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## Farmer participation in on-farm agroforestry research prioritization

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*An evaluation of the potential of various approaches to interaction between researchers and farmers, based on agroforestry research efforts undertaken by the International Center for Research in Agroforestry (ICRAF).*

### [Researchers take measurements together with a farmer during agroforestry trials in western Kenya](#)

Generally, on-farm research ranges from statistically rigorous experiments to informal observational trials carried out by farmers, although some practitioners would even go so far as to include certain types of project monitoring and evaluation. As Hocking and Islam (1990) have observed, the essential feature of "research" in the broad sense is observation and the feedback of results to modify future action.

Different on-farm research efforts embody diverse styles of interaction between researchers and farmers. Ultimately, the style of interaction determines who "owns" the research. The chart (p. 14) describes four possible styles of interaction between researchers (and other professionals from outside the community), on the one hand, and "farmers" (and other local people selected for external assistance), on the other. There is some form of "participation" in all four interaction types which, however, are clearly different in the degree of local participation which they embrace. This article examines the strengths and limitations of the three more participatory approaches, based on the experiences of the International Center for Research in Agroforestry (ICRAF) with on-farm agroforestry research.

### The consultative approach to farmer participation

During the 1980s, ICRAF researchers developed a "farming systems" approach to on-farm agroforestry research which was based on the Diagnostic and Design (D&D) methodology (Raintree, 1987a; Raintree, 1987b; Rocheleau, Weber and Field-Juma, 1988; Scherr, 1990). This kind of consultative approach has resulted in a significantly increased participation of farmers in research with professional researchers. Nevertheless, ICRAF researchers discovered that the consultative paradigm embodies considerable limitations as an approach to developing truly adoptable agroforestry technologies.

### Styles of interaction between researchers and farmers

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	<b>Prescriptive</b>	<b>Consultative</b>	<b>Participatory</b>	<b>Catalytic</b>
Interaction	Researchers tell the farmers what to do according to their own knowledge (or beliefs) about what is best for the farmers highly professional researchers, as do all research and extension workers try to "sell" the results to the farmers	Researchers and extension workers consult with farmers to improve their own understanding of the farmer's situation, researchers take this information into account when designing technologies for the farmers, it is typically the researchers who decide on priorities and conduct the research but the farmers who make the ultimate decision to adopt or reject the products of research; farmers are often enlisted as collaborators in on-farm research	Researchers and/or extension workers enter into dialogue with farmers about their problems and research needs farmers and local communities identify their own research priorities; researchers and farmers conduct joint research on farmer's priorities, often in focus groups of farmers who share problems or interests	Research facilitators interact intensively with farmers, providing access to external information and/or acting as catalysts in the experimental learning and decision-making processes of the farmers themselves, with the help of the catalytic agent, farmers do their own non-formal experimental research within their own communities
Strengths	Efficient, cost-effective way of transferring a definite and fixed body of technical information to willing recipients; works best when recipients initiate the request for a transfer (e.g. the commercial acquisition of advanced technology by modern industry or farmer participation in successful export crop production schemes)	Research planning is made more relevant by farmer input; researchers feel that research is more meaningful and may enjoy consulting with farmers as long as they retain control of research priorities; more expensive than simple technology transfer but still a reasonably cost-effective way of orienting research towards local needs	Farmers' direct decision-making role in setting research priorities and designing technologies tends to increase the eventual adoptability of the research product, farmer involvement in research tends to pave the way for earlier adoption by the wider community	Building on an informal indigenous research tradition that is as old as agriculture itself, this approach stands the best chance of achieving locally adoptable results
Weaknesses	If undertaken at the instigation of the source group, inappropriate, harmful or non-adoptable technologies may be "force fed" to unwilling or unsuspecting recipients, resulting in low adoption rates and/or unforeseen negative impacts	Despite greater relevance to local needs' the resulting technologies may still fail to achieve a high rate of adoption because they are "foreign" in their style or intent, or because farmers have easier, more familiar ways of addressing the same problems	Community participation in decision-making is a time-consuming process; appropriately trained professionals and paraprofessionals are in short supply, since full-time involvement of professional researchers tends to be prohibitively expensive and extension workers typically lack the requisite research	Requires lengthy residence in the local community; expensive to field highly qualified professional staff, shortage of qualified paraprofessional staff because of a lack of training for the role of catalytic change agents; long-term sustainability issues may not be fully addressed without external help

## **Farmers and researchers often diverge in problem prioritization**

In ICRAF's first on-farm trials, researchers tended to dismiss as unimportant such farmer-identified problems as "lack of shade trees" or "lack of fruit-trees" because, at the time, they did not see these as posing many interesting research questions.

Of far greater importance to the researchers was the diagnosed long-term decline in soil fertility; this affected the productivity of the whole land-use system and, not insignificantly, offered the researchers greater scope for interesting research. Farmers concurred with the researchers on the identification of soil fertility as a problem but were sceptical that much could be done about it. So the soil fertility problem received a low-priority rating in the farmers' minds.

What the farmers' sense of priorities called for was an extension solution, i.e. an immediate logistical response that would increase the local supply of seedlings of shade and fruit-trees. In a more farmer-participatory approach, where farmers themselves set the priorities, these issues would have been addressed from the beginning, thus leaving the farmers free for a greater subsequent involvement in the more challenging research activities.

Therefore, the early on-farm trials of alley cropping and other soil management technologies suffered from rather disinterested participation by the farmers. By failing to address what the farmers felt was most important to them, researchers ran the risk of failing to engage the farmers in a meaningful dialogue. It could be argued that every on-farm research programme needs to have at least a small extension component.

## **Farmers and researchers often have different strategies for agreed priority problems**

With the consultative approach, a lack of awareness of existing strategies, or an insufficient appreciation of the level of local commitment to existing strategies, is often among the main limitations to the researchers' grasp of the local situation. Even with the best intentions, it may be difficult to avoid. This phenomenon was well illustrated in ICRAF's early on-farm trials in Machakos District, Kenya, when the researchers trying to promote a "green manure" soil management strategy (alley cropping) found themselves at cross purposes with farmers who were already committed to a "brown manure" strategy (use of manure from pen-fed livestock) (Vonk, 1983).

## **On-farm experiments: the main medium of communication with farmers**

A sincere attempt to get local land users involved in the design activity is an explicit feature of the approach practised by the early ICRAF researchers. Although there is nothing that prevents a more participatory use of the D&D methodology, most of the early applications remained within the limitations of the consultative mode, since it was usually the researchers who made the final decisions about prototype technologies for the initial round of on-farm trials.

This is not necessarily an inappropriate approach so long as the initial design is intended not as a final solution but rather as the opening statement in an extended dialogue in which farmers can express their own ideas through modifications of the prototype. In the Machakos alley cropping example, the farmers introduced a modification using the contour hedgerows of leguminous trees for fodder rather than for green manure. In this form, the agroforestry system was well appreciated by the farmers. Moreover, the hedgerows retained at least part of their effectiveness as an erosion control measure, and soil fertility was improved in accordance with the farmers own "brown manure strategy by increasing the amount of manure that could be collected from the pen-fed livestock.

It may be argued that this level of mismatch between researchers' and farmers' perceptions is too much, even at the start, and that it could be easily reduced if farmers were allowed to design their own technical solutions in the first place. It can be countered, however, that minimizing the researchers' own design input is not necessarily conducive to the best outcome for the farmers. In the alley cropping example, the local farmers might never have thought of trying the innovation of fodder hedgerows on cropland (which they readily adopted) if researchers had not demonstrated it to them.

### **Best case, worse case**

Thus far, this article has considered consultative research in the "best case" scenario, i.e. where researchers are genuinely interested in and open to a dialogue with farmers about the new technology. In actual practice, however, the prevailing standard of openness may be far lower.

As explained by an experienced on-farm researcher in Zimbabwe, the most significant limitation to the utility of the "consultative" approach may be the individual researcher's attitude to what happens after the initial round of consultations:

"Researchers have a tendency to be arrogant about their abilities and imagine that, after the D&D and list of "agroforestry interventions" have been identified, they have all the answers and all that remains is to test and demonstrate them on-farm and then farmers will adopt them. In fact, the situation is much more complex than can possibly be revealed by the initial diagnostic work, and outsiders really need to spend a year or more living and working in an area to be competent in designing appropriate solutions. As this is simply not possible for most professional researchers, the importance of involving local people in the ongoing research process is once again underlined" (Clarke, 1990).

In the final analysis, it is doubtful whether any amount of improvement in the consultative approach can be a substitute for local participation in the technology research and development process. Even given the best scenario, researchers are unlikely to be able to anticipate every aspect of farmer response to a new technology. Although iterative consultation procedures can be self-corrective, it may be more efficient to avoid problems than to solve them. This can be done by making the whole process more participatory from the start.

## **Participatory on-farm research**

The essence of on-farm research under the participatory paradigm is the willingness of researchers to give up some of their traditional decision-making autonomy in favour of a more interesting dialogue with their farmer colleagues. Over time, participatory variants of ICRAF's D&D procedures evolved both within (Rocheleau, 1984) and outside ICRAF (Buck, 1989). One of the chief features of the new participatory methods was the use of group processes to "socialize" the D&D procedures and devolve more of the decision-making to the local communities.

### **Socializing on-farm research: the importance of group processes**

The simplest way of making a consultative process more participatory is to reverse the usual proportion of researchers and farmers. In consultative research, a multidisciplinary team of three to seven researchers usually interviews a single farmer. This tends to be overwhelming for most farmers, with the result that they hold back. Reversing the imbalance by sending one or two researchers to participate in a meeting of ten to 20 farmers completely changes the dynamics of the interaction. The farmers discuss more among themselves rather than simply responding to the questions of the researchers and the information that emerges bears a far

greater resemblance to what farmers actually think.

### Steps in ICRAF's on-farm research trials in western Kenya

Research activity	Participation		
	Researchers	Farmers	Extensionist
Diagnostic meeting	Ö	Ö	Ö
Design workshop	Ö	Ö	Ö
On-station visits	Ö	Ö	Ö
Household selection	Ö	Ö	Ö
Trial layout	Ö	Ö	Ö
Planting	(Ö)	Ö	Ö
Crop management		Ö	
Tree management	(Ö)	Ö	
Postplanting evaluation	Ö	Ö	Ö
Trial monitoring	Ö	Ö	
Farmer assessments	Ö	Ö	

*Note:* (Ö) indicates that the researchers only gave advice.

Source: Ndufa, Ohlsson and Shepherd (1992).

The participatory D&D variant developed by CARE International (Buck, 1989) creates opportunities for farmers to play a more active decision-making role throughout the process by using such methods as group interviews and community meetings to decide on priority problems and research issues as well as employing pre-existing neighbourhood self-help groups as the basis for research and extension activities.

The use of group processes also allows a more efficient use of limited research resources. Trial designs can be proposed and discussed in group meetings, inputs can also be distributed and data collection activities can be more effectively coordinated. Feedback from farmers, the type of data which is of paramount importance in on-farm research, is also speeded by group discussions. Norman et al. (1988) report that the existence of groups gives greater interest and vitality to field days and stimulates intergroup competition (a positive factor in farmer motivation).

### ICRAF's on-farm research in the 1990s

#### A blend of consultative and participatory research

The recent work of the ICRAF on-farm research team in Maseno, western Kenya, incorporates many of the foregoing innovations while pioneering new ways of structuring the interaction between farmers, researchers and extension workers to achieve a better research outcome. It does not maximize farmer participation, but neither does it minimize the participation of professional researchers.

This approach is rooted in an attempt by ICRAF's agronomist and statistician to come to terms with the statistical difficulties of on-farm agroforestry research, where the large number of interactions and uncontrolled factors in agroforestry systems typically result in a very high

experimental variance (Shepherd and Roger, 1991). The conclusion that emerged from this period of scientific soul-searching was that questions regarding the substance of agroforestry interactions, which require rigidly controlled experimental designs, are likely to be too delicate and agronomically oversimplified to be of much use in on-farm research and would be best left to on-station researchers. The ICRAF team concluded that the real value of on-farm research is in answering questions about "how" and "why" farmers are able to adopt certain kinds of agroforestry practices and not others. These are the questions that most directly affect the design of successful agroforestry technologies and they are also the kind of questions that can only be answered through on-farm research.

### [Meeting with farmers and extensionists in Kenya](#)

The practical outcome of this re-evaluation was a more rigorous foundation for on-farm research based on a well-defined appreciation of farmer assessments as the key output of on-farm agroforestry research. Ultimately, what resulted was a methodology that put farmers at the centre of the on-farm research process without relegating researchers to the sidelines. This methodology also acknowledges the key role that extension workers can play in on-farm research. The Table summarizes the steps involved in applying this methodology in ICRAF's current crop of on-farm research trials in western Kenya.

The present generation of on-farm researchers at ICRAF has taken care to give adequate representation of farmer interests in the design of the trials. The technologies on which research is being conducted are: alley cropping, improved fallows, fodder banks, boundary plantings and farmer-designed trials. The participatory intent and content of the research programme is evident.

Much of the methodology is designed to take advantage of the dynamics of group processes. After the diagnostic work, an initial selection of technology focus groups is made by the researchers. From this point on, all the key decisions are taken by the relevant farmer groups and individuals, including the nomination of a subset of households to participate in on-farm trials. Researchers then make the final selection from among these farmer nominees. Group activities continue in each focus group throughout the trials.

Group meetings, discussions within smaller subgroups and tours of the trials are conducted to obtain feedback on the participatory approach, gather farmers' and extension workers' assessments of trial establishment, explain data collection procedures and elicit farmers' suggestions. Over the course of the trials, a number of measurements and observations are made: farmers who want to keep their own records of labour, other inputs and yields are taught how to keep the records. At the end of each cropping season farmers are asked for their assessment of the new technology. Farmers' assessments, modifications and reasons for their management decisions are the most important types of data to emerge from the trials.

What is noteworthy about this research methodology is the degree of open interaction between researchers, farmers and extension workers. The researchers give the farmers ample opportunity to express their own approach to the new technology without foregoing their own role as active research partners. Moreover, the researchers impart sufficient structure to the on-farm research process to justify external confidence in the validity and wider applicability of its findings. Extension workers interact continuously with both farmers and researchers, thus getting a head start on the eventual extension of successful new technologies while facilitating the process of

technology development.

### [Watering seedlings for agroforestry trials In Kenya](#)

#### Innovator workshops in Bangladesh

One of the key requirements for participatory on-farm research is an ability to identify successful farmer innovations when they occur and to facilitate feedback to the community about what it, collectively, can learn from the experiments. This is important in moving the group learning curve beyond what a single farmer could achieve in isolation. The ICRAF researchers and cooperating extension workers keep an eye out for farmer innovations in the on-farm trials and try to understand how and why farmers modify the experimental technologies.

On-farm researchers in Bangladesh have developed a more structured approach, using farmer workshops as a way of identifying farmer innovators (Abedin and Haque, 1991). At these informal workshops, which are organized in research stations, rural schools and community centres, farmers are invited to come and talk about their innovations. The discussion on these occasions can get quite lively and a surprising number of innovations may come to the surface. The main achievement of these workshops thus far would appear to be having facilitated learning by researchers and extension workers from farmers. Probably a lot more could be done to facilitate and maximize direct learning by farmers from each other, but certainly a promising start has been made.

### Catalytic on-farm research

In the catalytic approach to on-farm research, the role of the outside professional is to facilitate the farmers' own informal research by stimulating group processes and providing access to external information. Catalytic approaches differ widely in the relative emphasis given to the latter function.

One approach, called the "problem census?", emphasizes the role of the external change agent (in this case described as an "extension worker") as purely and simply a facilitator of group processes, with little or no role in providing access to external information (Couch, 1991).

"The extension worker should let the group complete its task without interfering. His or her major concern is with group processes, not with content. 'Group processes' refers to how the group is communicating: who talks with whom; how much each member is contributing; which members, if any, are being ignored; who is emerging as a leader; whether key information is being suppressed; and so on.... It is absolutely essential to keep clear of group activities and let members get on with their job" (Couch, 1991).

A less extreme view has been expressed by Raintree and Hoskins (FAO, 1988) who described a catalytic role model combining elements of classical extension with participatory research - the "Extension R&D" (ER&D) agent:

"As a change agent, the role of the ER&D agent would be to catalyse the local development, adaptation and/or adoption of appropriate technologies. This would be done by coordinating community access to potentially useful information within the international network and by

stimulating the creative processes within the community by which useful exogenous information is combined with indigenous technical knowledge and extended into new adaptive domains.... As a member (and often the organizer) of a community-based R&D team, the ER&D change agent would function not as the messenger of a distant bureaucracy, but as an internal catalyst in a system of cross-fertilizing information flows. What is extended is not just a particular technical package, but a self-reliant, participatory approach to problem solving in general."

Thus, it is possible for the catalytic agent to embrace the role of communications facilitator described by Couch without accepting the constraints on his own participation. The critical test is still: "Whose thought processes is one trying to facilitate?"; and the answer, in both cases, is "the farmer's".

Save the Children's Fund's "Agro- and Community Forestry Project" in Nakorn Sawan, Thailand, is another good example of this kind of "catalytic activism".

Without limiting their information inputs, the primary intent of the change agents in the project is to facilitate the local community's own R&D activities, using a number of innovative group processes based on working with existing local organizations; farmer-to-farm extension using networks of farmer-demonstrators; and flexible support to the work of farmer innovators and opinion leaders through modest inputs of materials, information and problem-solving assistance.

The difference between this kind of catalytic action-research and the participatory on-farm research of ICRAF is that, although the catalytic agents need not hold back on their own intellectual involvement in the R&D process, the success of the research does not depend on what they understand. Andrew Middleman (personal communication) relates the story of an outstanding farmer-innovator in the Nakorn Sawan project. Not only has he developed his farm into a locally admired experiment in sustainable agroforestry, he has also developed a complete theory of his farm as a "living system", drawing freely on modern ecological concepts and ancient Sanskrit humoral theory to articulate his new understanding. None of the project staff can really claim to understand this farmer's thinking but that does not detract from their role in having catalyzed his experimental activities.

## Conclusion

Research must be appropriate to the questions it is expected to answer. A combination of several different research approaches may be required to answer all the questions that need to be addressed when promoting sustainable forestry and agroforestry development. Therefore, none of the four styles of research reviewed here has a monopoly on "political correctness".

Nevertheless, in today's climate of increased accountability, an agroforestry research programme that does not include participatory research somewhere in the total mix of its activities will generally be at a disadvantage. A good programme will try to achieve a balance of research styles, with an open and active information exchange and feedback between professional researchers, extension workers and farmers.

Recognition of the value of indigenous knowledge and dedication to participatory principles must not prevent us from facing the fact that many rural communities are in serious trouble as a result of unsustainable land-use practices. Although new land-use systems must be based on and



integrated with local expertise and traditional land-use practices, without the infusion of new ideas and plant materials, many local communities will be doomed. The archaeological record is littered with extinct cultures which failed to meet the adaptive challenges of changing environments. To minimize the environmental hazards faced by rural communities in the name of sensitivity to local traditions is a cruel and misguided form of respect.

If tree-planting projects are to have any justification, they must be prepared to play an activist role. They must be active not only in facilitating the application and further development of local expertise, but also in providing relevant new models with which the local people can experiment. Although local people are, ultimately, the best judges of what will work in their situation, it is unreasonable to expect them to render their best judgement until they have had a chance to give an innovation a fair and adequate trial.

The most realistic and genuinely helpful stance in the long term is recognition of the fact that local people and outside experts each have unique areas of expertise which, together, provide a better foundation for research and development than either in isolation.

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