

# FACTS, FANTASIES AND FAILURES OF FARMER PARTICIPATION INTRODUCTION TO THE SYMPOSIUM VOLUME

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The notion of farmer participation in agricultural technology generation can be traced to the work of three researchers: Stephen Biggs (1980, 1986, 1989, Biggs and Clay 1981) Robert Rhoades (Rhoades and Booth 1982, Rhoades 1982, 1987, 1988, 1989, Rhoades and Bebbington 1988) and Paul Richards (Page and Richards 1977, Richards 1985, 1986, 1989a, 1989b). Working separately, all three came to essentially the same conclusions by the early 1980s; that farmers have valuable knowledge, that they do agricultural research on their own, and that scientists could tap their abilities to improve agrarian R&D (research and development). These form the three philosophical pillars of farmer participation in agricultural research. Eventually Biggs, Rhoades and Richards began to cite each other's work without acrimonious debate, suggesting that they

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found each others' notions sufficiently comparable to their own to avoid quibbling over details.

Richards (1985, 1986) demonstrated that farmer experiments include self-conscious rice variety selection. Rhoades and Booth (1982) described how CIP (Centro Internacional de la Papa) researchers learned about diffused-light potato storage from African farmers and spread it to Latin America and Asia. In a remarkable article, Biggs and Clay (1981) outlined many of the issues in farmer participation that are still current, such as the importance of linkages between farmers and scientists, genetic erosion, and environmental specificity (and may have been the first to apply the term "participation" to agricultural R&D). These authors are so often cited in the burgeoning participation literature that they obviously deserve substantial credit for stimulating the notion of farmer participation.

On the eve of the first programmatic statements about farmer participation, other writers were trying to call the agricultural scientists' attention to the creative power of peasant farmers, including the American anthropologist Allen Johnson (1972) and the soil scientist Hugh Brammer (1980). An even larger body of literature already showed that indigenous technical knowledge (ITK) and traditional farmer practices were ecologically sound and had much to offer the science of agronomy (see Brokensha *et al.* 1980). The agroecology of Conklin (1957) and ethnobotany of Berlin *et al.* (1974) are now cited so frequently as examples of profound farmer knowledge that I need not repeat their arguments here. Chambers (1983: 85-95) sums up many other primary sources on ITK. Less well known is the vast body of earlier anthropological and geographical studies which painstakingly documented indigenous food-getting technologies and ecological knowledge of all sorts and presented them in a light sympathetic to peasants and tribal peoples<sup>2</sup>. Just mentioning some of the better studies quickly adds up to several lines of citations (Evans-Pritchard 1940, Steward 1955, Leach 1968, Netting 1968, 1981, Rappaport 1968, Johnson 1971, Cancian 1972, Hunn 1977, Wilken 1977, Durham 1979, Denevan *et al.* 1984). However, a comprehensive inventory of good research on cultural ecology is beyond the scope of this introduction (see Netting 1977, Ellen 1982). Although long under-appreciated, Norgaard (1987)

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<sup>2</sup> A cultural ecology focus can be used to defend even land fragmentation, a traditional form of farm structure that agrarian policy makers and many economists use as a prime example of irrational behavior (Bentley 1987a, 1990b).

credits cultural ecology with providing the philosophical under-pinnings of agroecology, a new discipline consistent with farmer participation.

There was enough *information* about ITK and even about farmer experiments to have led agricultural researchers to farmer participation some years earlier. Stimulating and valuable as it was, Richards', Rhoades' and Biggs' work may not have been the only reason that farmer participation and interest in farmer experimenters suddenly came into vogue. As Gould (1977) points out, scientific theories are not usually built up bit by bit from the data, but are usually proposed for social and political reasons and then old data is discarded and other data marshalled to suit the new theory. Much of evolutionary theory was an attempt to place Victorian Englishmen at the top of the biological and social ladder. "Information always reaches us through the strong filters of culture, hope and expectation (Gould 1980: 118)." As it bows to the underdog of development--the long-ignored small farmer--the participation fad is dressed for the current political climate. By the 1980s the green movement was growing strong (Redclift 1984). Discouragement with capital- and chemical-intensive agriculture was rampant (Altieri 1987, Granatstein 1988, Murray and Hoppin 1990, Thrupp 1988). The United States Agency for International Development (USAID), the Food and Agricultural Organization (FAO), the World Bank, the International Monetary Fund (IMF) and other industrial country aid agencies were being discredited as serving to stimulate the economies of industrialized countries rather than the alleged beneficiaries<sup>3</sup> (Hayter and Watson 1985, Linear 1985, DeWalt 1985, 1986, Stonich 1989). The achievements of the green revolution were being seriously questioned (Altieri 1986, Cleveland and Soleri 1989, Crist 1983, Chambers and Jiggins 1987, Gómez-Pompa et al. 1982, Hunter 1981, Lansing 1987, Pimentel and Goodman 1978, Waters-Bayer 1989). Small was beautiful in development circles.

I have two main arguments in support of the notion that farmer-participation is motivated more by political and economic motives than by technical considerations.

1. As mentioned above, a well-known anthropologist, Allen Johnson, made a convincing argument for farmer experiments in a prestigious

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<sup>3</sup> In American Indian nations in the United States a similar relationship occurs, where university faculty use development funds, ostensibly to improve local standards of living, while furthering the scientists' research and career goals (Bentley 1987c).

journal in 1972, but went uncited and largely unread until his paper was belatedly discovered in the late 1980s. Johnson's descriptions of farmer experiments in his widely read monograph on small-scale farmers in Brazil (1971) could have served just as well as Richards, Rhoades or Biggs to light the fuse of farmer participation. Elsewhere I have argued that Johnson's work on farmer experiments was ignored because it went against the grain of anthropological thought, which places perhaps too much emphasis on community lore and not enough on individual creativity<sup>4</sup> (Bentley in press).

2. As Keith Andrews (1990) points out, agricultural research has *always* been participatory in the case of commercial farmers (with money to spend on research) whether they be almond growers in California or transnational banana companies in Honduras. Another example comes from an African palm corporation in Costa Rica, which has several Ph.D. level researchers and four large farms. Twice a year everyone in the company meets to discuss technical topics. Company leaders discuss research goals and progress more often among themselves. Production people (i.e. "the farmers") often help collect data. Collaboration between research and production personnel is facilitated by many informal (social, recreational) links between them. Successful experiments are tried out on a larger plot and from there new technology is adopted on a large scale by production people, usually with no further adaptation needed (Nidia Guzmán, personal communication). This case suggests three important factors present in commercial farmer participation which are missing from peasant farmer participation: 1) there are structural, financial relationships between production and research; and research must dance to the tune that production pipes. 2) The commercial farm is powerful, organized and concentrated, so extension flows naturally, almost automatically, from research. In Standard Fruit, the production people are required to use the research results and recommendations once they are approved by higher management and incorporated into the production guide book, commonly known as "the Bible" (Keith Andrews, personal communication). 3) The "farmers" and the researchers in this high

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<sup>4</sup> In an intriguing article, the linguistic anthropologist Keith Basso (1967) discussed the Western Apaches' complex knowledge of and lexicon for car parts. The words are extended from the Apache terms for a horse's body parts, and the knowledge derives from tearing down and rebuilding old pick-up trucks. Certainly knowledge and vocabulary are as easily molded by a people's experience as they are handed down from the ancestors.

y participatory research program share the same class background. Farmer participation's emphasis on land-poor farmers, "empowerment" of peasant farmers through respect for ITK (Thrupp 1989) and its small-scale approach make it an ideal mental refuge for liberal social scientists and sensitive agricultural scientists. Farmer participation became the heir of farming systems research (FSR) and appropriate technology movements. As advocates of a trendy, politically-correct idea, rather than as dispassionate scientists, authors of farmer participation papers have generated one of the vacuous bodies of literature ever written. Amanor (1989) listed 340 abstracts on the subject by 1989. In spite of this literature the development establishment goes about business as usual. "As we enter the 1990s, the dominant paradigm of development expressed by normal professionals and implemented through normal bureaucracy is still top-down and centre-outwards (Chambers 1990:3)."

My experience suggests that farmer participation is sometimes of limited use in technology generation (Bentley and Melara 1990) and that participation in extension is less important than ecological factors in technology adoption (del Rífo *et al.* 1990). While a recent anthology demonstrates that farmers and other rural people invent technology on their own (Gamser *et al.* 1990), the lack of concrete reports in the literature suggests that formal scientist-farmer interaction has failed to generate many new technologies. Because farmer participation is frustrating and unwieldy the only way most authors can describe their experiences and still sound rosy is by skipping most of the real-world details. Most farmer participation papers include no data, no description of technologies generated with farmers and no description of the method used or which scientists participated and how. Some even fail to mention which crop was under study. Despite its promising sub-title, "*Farmers' Participation in the Development of Technology*," none of the papers in the Matlon *et al.* (1988) volume mention a technology developed with a farmer--except for Rhoades (1988), who again writes about diffused light potato storage.

Lightfoot *et al.* (1988) wrote one of the few articles to describe a technology invented by farmers and scientists together; they discovered with farmers that the broad leafed plant *Desmodium ovalifolium* could be used to shade out *Imperata* sp. grass. Their article is unusual among participation literature in describing scientist-farmer interaction in some detail. Bentley and Andrews (1991) describe an experience Keith Andrews had in 1983,

developing a slug trap with farmers, made from cut weeds. However, even farmer-scientist hybrid technologies are no panacea; as this case shows, since the "trash trap" requires more labor than farmers are willing to spend it has not been widely adopted (Andrews and Bentley 1990, Bentley and Andrews 1991, Shaxson and Bentley 1991).

A brief article on citrus ants (*Oecophylla smaragdina*) Fabr. in China by two entomologists is surprisingly full of references to farmer inventions and unselfconscious farmer-scientist interaction. Huang and Yang (1987) learned how villagers in one area rescued the vanishing art of ant cultivation to control insect pests and invented cement rings to keep the ants in the trees and shelters to allow the ants survive the winter. In another village farmers taught the scientists that ants naturally survive the winter in pomelo trees, which are leafier and provide more shelter than orange trees. The entomologists suggested that the growers move the ant nests to pomelo trees from orange trees before the orange harvest. The villagers tried the idea and saved more ant colonies. This paper is about biological control of insect pests, not about scientist-farmer relations, as though the authors were unaware of the participation craze. Perhaps true farmer participation is rare because it requires scientists who have the humility to learn from farmers, the ability to teach them, and the creativity to synthesize formal and informal research.

Other participation articles discuss experiments with very simple technologies like new varieties (Ashby *et al.* 1989a, 1989b) or fertilizer (Ashby 1987, Ashby *et al.* 1987, Matlon *et al.* 1988) that farmers try on their own anyway. The commercial sector figured out years ago that farmers will experiment with chemical fertilizer, and in Portugal it used the tendency as part of a marketing ploy. Agrochemical vendors gave away one kg bags of fertilizer at country fairs in the 1930s and returned the next year to sell 50 kg bags.

Chambers (1983) writes that researchers often have limited access to farmers, especially the poorest ones, because scientists don't venture far from cities, visit farms under the influence of specific projects, stay on the paved highway, travel during the dry season, and talk to men, especially the wealthier ones. Class, ethnic, geographical, economic and linguistic differences between scientists and small farmers mean that their interaction is, if not a pipe dream, a tremendous challenge which can only be met with extraordinary

effort. It is probably being attempted mostly by development tourists (see Chambers 1980).

Farmer participation is not failing for lack of farmer creativity. Farmers experiment all the time (Bentley 1989a, 1990a, 1991, in press, Bentley and Andrews 1991) and extend technology spontaneously (Bentley 1987b). Farmers in Honduras and many other countries habitually experiment with new seed varieties (Altieri 1987: 75, CIAT 1989, Conelly 1988, Farrington and Martin 1987, Kerr and Posey 1984, Matteson *et al.* 1984, Maurya *et al.* 1988). Many other experiments and inventions by rural people have also been documented (Biggs 1980, Brammer 1980, Estorninos and Moody 1990, Gamser *et al.* 1990, Richards 1989a). As Rhoades (1989) and Biggs and Clay (1991) point out, the archaeological record proves that illiterate villagers domesticated all farm animals and all crops (except triticale) and invented many agrarian implements (the plow, wagon, sickle and many others). European peasants carefully adapted plow types to fit micro-environments. The multitude of different kinds of plows that Oliveira *et al.* (1983) map for Portugal show that there are many small environments to which technology must be adapted, and that the plow types (many slight variations on a few basic designs) were conceived by local peasants. Animal and plant domestication and agricultural inventions were probably not the work of a few prehistoric geniuses, but the outcome of many bright men and women working creatively over centuries to make a living from available resources in the most rational way.

Farmers are so creative that there is a logical attraction to the notion that scientists could team up with them to generate new agricultural technology. The problem with farmer participation may lie with the scientists rather than with the farmers (see Andrews and Bentley 1990). Netting *et al.* (1989) argue that the stunning success of Kofyar farmers in Nigeria to sustain indigenous agricultural development (producing native food crops for the urban market) is precisely *because* the Kofyar were ignored by government planners and scientists, and were free to evolve new cropping systems based on new land, previous experience, local experimentation, roads and an open market. Chapin (1990) reaches much the same conclusion in Mexico; the few successful ecodevelopment projects he visited were ones without scientist participation.

Six basic problems limit scientists' ability to tap into farmers' creativity:

1. Farmers are difficult for scientists to reach. Most peasants live several days' journey from agricultural researchers. A common way around this problem is for scientists to work with farmers in nearby, accessible villages. I know one farmer who collaborates with five different scientists. Their influence on him means that he is no longer (if he ever was) representative of Honduran farmers.
2. Farmers and scientists have different observation styles. Farmers observe the natural environment as they work, while scientists set out to observe to fulfill an academic agenda. For example, malacologists place slugs in plastic boxes and offer them different foods to see which ones the mollusks prefer and which they reject; concluding that the common bean slug (*Sarasinula plebeia*) eats a wide variety of broad-leafed plants, including beans (Andrews et al. 1985). When I asked Honduran campesinos what bean slugs eat, some responded that they eat maize kernels. At first glance this answer seems bizarre, because bean slugs refuse maize seedlings as well as other grasses. However, a slug does occasionally find its way into a maize ear, where it may nibble a few grains. Farmers harvesting maize by hand are not likely to forget finding one of these slimy invertebrates in a maize ear.
3. Farmers and scientists have different experimental styles. Farmers often make up experiments as they go along (much like anthropologists designing hypotheses). I met one Honduran farmer who had a hard time getting a tractor to plow his land one year and so planted his beans later than usual. He considered this an experiment, to determine if late planting would lower slug attacks, although it was not a planned experiment. As in most farmer experiments, there were none of the formal trappings that agricultural scientists consider essential to distinguish a true experiment from a mere production experience: a control treatment, replicates, randomization and numerical data. Farmers generally try one thing at a time, over a whole field. Scientists divide a field into sub-plots, often blocks and replicates. The farmers' replicates are over time; one year after another. The farmers can't be bothered with filling their fields full of stakes and twine; this makes it much harder to get work done. Even planting is more time-consuming in many sub-plots. Occasionally farmers compare a handful of a new seed variety in a field with the variety they normally plant, but a simple mark--what Honduran farmers call a "sign" (*seña*)--like an old cornstalk or a stick placed between two rows, is enough to separate the treatments.

4. Farmers and scientists have different economies. Farmers live from the land and are not overly interested in any household economy other than their own. If an innovation works for them, they can easily judge its value qualitatively. Thus farmers are not interested in whether or not results from an experiment can be extrapolated to areas beyond their farm. Applied scientists are supposed to do research that addresses broad, significant problems and search for solutions which are applicable over areas large enough to justify the research expenditure. Scientists use specific experiences to generalize and extrapolate. Scientists live from their salaries, which is not closely correlated with their productivity; but scientists earn prestige from publications, which must include numerical data in agricultural journals. Farmers couldn't care less about the scientist's precious numbers and may harvest an experiment before the scientist collects the data from it (see Matlon 1988). This may explain some of World Neighbors' success; their promoters are generally from the areas where they work, and are not scientists (see Chapin 1990, Andrade 1990).
5. Scientists aren't Peace Corp volunteers. They have other things to do besides work with farmers. Family, laboratory work, writing, teaching, on-station experimental research, reading, administration, organizing symposiums, "networking" with each other and up-dating their resumes all compete for their time.
6. There are many local natural environments, each with unique research needs (Biggs and Clay 1981, Horton 1984, Andrews and Bentley 1990). When colleagues and I asked farmers in 13 villages in Olancho, Honduras, what their problems were in maize, most mentioned maize ear rots (a complex of fungal diseases, especially *Stenocarpella* spp. and *Fusarium maydis*) or whorlworm (*Spodoptera frugiperda*) (J.E. Smith) (Lepidoptera: Noctuidae), but farmers in the village of El Bebedero described an odd disease they called *canícula* (the short dry season that interrupts the rainy season every year). They said in a drier year, whole maize fields fail to develop brace roots, the plants grow onion-like roots and fall over in the first good wind storm. Agricultural research takes years and no scientific team has the time and money to study an agricultural problem that happens in one village, no matter how important that problem is for that village.

Perhaps farmer participation can work for some purposes. The Nigerian economist Aboyade (1991) says that peasant farmers should set research agendas. Keith Andrews (personal

communication) goes one step further: farmers should not be involved in actual experiments, just in setting research agendas and scientists should then report the results back to them. Farmers should set strategies and establish some evaluation criteria, then do "quality control" on the scientific program, helping to redirect it and decide when extension should begin.

Farmer participation may work for students, non-governmental organizations, the Peace Corps and others who can live and work in remote villages (see Andrade 1990, Bunch 1990). Unfortunately, these people often lack the technical agronomic knowledge to do formal scientific research. Most of the celebrated work by World Neighbors has been with the adaptation of relatively simple technologies, and not wholesale technology generation (Chapin 1990). Perhaps the key to farmer participation is that scientists should work with farmers through intermediaries who live in remote villages and can serve as information brokers between scientists and farmers. True farmer-scientist interaction is excruciatingly difficult, perhaps an art requiring special gifts. This does not mean it is impossible or should be discarded. Flying a 747 and playing concert piano are also difficult, but with extensive training some people manage. Keith Andrews (personal communication) points out that salaries and living conditions make the effort to acquire these skills worth making. Fewer people want to struggle to learn new skills if the reward is to go to Central Mali to apply them.

There are several valid reasons why scientists should not throw in the towel on farmer participation. First, researchers can work with traditional technologies to validate and retool them for today's conditions before the old practices are lost completely. Thurston (1990) documents many such techniques, including bending the mature maize plant, which protects against fungal diseases in a number of Latin American countries.

Second, although farmers are ingenious experimenters, they can easily get into trouble with agrochemicals. Farmers in Burkina Faso had been taught to use insecticides in stored grains, and so began experimenting on their own, mixing highly toxic herbicides with insecticides and applying them in grain storage. "The powders, like powerful potions in folk medicine, were thought by the villagers to have magical qualities that protected plants and grain from harm by evil influences such as insects, spoilage (Vierich 1988: 23)." Marcus Linear reports several pernicious farmer experiments with chemicals, including fishing with insecticides in streams in Ghana (Linear 1985:96). I recently

watched a Honduran campesino spray a small field with paraquat. He had fashioned small channels from the trunk of banana plants to cover his maize seedlings, so he could spray a contact herbicide without killing his crop; an ingenious experiment with a foul chemical. The man smoked as he worked, bringing the herbicide to his lips. He and his two small sons moved the banana trunk pieces from row to row with their bare hands. Farmers in industrial countries are also vulnerable to pesticide maladaptation. Tait (1983) writes that English farmers poison themselves with pesticides at alarming rates.

Third, outsiders must help local people preserve wild lands before much of the world's biological tropical heritage disappears altogether. The small African forest elephant (*Loxodonta africana cyclotis*) that once brought new rice varieties to West African farmers, by eating in one field and defecating undigested husk rice across tribal boundaries, is near extinction in Sierra Leone (Richards 1991). The stirring success story of indigenous Kofyar agricultural development in Nigeria had a dark side; farmers stripped the plains of all but a few species of trees (Netting et al. 1989). If left to their own devices, loggers, ranchers and small farmers--pushed by population growth, depressed economies and displacement by commercial agriculture<sup>5</sup>--will eliminate the last wild areas, including large remaining rainforests in the Río Plátano and Tawahka areas east of the Honduran Mosquitia.

This volume represents a typical anthology of farmer participation as it was conceived of in 1989, and is useful for several reasons.

1. It is in Spanish, filling a void for Spanish-speakers who are interested in farmer participation.
2. It has two papers by farmers, and others by social scientists, agricultural scientists, government officials and leaders of NGOs.
3. It is about Latin America. If farmer-participation is going to work in tropical countries, Latin America has perhaps the best comparative advantage. There are fewer linguistic differences in Latin America than in other tropical regions. In the cases presented in this volume, all the farmers and scientists speak Spanish (although with differences in dialect and argot [work jargon]) and do not need to use interpreters or speak pidgins to talk to farmers.

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<sup>5</sup> See DeWalt (1985, 1986).

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