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Researchers concerned with agricultural development in the Philippines have recently turned more attention to upland environments and to migrant cultivators and other small-scale farmers in these areas. Along with agroecological and agronomic research, a starting point in developing appropriate technical innovations is the determination of existing farmer practices. Understanding small farmers, however, has often been hampered by stereotypical views about the farmers held by development project workers. This article presents a number of examples supporting the idea that much of farmer traditional technical and ecological knowledge and related practices are systematic, rational, and locally appropriate.

AGRICULTURAL RESEARCH IN THE UPLANDS

Farmers readily describe their activities, and researchers have analyzed agronomic, economic, and other aspects of lowland cropping and resource management systems. But upland agroecosystems and farmers pose a more complex challenge. The uplanders interact with an often more diverse, uncertain and fragile environment, and farming strategies are correspondingly complex. Shifting cultivators, for example, must evaluate varied local micro-conditions, possible crop sequences and combinations in a context of declining fertility and increasing weeds and pests, and soil regeneration potentials against labor costs if lands are to be fallowed. Further, much of the uplands is under the jurisdiction of government agencies and many uplanders are legally classified as "squatters." Tenure arrangements on alienable and disposable lands are numerous, often complex. Distant markets, lack of infrastructure, and individual circumstances can also influence upland farmer strategies.

Perceptions and knowledge underly practices, and "making sense of" farmer decisions by determining such knowledge can be an initial diagnostic step in the development of innovations. Some agricultural researchers in the past implicitly assumed that small, especially subsistence-oriented farmers were economically irrational, that their practices were somehow "unscientific," and that there was little need to talk to and learn from farmers. Today, few scientists remain so convinced; and much credit is due to agricultural economists and anthropologists looking at small farmer decision making,[1] to anthropologists and agronomists interested in "indigenous technical knowledge,"[2] and to the many scientists now concerned with "farming systems" and diagnostic "rapid rural appraisal" techniques.

Talking with farmers is structured by the interview methods used. Sample survey interviews with formal questionnaires can produce replicable, quantitative analysis of a population, but are not especially productive for the initial, more exploratory and diagnostic eliciting of farmer knowledge. On-farm, informal, open-ended, but structured and iterative interviews appear more appropriate for this latter objective and were used to provide data for the examples below.[3] The simple method employs focused and technically informed guide questions, interactive follow-on question sequences that build upon discussion and upon what the interviewer observes in the farmer's fields, open-ended lines of

1. Peggy F. Barlett, ed., *Agricultural Decision Making: Anthropological Contribution to Rural Development* (New York: Academic Press, 1980); G. A. Norton, "Analysis of Decision Making in Crop Production," *Agrosystems* 3 (1976): 27-44; Cristina A. Gladwin, "Contribution of Decision-Tree Methodology to a Farming Systems Programs" *Human Organization* 4 (1983):146-57; Cristina H. Gladwin, "A Theory of Real-Life Choice: Applications to Agricultural Decisions," in *Agricultural Decision Making*, ed. Peggy Barlett.

2. D. W. Brokensha, D. M. Warren, and O. Werner, eds., *Indigenous Knowledge System and Development* (University Press of America, 1980); Allen Johnson, "Individuality and Experimentation in Traditional Agriculture," *Human Ecology* 1 (1972): 149-59.

3. Sam Fujisaka, "Anthropology in Rainfed and Upland Development in the Philippines," in *Practising Development Anthropology*, ed. E. Green (Boulder: Westview Press, forthcoming).

inquiry, and careful building of internally consistent and complete data pictures. The method draws upon ethnographic techniques by including questions about farmer categories and corresponding perceptions and practices.[4] Fortunately, informal rather than formal methods (i.e., those used by ethnobotanists, ethnoecologists, or other anthropologists for eliciting indigenous systems of classification) are adequate for agricultural development research.[5] Compared to sample survey research, the open-ended informal interviews usually require fewer respondents and interviewers, but more interactive skills, interviewer knowledge of research goals, and sensitivity to language and translation. Interviewers must be technically informed and curious observers. Care must be exercised since such interactive methods are easily influenced by interviewer biases and training, and, in the Philippines, the languages involved.[6] Although researchers need not be ethnographers, they can benefit from brief, practical training exercises in ethnographic methods.[7]

Some scientists know or take pains to learn languages needed for research. More rely on the skills of field assistants. But good

4. E.g., What kinds of soils/lands do you have on your farm? What do you call. . .? What is the difference between. . .? What is this type of land good for? , etc.

5. Ethnographers (e.g., fieldworkers using methods from ethnoscience) have, of course, produced some of the most detailed and comprehensive accounts of traditional agriculture. Conklin's early landmark work in the Philippines with the Hanunoo ("Hanunoo Agriculture: A Report on an Integral System of Shifting Cultivation in the Philippines," *FAO Forestry Development Paper* 12 [1957]); and later with the Ifugao (*Ethnographic Atlas of Ifugao: A Study of Environment, Culture and Society in Northern Luzon* [New Haven: Yale University Press, 1980]); work in Central Java by Mubyarto, et al. (L. Mubyarto, L. Soetrisno, and M. R. Dove, "Problems of Rural Development in Central Java: Ethnomethodological Perspectives," *Contemporary Southeast Asia* 5 [1983]); and Johnson's ethnoecological research in Brazil (1972, 1974) are but a few examples of the many contributions by ethnographers to rural and agricultural development.

6. This paper might be applicable only to countries as language diverse as the Philippines. In Bolivia, for example, almost all scientists, researchers, project staff, and farmers speak Spanish, which is also the "technical" or "scientific" language. Many Quechua and Aymara farmer respondents are also native Spanish speakers. In any case, most researchers seem aware of potential problems (although fewer than in the Philippines) of translating between Spanish and Quechua or Aymara, and often look for the basic conceptual differences that go beyond simple translation.

7. I have participated in giving short training courses for the Farming Systems Development Project-Eastern Visayas and the Visayas Research Consortium. These have emphasized farm visits and use of iterative informal structural interviews, and have relied on lecture and field practicum. Papers detailing methods, exercises, and results for both courses are available from the author and from the respective project and consortium.

technical and language skills are more often the exception than the rule in the field. Much farmer interviewing in the Philippines requires some sort of language translation. Scientists may use translators in the field to work from a farmer language to their own native Tagalog or English. More problematical for determining farmer perceptions is that interviewers commonly translate from a farmer language to English in recording data. Interviewers are often not familiar with, are not trained to recognize, and may be biased against farmer concepts, terms, and categories. Many agricultural development project site technicians feel that they have "scientific knowledge" which the farmers lack. They have usually been "scientifically" educated in English and often do not recognize farmer terms, concepts, and categories which may be important and could be discussed via follow-up lines of inquiry. When terms are recorded, they are often too quickly translated and "lumped" into single or too few English terms, again losing potentially useful lines of inquiry. Finally, agricultural development projects may have "cooperator farmers" in long-term contact with project technicians. Farmers can easily learn technician terms, categories, and concepts, and may eventually be unwilling to answer questions in terms other than those learned from the "educated" technicians. I have encountered "well-informed informants" who spoke no other English but were adamant that their soils were "sandy loams," "clay loams," and so on.

EXAMPLES OF TRADITIONAL TECHNICAL KNOWLEDGE

The examples which follow are drawn from research in several Sierra Madre communities of pioneer shifting cultivators and from working visits to other upland, rainfed areas – Samar and Leyte (the Farming Systems Development Project-Eastern Visayas), Claveria, Misamis Oriental (a cropping systems project site of the International Rice Research Institute), and Antique (the Antique Upland Development Project). The examples are of farmer terms and perceptions regarding their soils and lands, related land use practices – especially crops and plot fallowing – and farmer problems and strategies. Languages involved include Tagalog (the Sierra Madre communities), Waray (Samar), Cebuano (Leyte and Claveria), and Kiniray-a (Antique).

LANDS, SOILS, AND CROPS

The first two examples suggest that traditional farmer knowledge and perceptions concerning lands and soils are quite extensive and a determinant of cropping and management decisions.

The project site staff of the Eastern Visayas project said that farmers made few distinctions among soil and land types, that farmer knowledge and cropping decisions relative to soils and lands were "random." Leyte farmers supposedly called all poor soils *pansil,* which Samar farmers called *umau.* Technicians said that farmers in Gandara, Samar, could only distinguish red (*pulahon*) clay soils (*anapogon*), sandy oils (*basoon*), and "good" soils. Informal but intensive interviews using the simple eliciting techniques demonstrated that farmers had a greater range of terms and corresponding practices (see Table 1).

The table includes farmer term, translation, and "connotations." The project staff first had difficulties in *not* immediately translating and "lumping" farmer categories into English (not their native language). Practice was needed to consider terms in light of distinctions being made by informants. With translations that were less literal, more of the farmers' knowledge and perspectives emerged. While *lugarugan* "means" "carabao wallow," it refers to valuable moist, dark-grey, enriched soils. *Pongango* ("corn cob") refers to soils from which nutrients have been depleted although the land remains. *Lulbarinin* (faded) refers to soils of uneven nutrient and moisture characteristics such that the crop is unevenly colored and sized depending upon location within the field.

Farmer terms (Cebuano) and distinctions were informally elicited in Leyte. Soils were sandy (*basoon*), sandy and could not hold water (*mayiniton*), leached (*lubas*), poor (*umay*), sour or acid (*aslomon*), and clay (*hagkoton*). Lands were *lamak* (flat lowland), *makilid* (sloping), *buntod* (hilltop), *patag* (lowland rice), *tabok, tambok,* or *tabunok* (rich, low-lying, with mixed vegetative cover, next to water), *tanhong* (shaded), *dagan* (washed down), and *ugmad* (newly opened). Farmers make some cropping decisions based on their distinctions regarding soil color, texture, acidity, fertility, moisture, and land slope, drainage, and shading. In place of preconceived "random" farming practices, project technicians started to see more systematic, "logical" farmer land use decisions.

Table 1. Gandara, Samar, Farmer Terms (Waray) for Soils and Lands

Term	Translation	Connotation
galot-galoton	sticky-sticky	very sticky
mapilit-pilit	sticky-sticky	sticky
maitom-itom	black-black	very dark
matig-ana	hard	hard
mayomu	soft	soft
mapula-pula	red-red	clay red
bato bato	stone stone	stoney
palanas	bald or bare	slippery
lulbaranin	faded	uneven
lugarugan	carabao wallow	wet lowland
pongango	corn cob	poor soil left behind
guitona-i	original	pure soil
bagnas	land after harvest of upland rice or corn	
bulas	field after camote is removed	
higad	slightly rolling	
tangid	steep	
danaya	undulating	
tugha	not yet planted to rice	
dagu	after planting rice	
danau	paddy rice plot	

Land and soils are the most important resources to the Sierra Madre pioneer settlers and knowledge is critical for resource management. Local soils, mostly nutrient poor acidic red clays, are described (see Table 2) as *maasim* (sour), *mapula* (red), and *malagkit* (sticky). Soils are also said to be either overly sticky in the subsurface (*sobrang lapot sa ilalim*) and loose on the surface, or sticky on the surface and loose underneath (*buhaghag sa ibabaw*). Reddish clays are also described as *batong bakal* (stony iron) and *makalawang* (rusty). The darker and more fertile soils are described simply as *itim* (dark) and *mataba* (fat).[8]

8. Eva Wollenberg, "Nutrient Cycling in Shifting Cultivation: Results of a Study in Calminoe, Philippines," 1985. (Mimeographed.); S. Fujisaka, "Pioneer Shifting Cultivation, Farmer Knowledge and Upland Ecosystem: Co-Evolution and Systems Sustainability in Calminoe, Philippines," *Philippine Quarterly of Culture and Society* (forthcoming).

Table 2. Sierra Madre Farmer Terms/Descriptions for Land and Soils

Terms/Descriptions	**Translations/Meanings**
Poorer Soils/Lands/Characteristics	
maasim	sour; acidic
mapula, pulang lupa	red, red soil
malagkit	sticky, clay
pulangtinggang	soil that is sticky after rains, hardens and cracks with sun
mainit	hot
matigas	hard
payat	thin; infertile
payagkit	compacted and sticky
batong bakal	stony iron
makalawang	rusty
sobrang lapot sa ilalim	overly sticky in the subsurface
buhaghag sa ibabaw	loose on the surface
lupang may anay paghin-ukay na malalim	soil with termites underneath
Better Soils/Lands/Characteristics	
itim, maitim, maitim-itim	dark; fertile
mataba	"fat"; fertile
mabulati	"plenty of earthworms"; very good
malamig	cool
maitim-itim na mabuhangin	dark and sandy
maputing medyo mabuhabuhangin	white and somewhat sandy
itim sa ibabaw, madilaw sa ilalim	dark on the surface and yellowish underneath; two features of a soil good for coffee
pulangluno	soil that is easily tilled
"malamig, na may bulok-bulok-bulok, buhaghag at malambot"	"cool, with decaying matter, easily crushed by hand and soft"
bulok na dahon	decayed leaves and roots; humus

Sierra Madre farmers recognize both soil erosion and water-logging as problems. They prefer slightly sloping lands, not sloping so much that soil is lost during heavy rains and not so flat that water accumulates on the surface. Informants also favored bottomlands into which soils from upslope had been eroded and parcels protected from winds. To the degree possible, given resources and resource access, farmers match crops to soils. Coffee soils are ideally dark on the surface (*itim sa ibabaw*) and yellowish rather than reddish at the subsurface level (*madilaw sa ilalim*). Tomato needs slightly sloping lands with brownish soils. The "Apollo" and "Crossbreed" tomato varieties grow on newly swiddened lands, while the "Dwarf-18" grows on lands cropped, fallowed, and reopened. The leaves of Dwarf-18 grown on new plots shrivel, and Apollo dies if planted on lands previously cropped. All farmers said that banana, pineapple, cassava, and jackfruit grow well on the local red acidic clays, and a few said that pineapple did better without fertilizer.

FALLOWS

What do upland farmers consider in fallowing plots? Is behavior "random" or, for example, a response to lack of labor or traction? To what degree do fallow practices represent adaptations to local and individual circumstances; and what farmer technical knowledge is involved?

Pioneer shifting cultivators in the Sierra Madre mountains fallow plots for one to ten years after one to several croppings. Fallow timing and length depend on past land use, soil conditions, crops planted, distance from the road, and land demand. Because of increasing weeds and pests, fresh plots used for the locally important crops of rice and tomato are usually planted only once after clearing and are then fallowed or planted to root crop-perennial combinations. Surprisingly, many informants said local lands need only one to three years to regenerate, a short time for plots under shifting cultivation. Fallowed plots (*gusarin*) are left to "let everything regrow" (*pabulasin*). Plots are fallowed as yields decrease, ant or insect populations increase, and as weeds and grasses, especially *kulapi (Paspalum conjugatum)* start to invade. Sierra Madre informants agree on indicators of returning fertility: lack of *cogon* (*Imperata cylindrica*) and the presence of a vine, *baging hapon* (*Mikania cordata*), as well as ferns, shrubs, and any trees, usually *Ficus* and *Macaranda.*[9]

9. S. Fujisaka and A. D. Capistrano, "Pioneer Shifting Cultivation in Calminoe, Philippines," *East-West EAPI Working Paper* (Honolulu, 1985).

Researchers are also currently investigating soils and vegetative composition of what farmers call *resiko*. Many Sierra Madre farmers, regardless of place of origin, experience with upland farming, and time in the area (except new arrivals), agree on a surprising perception of the local agroecosystem and a corresponding practice called resiko, which farmers explain as follows:

> Mature secondary or primary forest patches are cleared, burned immediately fallowed for 3 to 4 years without cropping, and then re-cleared and planted, usually to rice or tomato. Soils on newly opened plots are usually poor or weak (*mahina*), and crop production is low and plants are not vigorous. Newly opened plots are also unstable and have too many roots and stumps in the soil. *Resiko* (or a similar period of very low density root cropping) allows roots and stumps time to decay. Soil fertility improves and soil acidity decreases. Grasses and vines grow which improves fertility. Some soil is initially lost, but *resiko* allows quick natural revegetation, rotting of roots and stumps, and a settling of the soils so that, overall, much less erosion occurs with both the initial and subsequent clearings and burnings, and with the final planting. Elimination of roots and stumps lessens infestations of termites and ants once cropping is underway. After soils and soil fertility are improved, crop yields remain relatively high, stable and sustainable, compared to plots planted immediately after first clearing and burning. *Resiko* is necessary in the local (Calminoe or Magsaysay) area, but was not needed in previous places of residence.

Resiko is a curious practice and one not previously reported on in the literature concerning shifting cultivation. Fallows otherwise take place after cropping, soil fertility losses, increased weeds, and after yield declines. Farmers practising resiko defer land use after the investment of labor in initial clearing, and must invest again for reclearing in return for the benefits they have discovered. A few farmers in the community of Calminoe first described the practice. Researchers were surprised and doubtful. They asked more questions of the same respondents and listened for others to mention and then discuss similar practices and perceptions. They talked with other farmers and observed more resiko plots in the communities of Magsaysay and Pinagtablahan and were able to piece together the above account of what appears to be a somewhat common practice in the Sierra Madre. Current research on biophysical dimensions of resiko starts with, and hopefully will usefully complement this case of farmer learning and local adaptation.

The Eastern Visayas project first paid little attention to fallows. The question "What do farmers in your project area consider in fallowing or reopening a fallowed plot? " was posed to site technicians. They said that "farmers just abandoned lands when yields dropped" and that farmers described plots only as "abandoned" or "empty". Interviews showed that so-called "local terms" (farmer terms in Waray) had been carelessly lumped and translated. Informal interviews again elicited a greater range of terms and perceptions (see Table 3).

Table 3. Some Fallow Terms (Waray) and Concepts in Gandara, Samar

Term	Translation	Connotation
paukyon	stop	cease cultivation
pahuway	rest	let land rest to recover
diskanso	rest (from Sp.)	let land rest to recover
bakanti	empty (from Sp.)	vacant land, usually grass
guinbaya-an	abandoned	no cultivation, land may be depleted
pinahabog an banwa	let the grasses grow	allow land to regenerate natural vegetation
tugwayan	pasture	early grassland fallow

I worked with the project staff of the Antique Upland Development Project to develop diagnostic techniques and sample-survey questions that were clear, appropriate, and culturally acceptable to farmers, matched to research intents, and not awkward for interviewers. For example, a first version of "Are you fallowing any of your farm lots? " was *Nagpabakante man bala kamo kang inyong uma*? " Farmers laughed at the Cebuano "*Naga-*" instead of the Kiniray-a "*Gina-*". The question was modified to "*Ginapabakantihan bala ninyo ang inyong uma*? " Farmers were then quite definite that "*ginapalnganan*" is appropriate for their "fallow" in the sense of land and vegetative regeneration rather than "*ginapabakantihan*" which implies "vacant". The final version was "*Ginapalnganan bala ninyo ang inyong uma*? "[10] Again, while

10. S. Fujisaka and N. Duhaylungsod, "*Pagpanag-iya* or *Paginobrahanay*? A Methodological Reminder for Philippine Social Scientists," *PSSC Social Science Information* 10 (1983): 1-6, 28.

the project staff said that farmers simply left lands empty, the farmers (as indicated through iterative translation and back-translation and rechecking) saw the situation differently.

Only five farmers were intensively interviewed during an exploratory visit in Claveria, Misamis Oriental. They own or tenant sloping, rainfed lands planted to maize, upland rice, cassava, banana, and some perennials, especially coffee. Yields are reportedly declining where fertilizers are not used. Land resources, tenancy arrangements, and cropping-fallow practices are varied. Farmers assessed soils, lands, and respective potentials by slope, color, texture, and location (see Table 4). All were aware of soil erosion and said that rains washed nutrients downslope to lower, consequently richer, plots. Farmers wanted darker rather than reddish soils or sticky clays and wanted lands close to the road.

All five farmers said that although area soils are essentially the same, fertility varies by plot and declines with continuous cropping. Four said that cropping cassava returned some soil fertility. Three said that corn or rice rotated with cassava helped the soil. All were aware of or had used liming. One said that his roadside parcel was richer because the road had been built on a limestone base and gravel kicked onto his land improved it.

Table 4. Some Claveria, Misamis Oriental, Farmer Soil Terms (Cebuano)

Cebuano	English	Cebuano	English
tambok	fertile	makilid	sloping
patag	flat	itomon	blackish soils
hagkoton	clay	batohon	rocky
palanhay	rolling	uga	dry
niwang	poor soil	vacante	fallowed (not planted)
pasto	pasture	fabrica	fallowed (for regen.)
pulahon	red soils	piliton	sticky

Fallow practices vary according to farmer circumstances. The first respondent could not fallow, given limited tenanted land. He plants as long as yields without fertilizers, although declining, are better than previously in Cebu. His landlord is against fallowing since such land would supposedly be more subject to agrarian reform confiscation. The second respondent, a large landowner, uses a variety of cropping-fallow patterns on many plots. He assesses soil potential by previous use, yields, slope, flooding, and erosion, and was very clear on the need for fallows for soil regeneration. Maize-maize is continually planted on a lower, flat flood plain; maize-fallow or rice fallow on rolling areas; cassava on sloping plots; fruit trees on a fallowed plot now covered with *Calapogonium.*

A third farmer plants annuals on tenanted plots and owns a parcel with coffee and another that is fallowed. He chooses and uses plots within his landlord's twenty-plus hectares because members of his family are *sinaligan sa mayaari* (favored farmers to the landowner) and the only tenants (*sa-op*). The respondent identified fallow as "*fabrica na yuta*" (manufacturing soil) and assesses the potential of plots more by past use than by current cover vegetation. A fourth farmer owns one hectare on which maize and then cassava yields have declined. He wants to fallow the one hectare and tenant other land, but none is available. The fifth, a large landowner, does not fallow. He said that fallowing was the "old" system and that "modern" methods required fertilizers, pesticides, and new varieties (see Table 5). The diversity of resources and practices suggests that working with farmers on improved nutrient management might be welcome by some, inappropriate for others.

Table 5. Claveria: Diverse Circumstances and Fallow Strategies

Resp.	Fallow	Circumstances	Perceptions and Strategies
1	no	2 ha, 1 rented and 2 tenanted parcels, flat to steep slopes	will continuously crop as long as yields w/o fertilizer are better than in Cebu
2	yes	20+ ha owned; 2 large parcels, 30 plots; slopes, soils varied	fallows very necessary; crops are rotated on each plot; plots are fallowed as necessary
3	yes	3 ha; owns 1 ha on 2 parcels, tenants 2 parcels of 1 ha each; is *sinaligan sa mayaari*	fallows very necessary; special status allows farmer to fallow, shift plots and expand as needed on owner's 20+ ha
4	no	1 ha owned plot, flat	wants to fallow own land, tenant better parcel (but none available)
5	no	12 ha owned; cultivates 7 ha, tenants out 5 ha	prefers to use fertilizer; equates fertilizer use with modern farming

Informal interviews, especially such a small number, can show farmer knowledge and perceptions to be diverse, even contradictory. While farmers agreed that *cogon* (*Imperata cylindrica*) indicates low soil fertility on fallowed plots, there was less agreement on other plant indicators. *Mimosa, talahib,* and carabao grass were cited as indicators of both soil fertility and infertility by the different farmers (see Table 6).

Table 6. Claveria: Diverse Farmer Perceptions about "Indicator" Plants

Farmers	Indicates Fertility	Indicates Infertility
1	mimosa Japanese grass	cogon talahib
2	Calapogonium very vigorous cogon carabao grass	cogon yellow, stunted grasses dinog trees
3	sunflower talahib	cogon carabao grass mimosa
4	land used as pasture	cogon
5	putok-putokan (Crotaleria) baho-baho (Hyptis incana) gapas-gapas kawayan (bamboo) bagkagay (small, green bamboo)	cogon

FARMER PROBLEMS

Informal interviews combined with on-farm observation can be useful in eliciting and then carrying out initial investigation of farmer problems. The process can lay the groundwork for further research.

The site staff in Gandara, Samar were encouraged to do initial informal analysis of identified farmer problems. Some, but not all, farmers mentioned a problem with mole crickets (*Grylotalpa Africans),* and this was examined in the field using simple follow-up questions:

1. Could you describe the cricket problem?
2. Which crops and varieties are affected?
3. At which stage are the plants affected?
4. Have you observed if certain management practices affect the seriousness of infestation? Do you know why?
5. Do you know of and have you tried any ways of controlling the crickets? What was the result?

The answers suggested that crickets are a problem for farmers not having perfectly leveled paddy fields since the damage to rice plants is seen only in portions of paddy fields not submerged due to incomplete leveling. This, in turn, suggests that the farmer problem may involve lack of traction for land preparation. These observations led to more questions:

6. How do the crickets affect different types of plots and different parts of single plots?
7. How do you prepare each plot?
8. Do you own a carabao? (If not) How do you obtain use of carabao for land preparation?

Further questions followed in the light of responses. The site staff could then determine the extent of the problem, who are affected, local control methods and effectiveness, and possible ties between problem and management practices. Local solutions can be examined as possible "best bets" given local circumstances. Finally, needed back-up technical research could be identified. Such research could then build upon the knowledge already gained in the field and could be focused and directly project-relevant.

Farmer terms alone are not especially useful for agricultural research. More important are the practices that accompany concepts and the implications for further research and development of innovations. Data from the Sierra Madre also indicated next-step research and aided in the initial screening of possible upland development technologies. Because farmers were well aware of the process and problem of soil erosion, fertility management measures might be acceptable. In the informal interviews, farmers said poor soil fertility was a problem, and this was shown to be a commonly held perception by a follow-up sample survey. The survey, however, also indicated that farmers saw the problem more in terms of a lack of or need for fertilizers, rather than in terms of needing better management practices to lessen nutrient losses. Moreover, some said soils were improving with use; and again we verified this perception through a sample survey. We are now carrying out basic biophysical research with the goal of working with farmers on improved soil and nutrient management practices.

Intensive informal interviews can provide a systematic view of the farmers' overall strategies. For example, once the complexity of individual farmer strategies was recognized, the staff of the Eastern Visayas farming systems development project were better able to consider whole-farm enterprises. In a four-hour discussion with a "non-cooperator" farmer, interviewers visited the farmhouse, a stream-fed paddy, and an upland swidden plot. The respondent's paddy was between lowland and upland areas and was formed after several cooperating farmers (*coporasyon*), mostly relatives; built a diversion ditch from stream to field. The paddy has been cropped for four seasons and is being leveled gradually due to limited carabao access. Varieties planted are IR36 and IR42. Many Gandara farmers say these must be alternated (perhaps in response to blast?) for each to produce well.

The farmer interviewed said that crickets are a problem for paddy rice. Crickets attack plants on higher, unsubmerged patches. As confirmed by other interviews and observations, crickets are, thus, a problem for farmers with paddy fields and limited traction access. The farmers' soils and land were assessed by color and vegetation. Red and then yellow clays are poor. At the other end of the continuum, dark loams are rich. Lands covered with *Imperata* are the poorest; *talahib* – covered land is better; and mixed shrubs and small trees are the best fallowed lands.

On a multileveled, multisloped upland plot, one farmer cleared and planted UP-Ri5 and a native rice crop. Corn followed rice on less fertile portions; a second rice crop was planted on better areas. Cassava and camote followed rice or corn; and these were followed by a carefully spaced mixture of pineapple, sugarcane, different types of taro, banana, and papaya. The informant was very specific in identifying different soils *within* the one-hectare plot, and in stating cropping sequences. The farmer uses crop residues as mulch and stated clearly that mulches protect soils on the slopes from erosion. The plot was opened section-by-section over several seasons so that at any one time the farmer would have a full assortment of crops corresponding in placement to the different and changing fertility of each subplot. The informant was very clear in describing the swidden plot as changing and developing over time from new plot to fallow.

The farmer experimented with crops such as eggplant and peanut, tried to find solutions to problems affecting these crops, and adopted crops for which he solved the problems. Peanuts suffered from rats and empty pods, and were dropped. Eggplant was attacked by worms. The solution – chemical spraying – was effective but expensive and costs outweighed benefits. Spraying was dropped; but losses to the worms included, eggplant was still profitable enough to be adopted.

The interviewers observed that the cropping of some other farmers did not follow the schedule used by the informant. He explained the complex balance between farmer experience, uncertainty as to climatic conditions over the year, risk assessment, and possible profits of producing harvests out of season. The farmer says that he places "priority" on his paddy field and leaves the upland plot relatively neglected during periods in which the paddy fields require a lot of labor.

Interview returns for the farming systems development project include a better understanding of farmer strategies and decisions, diversity of individual circumstances, and directions for needed research. More appropriate recommendations can be formulated and an approach not relevant to local farmers can be avoided. Equally important, agricultural development technicians can start to listen to and learn from their "client" farmers. For example, the project staff collected what had previously been thought of as farmer mis-diagnosis of livestock diseases (see Table 7).

Table 7. Some Gandara Farmers' Livestock Disease Terms

Term	Translation	Disease
pakdol	stumble	hoof-and-mouth
eget-eget	diarrhea	various
tukwaw	groggy, wobbly	avian disease
buti	small scabs	various
karog-on	falling hair	?
kuto	lice	lice
hinga hinga	labored breathing	respiratory

CONCLUSIONS

Upland farmers of the Philippines interact with and adapt to diverse and fragile environments. Resource use and management strategies are individually complex and heterogeneous within communities. Development of appropriate innovations for such agroecosystems and farmers can be aided by initial knowledge of existing farmer practices. And more sense can be made of the practices through an understanding of underlying farmer perceptions, systems of classification, and traditional knowledge. Examples of upland farmer traditional knowledge and perceptions, especially concerning soils – land classifications and corresponding cropping and fallowing practices – demonstrate the internally consistent, knowledge-based, and adaptive rationality of farmer activities, the complexity of individual farmer strategies, the diversity of farmer strategies within communities, and the technical nature of farmer knowledge. Experience also indicates that successful interviews on farmers' fields require, among others, fieldworker scientific curiosity, interactive skills, and sensitivity to problems of language use and "translation." These simplified ethnographic techniques can complement agronomic, ecological, and economic diagnostic research for agricultural development.