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Understanding professionals: small farmers and scientists

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Understanding scientists

The dominant professional values of scientists concerned with agricultural research impair their ability to work with small farmers. This statement applies to social scientists as well as to natural scientists. Scientists' values and behavior must change if scientists are better to understand small farmers, and their environments, and if that improved understanding is to be reflected in agricultural research. To explore what changes are necessary, we must start not with small farmers but with those who seek understanding.

Scientists must first understand themselves. Without self-critical introspection, scientists are likely to hold views of small farmers and their environments that are largely determined by professional training, by the ways in which scientists are exposed to small farmers, and by scientists' own environments. These three types of influences on scientists' attitudes deserve special attention.

First, professional education and training, so often regarded as unequivocally beneficial, can also be seen as a lengthy process of conditioning in selective perception. We are taught to see the world in certain ways, to look for certain things, to ask certain types of questions. This training at the same time makes it difficult for us to see the world in other ways, to look for other things, or to ask other types of questions. Visiting a village, a physician, an agronomist, an engineer, an economist, and a sociologist will notice very different things and ask very different questions. Each will form very different, and partial, views of a reality, which furthermore is perceived differently, and more holistically, by the villagers themselves. Consequently the visitors will derive different, and sometimes conflicting, ideas about what ought to be done in the name of development. A first step, then, is to be aware of our professional blinkers and tunnel vision, and to recognize that there are things we do not see, questions we do not ask, and relationships we do not identify.

Second, we have to understand the biases built into the ways in which we are exposed to, and carry out our inquiries about, small farmers and their environments. What I call rural development tourism—brief rural visits by urban-based professionals—is a common activity. It tends to direct attention to people who are better off, to the exclusion of those who are worse off. Rural development tourism has many mutually reinforcing anti-poverty biases:

urban. Toward rural areas near towns, which are usually more prosperous.
paved roads and roadsides. Along paved roads and roadsides generally, where better-off people live with better services, and to regions that are more developed, rather than less.
project. To projects, rather than to areas without projects.
elite. Toward meeting people who are better off and more powerful; toward the larger and more progressive farmers; and toward farmers, rather than the landless.
male. Toward meeting men, rather than women.
user. Toward meeting users of services, rather than non-users (the members of the cooperatives, not the nonmembers, etc.).
adopter. Toward meeting adopters of new practices, rather than nonadopters.
dry season. Toward travel, especially to remote areas, mainly in the dry season after harvest when people are usually healthier and better fed, rather than during the rains when the reverse is true.

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modern. Toward seeing whatever is modern (the tractor, the mill, the high-input cash crop), rather than traditional (the hoe or ox-plow, hand-pounding, the subsistence crop).
irrigation. Toward areas with irrigation rather than those without.

Any of these biases on its own might be serious. Combined they systematically lead the observer to perceive rural people as being more prosperous and less deprived than they really are, and

toward interacting with and learning from those who are better off, rather than from those who are poorer. The prosperity after harvest of a male farmer in a project beside a main road close to a capital city may color the perceptions of a succession of officials and dignitaries. The plight of a poor widow starving and sick in the wet season in a remote area may never impinge on the consciousness of anyone outside her community.

Third, rewards, prestige, and promotion point professionals away from small and poor farmers, and inward toward urban and metropolitan centers. One can ask which is more valued and rewarded professionally:

- Research that benefits small and poor farmers more, but generates few publications; or research that generates many publications, but benefits small and poor farmers less?

- Research on crops or animals for market or for export (coffee, jute, tea, or exotic cattle), or research on low status, more subsistence crops or animals (millets, goats, hens) that are important for the poorer people?

- Work that makes use of indigenous technical knowledge and that is carried out in collaboration with farmers as equal colleagues, or work that is based solely on modern scientific knowledge regardless of the on-farm situation and that has no farmer participation?

- Trials (a low status word?) in farmers' fields, or research (a high status word?) at agricultural experiment stations?

These rhetorical questions suggest some of the forces that restrain scientists concerned with agricultural research from close contact with farmers. Like small farmers, scientists are rational. They are likely to behave in ways that are rewarding, given their environments—ways that lead to promotion, higher incomes, opportunities for travel, and residence in urban centers, which have conveniences such as good schools for their children. They are then not merely restrained from contact with small and poor farmers; they are drawn away from it.

Some of the effects of these and other forces that have kept scientists and small farmers apart have been astonishing. One is the time it has taken in East Africa for the benefits of intercropping to be recognized, as Deryke Belshaw has pointed out. It took decades for it to be realized that farmers' "primitive" practices were efficient and for agricultural research to be adapted accordingly. In the meantime there were many demoralizing years of suboptimal research generating inappropriate advice.

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Introspection also leads one to ask how objectives are chosen. Is there a tendency to fix on one straightforward objective or criterion as a way of simplifying work and thought and as a way of eliminating awkward "political" or "social" aspects of development? Agricultural literature is replete with books and papers that treat production as though it were a sole and adequate objective. Such a view has been widely challenged. Again and again, those who have benefitted from agricultural change have been the strong, the powerful—those who were already better off. The poorer and weaker have sometimes gained a little, sometimes gained not at all, and sometimes lost. Whatever the myths and appearances, agricultural research is highly political since it affects who subsequently gets what. Unless research planners deliberately address the question of which farmers will benefit, the familiar pattern will be repeated. But agricultural scientists may protest that this is none of their business. In the words of the Tom Lehrer song "... when the rockets go up, who cares where they come down—that's not my department...." And yet, to pursue the metaphor, the choices about what sorts of rockets to build—what sorts of research to carry out—do determine where they are likely to come down. Research on poor people's rainfed food crops will benefit different groups of farmers than research on a cash crop grown only by the larger farmers, or only by those with irrigation.

All this is well known. Its relevance to understanding small farmers is the question: understanding *which* small farmers? Professional training, the biases of rural development tourism, and professional incentives and rewards point scientists toward the better off farmers and away from the poorer and smaller ones. If equitable distribution of benefits is an objective in addition to production, then scientists deliberately have to attempt to counteract these tendencies in order better to understand poorer and smaller farmers and learn about their farming systems.

Reversing professional tendencies

Some of the opportunities presented by this view can be described in terms of three reversals of common professional tendencies.

1. Valuing indigenous technical knowledge

Modern scientific knowledge and the indigenous technical knowledge of rural people are grotesquely unequal in power. Modern scientific knowledge is centralized and associated with the machinery of the state; and those who are its bearers believe in its superiority. Indigenous technical knowledge, in contrast, is scattered and associated with low prestige rural life; even those who are its bearers may believe it to be inferior. It is difficult for some scientists to accept that they have anything to learn from rural people, or to recognize that there is a parallel system of knowledge to their own, which is complementary, usually valid, and in some respects superior. Rural people

often have their own categories and fine discriminations, such as detailed knowledge of soils, of plant indicators of fertility, of weather patterns, of pests and weeds, of livestock and pasture, and the like. For example, Michael Howes cites H. C. Conklin as indicating that the Hanunoo people of the Philippines are able to name 1600 plant varieties, 400 more than in a botanical survey. Unfortunately, many of the bearers of modern scientific knowledge have been trained away from being able to learn these different ways of seeing the environment, or to understand the problems and rationality of small farmers. They do not realize that, as John Hatch has put it, "...small farmers too are professionals." And even when, as increasingly occurs, scientists do seek to learn from farmers, they are still conditioned to imposing their own categories, meanings, and priorities, rather than learning from and thinking with those of farmers. Grace Goodell, discussing the work of IRRI, has written:

> Even when we do go to farmers for feedback, they prefer to answer our questions rather than to tell us quite freely whatever is on their minds about rice. This means that at best the researcher is talking to himself, with the farmer filling in the blanks. . . . What if, like alchemists, we miss the decisive questions?

The challenge is to listen to and learn from farmers, encouraging them to express their categories, meanings, and priorities, and treating them not just as professional colleagues and collaborators, but as teachers.

2. Developing quick-and-clean methods of appraisal

Rural appraisal has tended to have two forms—the casual empiricism of rural development tourism and the supposedly rigorous drawn-out and extensive rural survey. The former has been called "quick-and-dirty." But the latter might be described as "long-and-dirty." All too often its results are inaccurate, misleading, irrelevant, and late. One need is to develop methods that are quick and clean, where clean means cost-effective in terms of trade-offs among quantity, accuracy, relevance, timeliness, actual use of information, and the costs of obtaining it. The reversal required here involves seeing that cost effectiveness may often be best achieved by quick-and-clean surveys, even though that may entail activities that are not entirely respectable. The dominance of mathematics in education and the reverance for precision in scientific research have generated a whole industry of analysis and publication around the subjects of surveys, sampling, and statistical analysis, now reinforced by infatuation with computers, which draws research away from farmers and seems to justify analyzing data in offices rather than observing crops in fields. Judgment and experience are undervalued. It is often possible to know something on the basis of judgment and experience that it would take many months, perhaps years, to prove. The challenge is to develop methods for rapid rural appraisal that combine judgment, experience, indigenous technical knowledge, and the rigor of cost effectiveness.

3. Offsetting research station bias

Do precise measurement, controlled conditions, convenience, the location of staff housing, and cost effectiveness in terms of personal goals (publication, prestige, being noticed by senior colleagues, promotion) have a magnetic effect in holding agricultural scientists on research stations? For some forms of agricultural research, there is a valid case for conducting work under controlled conditions. But these "controlled conditions" are artificial since they leave out farmers, their needs, their resources, and their problems. Controlled conditions are in this sense peculiar and incomplete. Leaving out farmers is a heroic simplification of the environment. Given the many attractions of working at research stations rather than with farmers, one may ask whether there may not be a tendency to rationalize the desirability of on-station work. If the criterion of good research is beneficial and equitable impact on farmers and others, it might be cost effective for much more work to be conducted with farmers in farmers' conditions.

These three reversals—learning from small farmers, developing quick and cost-effective methods, and offsetting research station bias—are reflected in recent pioneering work by Michael Collinson in East Africa and Peter Hildebrand in Guatemala. Collinson has developed a sequence of quick and low-cost techniques for focusing adaptive agricultural research. These are zoning, evaluating local circumstances, rapid description and appraisal of the farming system, and a verification survey. The approach has affinities with the methods of social anthropology, uses guided interviews without a traditional questionnaire, and includes writing a scenario of the local farming system.

Hildebrand has developed an ingenious method for rapid appraisal combining agricultural and social scientists in a team. For part of the brief survey of a homogeneous farming system, investigators work in pairs—one social scientist with one agricultural scientist, changing partners at intervals. These investigations lead straight into innovations, which are then tested with farmers in their fields.

Approaches developed by CIMMYT have been summarized by Derek Byerlee and his colleagues. They advocate a team usually consisting of a plant breeder or agronomist and an economist to spend one to three weeks on an exploratory survey that places them in farmers' fields in direct communication with the farmers. The informal nature of the survey enables them to establish a tentative understanding of key farmer circumstances bearing on choice of crop technologies, to explore issues such as cash flows, and to ask questions about the feasibility of new technologies.

Individuals who engage in and develop these new approaches have been hesitant to write them up in detail. Only in the past few years has describing exploratory or reconnaissance surveys and quick-and-dirty or quick-and-clean

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methods, become a half-respectable activity. It now should be more than respectable. These activities are at the frontier of important developments leading to greater cost-effectiveness in agricultural research. It is to be hoped that editors of journals, directors of research stations and others who are influential will realize this, so that such work with farmers is recognized as being not only highly professional, but as more professional than less cost-effective work of a more conservative and traditional nature.

Cognitive change

We are faced with a complex system with many interlocking parts—the dominant influence of the agricultural professions in industrialized countries, the policies of editors of journals, urban and research-station bias, the curricula of university courses, ideas about respectable and rigorous research methods, disciplinary blinkers, belief in the universal superiority of modern scientific knowledge over indigenous technical knowledge, and so on—which forces attention and effort away from small farmers, away from learning from them and with them, and toward the citadels of professional advancement, and toward inappropriate research.

Some of the obstacles to change in professional values and behavior are cognitive—the way in which people have been conditioned to perceive and interpret experience. It is difficult enough for a sociologist (say) to learn to think like an agronomist, let alone for either to learn to think like a small farmer. And yet seeing the world in the other person's way—whether the view of another discipline or the holistic view of small farmers—requires a difficult combination of openness, imagination, and humility. Our status and self-esteem are often built on the premise that we have superior knowledge. It becomes, then, important in public situations for us to display that knowledge, and for the knowledge to be indeed superior. A recent IADS report lists among the abilities young professionals need for agricultural research and development, "Ability to handle farming skills *confidently* in front of farmers" (my emphasis). Confidence is certainly important in teaching, but it may be more important to have the greater confidence required to admit ignorance. But even that does not go far enough, for it treats ignorance as something shameful. Rather, ignorance should be accepted positively as an opportunity to learn, whether from a person in another discipline or from small farmers.

The practical problem is how to achieve such an attitude and the cognitive changes that follow from it. For social and natural scientists concerned with small farmers, four suggestions can be made:

1. Joint field work with other disciplines

A key part of the Hildebrand and CIMMYT approaches is interdisciplinary fieldwork. It is fascinating and illuminating to work in field situations with people from other disciplines. One is continuously surprised and intrigued by the things they see, the questions they ask, and the inferences they draw. There are few better learning experiences. Numbers should however be kept small. For short periods, two persons, as in part of the Hildebrand approach, may be ideal. Such work might be a required part of university education and of subsequent specialized training. It should certainly be a crucial part of agricultural research for area development projects, not just as a learning experience but also in its own right as a means to effective work.

2. Required learning from small farmers

Professional and career development in all fields typically involves periods of further training. One appropriate activity might be investigation of the knowledge of small farmers, by, for example, compiling glossaries of local terms. Among some pastoralists, a listing of words for colors would show a series of very fine discriminations, especially in the browns, which are not captured in other languages. More directly relevant are investigations of names for plants, soils, and plant indicators of fertility and micro-climates. Farmers' categories, which are related to their experience and needs, differ from those of scientists, and not only in the Third World. Milton Barnett and Norman Uphoff have told me that recent work at Cornell University has shown that farmers in New York State do not find the U.S. Department of Agriculture soil classification helpful—they use their own concepts. Another example is the calendar system of Bihari farmers, which, according to Graham Chapman, is more appropriate for describing changes in climate and the sequences of cultivation than the months of the conventional calendar.

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One promising approach to learning how different people construe their environment is through repertory grid techniques described by Fransella and Bannister. In Sierra Leone, Paul Richards used such techniques to elicit the way in which university botany and geography students, farmers, and trainee extension workers saw weeds. Four weeds were taken and presented to respondents in groups of three. The respondents were asked to identify which two were most similar and then to explain the "construct" underlying their choice. This was repeated for different combinations of three until all combinations were executed. There was no overlap between the university students' constructs, which were taxonomic and morphological, and those of the farmers, which were utilitarian. But the most startling finding was that the extension trainees' constructs were close to those of the students and also did not overlap with those of the farmers. This test was enjoyed by the participants and, according to Richards, led to

> a spontaneous "seminar" by the trainees on how they would communicate with farmers if their "scientific" approach to farming made them think in textbook botanical terms rather than in terms of farming utilities. Tentative action proposals for syllabus development and for studying alongside the farmers were beginning to emerge at the end of the period.

Learning from farmers with "games" such as this might be made part of the

training for social and natural scientists and extension workers.

Indigenous methods of quantification and new ways of eliciting quantified responses from small farmers are other means of learning how farmers see things and of learning from them. Indigenous systems of quantification incorporate ways of thought that reveal farmers' priorities. Many farming procedures have quantification built into the work. Richards gives the example of the rows of yam heaps of Takete Ide farmers in Kwara State, Nigeria, the ends of which are marked by guineacorn (sorghum) stalks woven together. The units represent the distance a farmer hoes before straightening up and stretching. The result is semi-standard and visible subdivisions in the fields.

Units of this kind can be used in place of a ready reckoner when estimating field size, but since in essence they record the ease or difficulty of cultivation rather than "area" in a geometric sense they will most probably "reckon" returns to labor rather than output per unit of land. Output per unit of labor is likely to be the primary concern of the farmer. There will therefore be little point in trying to introduce a land-use intensification to raise output per unit of land unless the farmers can perceive this in their own terms as increased output per unit of labor.

In this case, then, examining the indigenous method of quantification leads to understanding farmers' priorities for returns to labor.

More generally, other approaches can be created for eliciting quantified responses to questions posed to small farmers. David Atteh, for example, has devised a board similar to that used in a traditional West African game. It has been used for scaling farmers' priorities for investment in weed and pest control and can be adapted for a wide variety of questions, according to David Barker.

To require scientists to learn from farmers in these ways should not be considered demeaning or threatening. On the contrary, to try to understand how other people construe the world is intellectually exciting.

3. Learning through games

Another approach is specially devised games, such as the "green revolution games" developed by Dowler and Elston, building on the work of Chapman. In these, each player starts with similar resources (finance, family labor, land, water) and makes farming decisions, season by season, in the face of uncertainty about weather, input supply, pests, diseases, and the like. A simple computer program, with co-efficients derived from actual small farmer situations and incorporating random contingencies, then presents the outcomes of the decisions. Over a period, players become differentiated—some become wealthy, others landless. But in the process, they are forced to think like small farmers and to understand their rationality, for example in risk aversion. Such games could become a required part of every course for persons, of whatever discipline, who are concerned with agriculture and rural development.

4. Learning by doing

The suggestion likely to be least acceptable to established professionals is to work at farm tasks with farmers in their fields. To some, this would be totally unacceptable, an affront to dignity. To others, it may appear quite a good idea, but not practical. To a few, it may commend itself as something to be quietly tried out. And there are some who have done it already.

The value of this activity is not to discover the extent to which one's muscles have atrophied, but rather to provide an opportunity for insights and learning. John Hatch's remarkable work in Peru is an eloquent testimony to this. He worked for farmers without pay on condition that they would teach him the task they wanted done. He writes:

The scheme worked beautifully. Most small farmers took to their role as teacher very conscientiously. Rather than waiting to respond to my questions, they often volunteered task information I would never have known enough to inquire about. In fact, most of the information I gathered was gained in this way. Hired laborers often proved excellent instructors as well.

It may be objected that for professionals to work with farmers in their fields would be a waste of time. That is a matter of judgment. Hatch came to the conclusion that total labor use might be 50 percent higher than that estimated by outsiders, so one may ask whether professionals can afford *not* to use this approach some of the time. At least there is a case for gaining more experience with it, its costs and benefits, and the insights to which it leads.

Values and choices: Room for maneuver?

This paper calls for changes in values and behavior: to value learning from and with other disciplines, and from and with small farmers; to value equity as well as production; to seek out methods that are cost-effective, if unconventional, in identifying research priorities; to conduct more research with farmers as colleagues. It is easier to sit in a room in a rich country and write a little paper about this and the things other people should do, than it is to be those other people and to do those things. Moreover, there are questions about how real the choices are to act in different ways, about how much room for maneuver there really is.

Perhaps agricultural research, which is moving closer to small farmers through area development projects, presents an unusual opportunity. The value systems in agricultural research are international. In the past this may often have exercised a conservative and inappropriate influence (toward the needs of temperate climates, toward capital intensity, toward export crops, toward pure stands, and so on); and much of this may still be enshrined in the curricula of universities all over the world and perpetuated through their graduates. But that same international system could also help to create and invest with prestige a different climate of values so that national researchers would have more freedom to adopt new practices and turn inappropriate professional values on their head. If this could occur with some area development projects, they might then serve to test methods that would diffuse into agricultural education and training and into other agricultural research. Some of the beneficiaries would be those national researchers who were at the forefront of pioneering the new methods and who would be rewarded in their subsequent careers; but the largest group of beneficiaries should be small farmers whose interests would then be more directly and better served by agricultural research.

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