provinces of the First Priority Area of the Rice and Corn Productivity Coordinating Council with a total rated capacity of 3,857,200 cavans these warehouses are utilized only up to 38 per cent of this capacity. Among the problems cited in the Report which underlie this state of affairs are:

1. Since the FACOMAS in general have been promoted and organized chiefly as a medium for channeling liberal credit to farmers the farmer-members of the FACOMAS have become credit-oriented. Consequently most of the farmers look upon these FACOMAS as credit agencies and not as a marketing arm for them. Their cooperative activities therefore are dependent on the availability of the loan funds of the ACA (Agricultural Credit Administration).
2. Because of this misconception regarding the principal purpose of the FACOMA most of the members do not market their produce through it. As a result, the FACOMA is unable to generate a sufficient volume of business to make it an economically viable society.
3. Farmers are reluctant to joint or support the FACOMAS because most of them have impaired capital. In the meantime, these FACOMAS continue to operate and incur losses. Under these conditions, the agricultural cooperative movement has failed to attract new members and has alienated the support of a number of the old members.
4. Many FACOMAS do not have adequate facilities to perform the marketing functions that will enable them to serve their members effectively.
5. There has been no concerted and sustained education and information campaign among the farmer-members before and after the organization of their cooperative.
6. The present arrangement whereby the Agricultural Productivity Commission (the national extension service) promotes and organizes and the Agricultural Credit Administration (ACA) regulates agricultural cooperatives, gives rise to a vague delineation of activities in the matter of supervision.

7. Present ACA resources are insufficient to meet the credit requirements of farmers and cooperatives.⁷⁶

Directly related to getting farmers organized to this problem is government support price for rice, the harvest bonanza and the stipulation that the Rice and Corn Administration will buy palay only if it is clean and dry. Small individual farmers who have no access to driers are forced to sell to the middleman below the support price especially during the rainy season. As one barrio leader remarked: "in any market it is the seller who names the price of his goods, but in the case of our palay it is the buyer who dictates the price." It has also been claimed that because the RCA does not have enough money to buy, middlemen hoard the stocks sold to them and wait for the President to release funds for the RCA's purchase program. The rice subsidy has therefore been perceived as more beneficial to the middlemen than to the farmers.⁷⁷ Whether or not there is a real basis for this accusation is beside the point. As long as farmers perceive their plight in these terms, a sense of frustration and injustice will remain because their judgment of fair return for their produce depends not on amount received relative to cost of production but relative to what they expect from the support price. Ironically, the traditional middleman who is condemned every so often as an "exploiter" and an "evil" who should be done away with has assumed a more important role; his services have become even more indispensable, and his enterprising abilities put to an even greater test. From all indications he is responding energetically to the challenge.

An inquiry from some of the complaining farmers in Central Luzon about the prospect of getting organized in order to deal with these problems collectively, they replied, "We have tried forming an association but, farmer leaders become

suspect to the Huk, the landlords and the Philippine Constabulary for a number of reasons hence the reluctance to assume leadership for such undertakings." This could be a rationalization rather than a reason so therefore what deserves more scrutiny is the "*organizational propensity*" of the Filipino farmer. What is required now is not just a farmers' organization for self-help so they could stand alone but so they could deal more effectively with the forces and institutional framework outside themselves; which would give them more bargaining power, better services for their production needs, a greater share of the good things in life, and a meaningful linkage with new information because unlike before, they can no longer survive contentedly in isolation. They have already been initiated into the stream of modernization. All these mean that the extension and community development worker who was originally trained to assist the farmer to help himself at the farm or village level will rapidly outlive his usefulness unless his functions are redefined in the light of recent development. As one bewildered farmer remarked: "We have not had any farm management technician here for almost two years. He said that there is not much for him to do anymore. We have new varieties, new practices and increased yields." And yet, the whole village was complaining about low price for their palay, which they could not dry to qualify for the support price.⁷⁸

VI. AGRICULTURAL INNOVATIONS AND THE LAND REFORM PROGRAM

In a land tenure system where landlord and tenant share in the expenses for farming operations, studies show that majority of the managing landlords make the important decisions in the farm. They decide on the fertilizers to use, the variety to plant. They make other decisions that are not routinary in nature, especially if they are the ones who finance these inputs. The decisions left mostly to tenants are the time of planting and harvesting. But in the case of non-managing

or absentee landlords, the decision-making is left either to the tenant or the overseer.⁷⁹ When the landlord is progressive, innovations are readily adopted. On the other hand, if he is conservative, he is an inhibitory element in the tenants' application of innovations in the farm.

It has often been argued that share tenants would not have the incentive to produce more because they will not enjoy the full benefit of their additional efforts. But simply arithmetic tells us that even on a 50:50 sharing arrangement, 50 per cent of 100 is greater than 50 per cent of 50. Furthermore, on a sharing system, it is not only the output which is shared. The inputs are shared and so are the risks involved. With the land reform program and the conversion of share tenants to leaseholders, the role of high yielding varieties and other modern farming practices has become controversial.⁸⁰ In a non-land reform area, share tenants' success in increasing yields with the intensive guidance of a crop technician has made them realize the potentialities of their farm and has also given them more self-confidence to apply for leasehold arrangement. Earlier, they were reluctant to shift because they have to bear the risks alone. Before increased yields materialized, there were 9 leaseholders. After that, their number doubled to 18.⁸¹ Somehow they have managed to keep their lease rentals low.

In land reform areas, the issue has taken on a different twist. The question was: Which should come first, measures to increase productivity or the declaration of an area as a Land Reform District? Given the objectives of Land Reform, the initial step is to shift from share to leasehold with lease considerations based on the average normal harvest during the three agricultural years immediately preceding the establishment of the leasehold. The owner gets 25 per cent of the net production after deducting the cost of seeds, harvesting, threshing, loading, hauling,

and processing. With this provision in the Land Reform Code, high yielding varieties like IR-8 performed conflicting functions for the tenant and the landlord. If IR-8 has been adopted in a farm before shifting to leasehold, it would raise the rental and the eventual purchase price of the land. Landlords who got hold of IR-8 right away, raised their yields before the land reform declaration of their area hence the cost of the lease is high (20 to 25 cavans per hectare). Under the circumstances they consider leasehold not only satisfactory but lucrative. As one of them remarked: "The only difference to me is that I have ceased to be a landlord. I am only a landowner now." They have no other obligations to the tenant in terms of providing credit, irrigation, etc.; their relationships are strictly contractual. As a matter of fact, this fixed lease arrangement discourages the landowner from investing on his farm. When the Land Reform Program can not meet all the tenant's needs like credit, irrigation etc. the latter finds it difficult to operate under the leasehold system. For a tenant who pays only 10 to 12 cavans lease per hectare and who has access to capital for operating expenses, leasehold is a boon. The lower rental means that his average yield (either reported or actual) was low when their farm was included in the land reform area.

There has been some accusation that landlords have "forced" their tenants to plant IR-8 in order to increase land rentals. Studies have shown however, that while there were tenants who used IR-8 because of their landlord's decision there were those who did not adopt it because their landlords did not want them to, for one reason or another.⁸² Whether or not they made these decisions in spite of implications for land reform is not known. At any rate, to the share tenant who is aware of IR-8 and its potentials, the dilemma is how to increase his yield without raising his rental if he decides to change to leasehold later. One way out of the dilemma is to

increase yield "in fact" but not "in report." For areas anticipating to be declared land reform then, share tenants were cautioned by some lawyers to stay away from IR-8, but the yield prospects were too great a temptation for many of them. They planted it anyway but "depressed" their yield reports.

For some landlords the high yields from IR-8 were also too great to ignore, hence there was some interest in taking over the farm as an owner-operator using hired labor. But to do this, the landlord has to figure a way of easing out his share tenants. Even if he failed in this latter strategy, he has nothing to lose from increased production. Actually one of the incentives for the landlord to use the services of private farm management firms is to prepare for land reform. Higher yields mean higher rent, higher land value. The contrast in yields attained in owner-administered and tenanted land belonging to the same landlord is shown in a case study of a 330-hectare farm. The tenanted land had an average yield of about 45 cavans per hectare; the non-tenanted portion had yields of 79 and 98 for two different seasons.⁸³ Since this farm is located in Central Luzon, the desire to "depress" yields on the part of the share tenants could be one explanation for the substantial yield differentials between the two portions of the same farm.

Considering the interactions between increased productivity and land reform, it is hard to estimate whether agricultural innovations serve as reinforcers of the existing tenure system or whether they have created a rupture in the existing tenure structure. There are reports on both tendencies, but it is too early to tell which trend predominates. Structurally speaking, another trend which bears watching is the proposed vertically integrated rice production complex which involves thousands of hectares applying extremely modern management and technology.⁸⁴ This full-blown debut of rice as a highly commercial cash crop with all of its institutional impli-

cations would never have entered into the picture if the needed technology had not been developed.

VI. POULTRY AND LIVESTOCK INNOVATIONS--A NEGLECTED AREA OF STUDY

Because of the "fairy tale" quality and the sense of urgency in the "green revolution" other agricultural innovations have failed to attract as much attention. This is unfortunate because it is in poultry and livestock where we have excellent examples of direct transplantations or importations of technology from the developed world. It is the same White Leghorn, Vantress, Landrace, or American Brahman in your place which have been brought into our country for propagation. Unlike as in rice, corn or wheat production, livestock and poultry projects can tolerate only a minimum of compromise between the traditional and the modern in order to succeed. The requirements are much more demanding because unlike crops, they have to be cared for every single day. Postponement of marketing means a definite loss. Furthermore, animals have a highly visible mortality which dramatizes the necessity of skillful management and sophisticated concepts of nutrition, sanitation, disease prevention and contamination. Record-keeping is also a must because of continuous investment and the definite market-orientation of the enterprise.

In the Philippines there are numerous small poultry and livestock undertakings which have folded up. Meanwhile there are blossoming vertically integrated projects which go from eggs to chicken to feeds to barbecue. Studies of these large agribusiness enterprises not only in livestock but also in cash crops like pineapples (Dole and Del Monte) and bananas (Standard Fruit) and their impact on our society are very much in order because of the almost instant modernization which accompanies their establishment. Among the changes which they initiate are:

- (1) A whole set of physical and institutional infrastructure such as roads, hous-

ing, electricity, water systems, transportation, schools, churches, markets, health facilities, communication networks, etc., where they were nonexistent or only vaguely developed before.

- (2) A new social stratification system superimposed on the local and community structure based on a managerial-technical-laboring class system rather than on a land tenure system.
- (3) Development of a "corporate" community within an existing geographically and politically defined community.
- (4) A cash wage system, specified working hours and a more highly differentiated division of labor.
- (5) Participation of workers in labor unions and other organizations characteristic of industrialized societies.
- (6) Intensive exposure of modern agricultural and industrial practices and their eventual acquisition of essential knowledge and skills.
- (7) Short-circuiting of the adoption process where contract marketing is practices, because the guaranteed market provides the incentive to meet certain minimum standards for their products to be accepted.
- (8) Possible enhancement or deterioration of international relations where the enterprise is foreign-owned or managed.

One example of such high-scale enterprises coming into an hitherto isolated community is a four-year-old, 1,500 hectare Texas-style cattle ranch in barrio Laconon of Surullah, Cotabato. The owner has imported about 27 American Brahman bulls and 180 heifers for breeding stock, and had sunk more than 1 million in pasture lands, fences, roads, housing, electricity, etc. He has six tractors and 25 key men employed in technical jobs involving the scientific and practical ways of raising cattle. But more than that, his ranch has affected the life of the Bilaans (indigenous mountain tribes who practice slash and burn cultivation). An average of 100 Bilaans a day work

on his farm planting forage grasses and weeding, hence these people have started participating in a cash economy. He introduced schools and churches and has begun to train a few of the natives to operate a tractor and do other more skilled jobs. For their day's wage the Bilaans are given coupons which can exchange for groceries in the canteen at the ranch. If cash is preferred, they can exchange the coupons for cash. The roads he built are of great benefit to an area where marketing of products is a major problem because of inaccessibility.⁸⁵

The materials reviewed for this paper tell us that despite the social scientist's pessimistic prognostications on the acceptability of agricultural innovations, current developments indicate that these innovations have in fact found their way into the village, into the farm and have touched the lives of our rural people. If by this we have found for ourselves a Pandora's Box, then by all means let us open it, for the alternative to change is non-change; the alternative to big change is small change. If in the process we get dislocated, allow us the privilege of finding our way back. As the typical Filipino saying goes: *Bahala na* (God will take care). When we entrust ourselves to the Almighty we do not expect Him to do a poor job. In the meantime this gives us the "guts" to take risks and even the careless abandon to be reckless at times without which our country will not move and will forever be known as "developing" but never "developed".

-- NOTES --

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