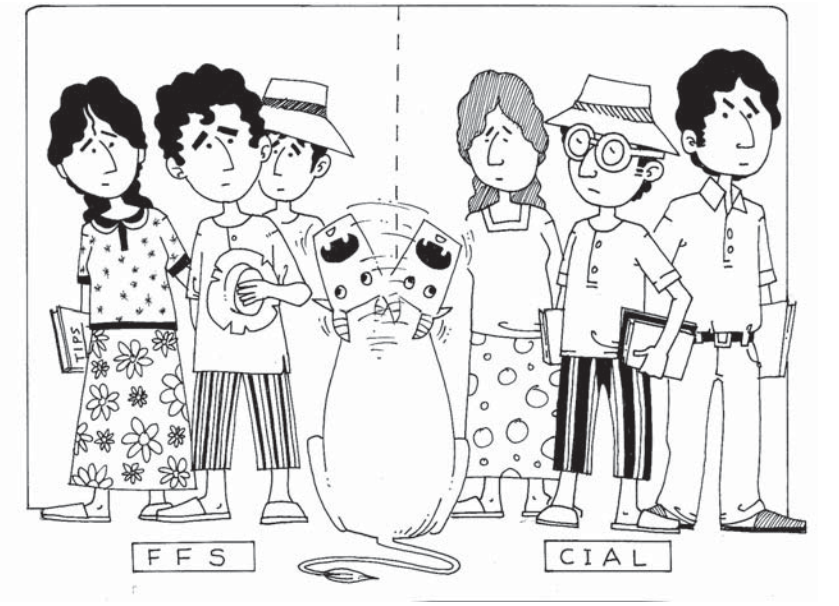
Farmer Field Schools and Local Agricultural Research Committees as Complementary Platforms: New Challenges and Opportunities



Farmer field schools (FFS) and local agricultural research committees (CIALs) are platforms supporting integrated decision-making and innovation for sustainable agriculture. They share several basic principles and processes but their main objectives differ. The first is oriented towards providing agroecological education through participatory learning, whereas the second is a permanent local research service that links farmer experimentation with formal research.

This paper compares their objectives, principles and processes as a basis for exploring their application and looks at the new challenges and opportunities.

Farmer Field Schools

FFS were initially developed by the Food and Agriculture Organization (FAO) to address problems of pesticide dependency and to develop location-specific management expertise that did not depend on the formal research system. Initial "classical" FFS for integrated pest management (IPM) of rice have been adapted for other crops and topics.

Developing agroecosystem management expertise means building understanding of ecological principles and processes and the impact of farmer management decisions. FFS provide an opportunity for learning-by-doing based on principles of non-formal education. Extension workers or trained farmers facilitate the learning process, stimulating farmers to discover key agroecological concepts and develop management skills through self-discovery activities practiced in the field.

FFS are designed for 20-25 participants from one community, a critical mass around which collective action and follow-up activities can be consolidated after the school ends. FFS hold regular meetings throughout the crop cycle. Improved decision making emerges from an iterative process of agroecosystem analysis (AEA), making and implementing decisions accordingly, observing outcomes and evaluating overall impact.

To discover key agroecological principles, each FFS plants a field where local crop management practices are compared with those based on the participants' AEA. Small groups of 4-5 persons make detailed observations of crop, soil, water, pests and beneficial organisms, and represent these in drawings depicting the development stage of the plants. Each group presents its analysis and proposed actions in a plenary session, followed by questions and discussion. Finally, participants reach a consensus on management practices to be carried out during the week. Drawings from previous sessions are available as reference material to enrich the discussion. Yields and profitability are compared at harvest.

FFS also include "special topics" designed to help farmers uncover unknown ecological relationships. Once internalized, these concepts help farmers make better management decisions. AEA and special topics also develop farmer research capacity by stimulating comparison of the outcomes of different management decisions and by providing regular opportunities for data gathering and analysis.

Each FFS meeting includes a group dynamics exercise to strengthen teamwork and problem-solving skills, promote creativity and create awareness of the importance and role of collective action. The facilitator suggests a problem or a challenge for the group to solve.

A good facilitator is vital: catalyzing, encouraging analysis, setting standards, posing questions and concerns, paying attention to group dynamics, serving as mediator and encouraging participants to come to their own conclusions. A facilitator who raises new questions rather than offers answers is more likely to flourish in an FFS environment. For example, if someone asks, "What's this insect? Is it a pest?" a good facilitator would answer with a question like: "What can we do to find out?"

Facilitators complete a session-long training program to get hands-on experience of managing the crop, while developing facilitation, leadership and administrative skills. Each facilitator is expected to guide at least three FFS per year. Increasingly, farmers are becoming facilitators. Farmers are often effective than professional facilitators because other farmers appreciate learning from peers with similar experience who speak their own language.

A FFS ends at harvest, but follow-up activities support the learning process and collective action. In some areas, Action Research Facilities (ARFs) are developed. Like field schools, ARFs are ephemeral, but generally operate over several crop cycles. They are designed to increase farmers' understanding of basic ecological principles within the larger agroecosystem, investigate serious problems and develop community-level action plans. Studies are conceived and carried out by FFS alumni with support from a scientist-facilitator. Farmers list ideas, both exogenous and endogenous, on how to manage the targeted problem, and study each option systematically. After the facilitator leaves, farmers are expected to continue studying to broaden their understanding of the ecological basis of agriculture and to maintain a community IPM program.

Where gaps in ecological understanding present barriers to developing effective field schools, more permanent ties have been established between formal research services and communities participating in FFS. One example involves World Education (WE), an international non-government organization (NGO) that developed FFS for vegetables. WE sought the support of universities and agricultural research centers, proposing the formation of an "integrated college" between researchers and farmers trained in the FFS approach or investigating on their own. Formal and local researchers worked together to understand and research production problems.

Local Agricultural Research Committees (CIAL)

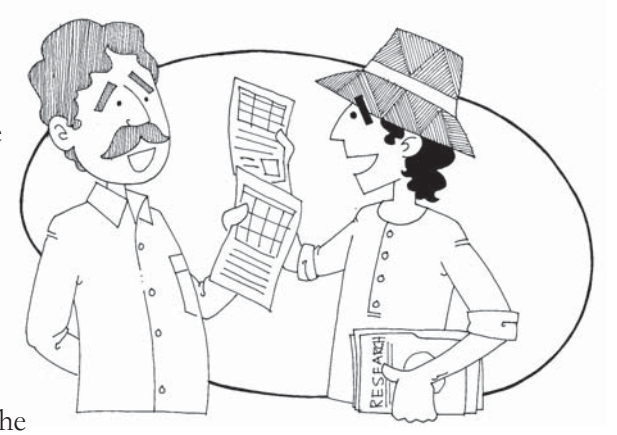
The CIAL, originally developed by Centro Internacional de Agricultura Tropical (CIAT), is a research service belonging to and managed by a rural community. The research team is made up of volunteer farmers, chosen by their communities because of their aptitude for experimentation. The CIAL links farmer-researchers with formal research systems, increasing local capacity to exert demand on the formal system and to access potentially useful skills, information and research products.

Each CIAL has four elected members and a facilitator and may have additional volunteers. The facilitator may be a trained agronomist from a supportive formal research center or university, an extension service or an NGO. Alternatively, he or she may be a trained farmer who has served on a CIAL. The facilitator plays a key role in developing the CIAL's competence in the research process, and provides feedback on farmers' priorities and research results to formal research and extension services.

Training, through regular visits by the facilitator, continues until the CIAL is able to manage the entire process independently. It equips the team of farmer-researchers to conduct experiments that compare alternatives with a control treatment, and that employ replication in time and space. Training familiarizes farmer-researchers with terminology that gives results credibility with formal researchers. It also builds skills in planning, management, running of meetings, monitoring and evaluation, record keeping and basic accounting.

Facilitation of a CIAL requires profound changes in attitudes and relationships among farmers, rural communities and agricultural professionals. Training of facilitators includes a sensitization process and learning to ask open questions that permit true two-way communication. After a two-week course, facilitators continue in-service training where they form a CIAL, supported by an experienced trainer who visits at key moments and provides feedback on strengths and weaknesses.

The Steps



The facilitator begins by inviting the community to a meeting where the purpose of a CIAL is discussed. Farmers are invited to analyze what it means to experiment with agricultural technology. Local experiences and experimental results are discussed. The possibility of accessing new technologies from outside the community is also mentioned. If the community decides to form a CIAL, it elects the committee.

A CIAL fund, owned by the community, helps absorb research risks. The seed money is usually a one-off donation, but may originate from a rotating fund managed by an association of CIALs. The committee uses the fund to procure inputs for experiments and to compensate members for losses. When an innovation proves successful, the CIAL may add to the fund by selling the harvest or the products of research (e.g., seed). As the fund grows, the CIAL can expand its research, share earnings with participants, invest in new equipment or services, or launch a small enterprise.

A key criterion for elected members is that they are experimenting on their own and are able and willing to serve the community. Elected members agree to take part in a regular capacity-building process over at least one year. They each have a specific role as leader, treasurer, secretary or communicator, and are often assisted by several additional volunteers.

The research topic is determined through a group diagnosis in an open meeting. The opening question is: "What do we want to investigate?" The community prioritizes topics based on the likelihood of success, who benefits, and the estimated cost of the research.

The CIAL experiments generate information on technology options of local or external origin. Offering technology while it is under development and making adjustments based on the feedback obtained form the CIAL is a powerful mechanism for research organizations to respond to farmer priorities.

The facilitator helps the committee obtain the information required to plan its experiments. Other farmers and staff of formal research and extension services are often consulted. The facilitator also helps the CIAL formulate a clear objective for each experiment. Based on the objective, the CIAL decides what to compare, how and when to evaluate, experimental variables, criteria for evaluating results, data needs, and measurement units.

After completing an experiment, the CIAL draws conclusions and presents results to the community. The analysis includes the question: "What have we learned?" Analysis of the process is especially important when an innovation is not successful, or when unexpected results are obtained.

Successive Experiments

The facilitator guides the CIAL through three successive experiments. In the first, "exploratory" trial, the CIAL tests innovations on small plots. These may have several treatments, such as different crop varieties, fertilizer amounts or types, sowing dates or densities. The exploratory trial is a mechanism for eliminating options that are unlikely to succeed under local conditions. The most promising treatments are tested on larger plots in a second experiment. Finally, two or three top-performing choices are planted over a still larger area in the third experiment, often called the production plot. Afterwards, the CIAL may continue with commercial production, or define a new research topic.

Beginning on a small-scale is fundamental. Small plots provide experience of applying new concepts, such as replication and control, and allow the CIAL to gain confidence before moving to larger and riskier scales.

As the CIAL becomes proficient, the facilitator reduces the frequency of visits, from two visits per month initially to one every three or four months. Facilitators visit mature CIALs for feedback on research priorities and results, and to provide access to technology under development by formal research services.

A decade ago, most CIALs were experimenting with crop varieties. More recently new research areas have emerged including small livestock, and pest, disease, soil, water and nutrient management. Case studies suggest that committees studying complex agroecosystem health topics face new challenges, including:

- conceptualizing research questions and designing management options with limited agroecosystem knowledge
- scaling up for collective action issues when designing research on agroecosystem health
- integrating different technological alternatives within overall farm management

The farmers and their communities gain a lot of momentum from the research process, which goes beyond learning how to resolve a production problem to generate income from the innovation. In Colombia and Brazil, many CIALs have formed small companies that produced improved seed (of varieties that they selected), which they sell in neighboring communities. This promotes uptake of the technology, at reasonable prices for their neighbors and can be the seed for building social and financial capital at the community level, which makes CIALs more sustainable.

FFS and CIALs Compared

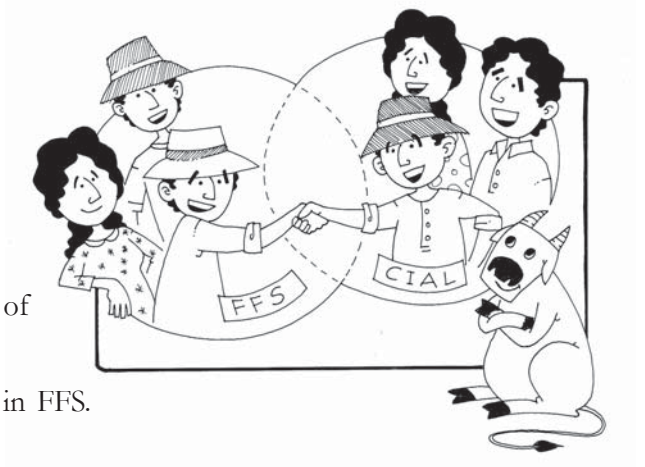
FFS and CIALs share underlying principles. Both consider farmers as experts, stress respect for local values and knowledge and build capacity based on hands-on experience. Both recognize and attempt to reduce the risk associated with learning and research, and perceive outputs as public goods.

CIALs and FFS are organized differently but share several processes. Facilitation styles and the role of motivation are similar. CIALs form second-order associations for increasing the dissemination of research results. Similarly, FFS follow-up activities spread knowledge horizontally through fora and networking.

Both aim to strengthen farmer experimentation and innovation, but in different ways. CIAL experiments are relatively formal; most are controlled comparisons involving a range of technological options. This increases local capacity for research and develops a common vocabulary that makes it easier for farmers to exert pressure on formal research and extension systems. In keeping with the emphasis on the systematic evaluation of technological options, the CIALs are made up of a small group of specialized farmer-researchers, chosen for their reputation as experimenters, and trained to further develop their research skills. In addition, CIALs stimulate local experimentation by raising its visibility and status.

Evaluation methods have been adapted to local levels of literacy by using symbols and simple classification and tabulation procedures. Farmers establish their own evaluation criteria, without influence from professional researchers. Because of this emphasis on respecting farmers' criteria, CIAL members prioritize, design and evaluate experiments based on their current knowledge.

The FFS approach emphasizes experimentation aimed at understanding agroecosystem patterns, interrelationships and structure, as the basis for problem-solving and decision-making, thus observation, evaluation of and identification of interactions among different elements in the system are fundamental to experimentation in FFS.



FFS farmers use drawings and other visual methods to represent what they see as a means of understanding key self-regulating feedback mechanisms. The FFS approach assumes farmer innovation is limited by the lack of this knowledge and by erroneous information - produced by poorly focused extension programs or agro-chemical distributors. The central focus of the FFS is on activities that allow farmers themselves to make discoveries. The responsibility of formal research is envisioned as the development of general theories of the structure and dynamics of specific agroecosystems that underpin effective FFS curricula.

The FFS do not focus on identifying a solution within a range of technological options as the CIALs do. They develop the capacity to manage ecological interrelationships better in the community. Consequently, the FFS are not directed towards a specialized group of farmer-researchers, but towards a relatively large and heterogeneous group within the community to sustain a learning process.

The FFS have been effective in addressing problems in agroecological systems that are well understood (e.g., irrigated rice in Asia). Where understanding of system components and interrelationships is less developed (e.g., in the case of non-crops which lack systemic self-regulation mechanisms), local capacity to evaluate different management options (technologies) is important, and controlled experimentation is required. The demand for technological options implies the need for a strong link with formal research, a comparative advantage of the CIALs.

The second generation of FFS in farming systems that include vegetables and crops rotated with rice, and the ARFs, have incorporated controlled experimentation and the evaluation of technological options, and have established ties with formal research.

CIALs may face knowledge gaps that limit experimentation. For example, a community in Bolivia prioritized an important potato pest, but farmers did not know that the larvae are a stage in the life cycle of a weevil. Thus, they were unable to plan and evaluate different control options. Aware of this difficulty, the facilitator helps farmers discover the insect's life cycle. Although facilitators may offer training when research proposals are limited by knowledge gaps, whether this occurs depends on their skills, knowledge and motivation. Guiding discovery-based learning is not an explicit part of CIAL facilitator training.

Complementarity and Synergy

The trend towards geographical and evolutionary converges has raised the question as to whether FFS and CIAL differ sufficiently to justify the application of both within the same area. We argue that they are complementary and synergistic.

FFS center on agroecological education; the CIAL on establishing a community-based research service linked to the formal research system. FFS are limited in time to one or two cropping seasons; CIALs are established as relatively permanent community-based organizations. Experimentation in FFS is geared towards discovering how the agroecosystem functions and how this is influenced by farmer's management decisions. CIALs concentrate on experimentation through controlled comparisons. FFS build agroecological knowledge to make CIAL research more meaningful. CIALs can generate locally-adapted technological options to strengthen the FFS. Both can be established in the same area or even the same community, although sequence of establishment and linkages needs to be carefully thought through (see Braun *et al.*, 2000b). Development organizations themselves have increasingly come to see FFS and CIALs as complementary (Almanza *et al.,* 2003).

New Challenges and Opportunities

Recently, new challenges and opportunities have emerged for farmer innovation. We look at three of these and identify the ways in which CIALs and ECAs have begun to respond.

Linking with Markets

The rise of globally-linked markets, increasing urbanization and falling product prices mean that farmers increasingly ask for help in entering new markets and adding value to local production. In order to respond to these demands, CIALs are beginning to make links with other actors in market chains. This is especially important in the case of varietal selection, which is still the dominant research theme of most CIALs. In this case, linking with other actors can help them to include end-user preferences in the selection criteria they apply. Some CIALs have gone further and established local businesses to supply these actors with varieties that they have selected that meet their criteria. Because research generates an income for CIAL members, it should enhance the sustainability of the CIAL. At the same time, because it generates private benefits for members, it may also challenge the CIAL's role as generating technology for all the community (public goods).

FFS have also been adapted to this new market context (Rueda *et al.,* 2003). FFS originally were planned around one cropping cycle, they are now being modified to cover one marketing cycle from planning through sale. Farmers are being trained in marketing issues and discovery-based approaches that can be applied by participatory assessments (*sondeos*) of local markets. Many market opportunities demand that products are constantly available throughout the year. This is often beyond the capability of a single community and requires coordination across several communities in implementing FFS and between CIALs. This kind of coordination can play a major role in territorial approaches to rural business development (Lundy *et al.,* 2002) and can also build on the participatory approach for innovation in market chains (Bernet *et al.,* 2004).

Municipalities

In several countries in Latin America, decentralization has led to an enhanced role for municipal governments with a concomitant transfer of responsibilities for service provision and a much greater role for local populations in solving their own problems. Some municipal governments have created units or departments responsible for agricultural development. CIAL groups, perhaps organized through a second level organization, can provide means for farmers to express genuine demands to municipalities, to assess the relevance of municipal agricultural development in a range of ways. FFS, because they build knowledge and empower farmers, can also form a part of municipal activities (Esprella and Aguilera, 2003; Cerna and Porras, 2003).

Local Funding

Both FFS and CIALs have been criticized because they rarely go beyond pilot experiences. Scaling-up of both will depend upon their ability to generate local funding and appropriation by local government and organizations at different levels.

In Bolivia, following the Popular Participation Law, municipalities have substantially increased budgets. They are beginning to demand actions, which support productive activities, but not with the conventional, "top down" approach. Pilot work by the Foundation for Research and Promotion of Andean Products (PROINPA) where the FFS and CIAL platforms were adapted at the community level, provided an example for the municipalities to see and understand the strengths of both, and so request them. As a result, several municipalities in different regions of Bolivia have planned, invested in, and evaluated the implementation of both platforms.

Funding of FFS and CIAL depends not only on outside agencies but also on the community itself. Farmers invest time and capital which may exceed the investment of outsiders. Okoth *et al.* (2003), writing of Kenya, describe a "revolving educational fund" used for funding FFS and maintained from the profits of commercial fields, which FFS participants manage close to their study fields. This example shows that innovations can be made in the FFS methodology to make it locally-funded. CIAT's IPRA project is carrying out research to bring together the experiences with self funding of different organizations working with CIALs. This showed that in Bolivia, CIAL members used a range of mechanisms to help fund research activities, including raffles, commercial fields (similar to the Kenya experience with FFS), sale of agricultural inputs in the community at lower prices and football competitions to support CIAL activities. Investments made by CIAL members included loan of land for research, family labor on trials and donations of seed.

In Honduras, each chapter of the federation of CIALs, is supporting mini-development projects through small loans of the CIALs. These include chicken improvement programs for the women's CIALs, and artisanal seed production for the launching of micro-enterprises. The money is repaid with interest at the end of the project period. Such opportunities for collective action through the CIALs serve as powerful cohesive agents, permitting longer-term research to be undertaken and ensuring economic sustainability of the CIALs as local research organizations (Humphries *et al.*, 2000).

In Armenia LERGs (Local Extension and Research Group, the English translation of the Armenian name for CIALs) are establishing sales points in the local markets where they generate funds from the sale of produce offered in LERG-packaging. These funds will be used to purchase seed of the best vegetable varieties identified via LERG research for provision to the community and other interested farmers (Gyulkhasyan, 2002).

It is important to emphasize the role of institutions (understood as the rules of the game which govern interactions between actors) in facilitating the aforementioned processes and facilitating scaling up. The Popular Participation Law in Bolivia was critical in facilitating funding by municipalities. Additionally, development organizations, building on their field experience, have played an important role in creatively supporting community-based organizations in developing local funding opportunities and in the appropriation of these participatory platforms.

Next Steps

In many countries, the value and relevance of agricultural research and development (R&D) are being questioned. FFS and CIAL promote closer engagement with rural society, building local institutional structures and processes for agricultural development. They make R&D more relevant by putting farmers at the center of development processes and open the possibility of a more fundamental transformation of agricultural R&D systems. Growing interest among a wide range of financing and implementing organizations in both platforms reflects an underlying perception that they are viable new alternatives. FFS and CIALs fit the new emphasis on linking farmers with markets that pervade much recent development thinking, they have attracted the interest of local governments, which are increasingly important development actors. Further, there are opportunities for scaling-up by moving to self-funding mechanisms. Under these circumstances, there is good potential for applying these platforms even more widely. As this occurs, both will evolve further, and their future development should be managed to draw on their underlying synergy.

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