

Growing Social Research in CIAT, 1968-2002

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Abstract

During CIAT's 34 years, anthropology, sociology, geography and community development have swung from marginal activities to a key part of CIAT's vision for sustainable rural livelihoods. This paper attempts to describe and explain the changes over time, and to draw lessons from the ways that social research has been organized, its integration with biophysical research, and its impact on the poor. This study is based on an analysis of CIAT reports and research documents, and a convergent interview process with past and present staff of CIAT.

While the social and equity dimensions of CIAT's role were fully recognized in the earliest documents from 1968, CIAT had no social scientist until 1974 when there was a first, unsuccessful experiment at operating a program focussed on social sciences.

Social sciences were first effectively integrated with biophysical sciences in multidisciplinary commodity teams. Bolstered by Rockefeller Foundation appointments, the number of anthropologists, sociologists and geographers climbed through the 1980s. The initial mandate was to "sell" technologies, but social analyses of farmers' knowledge, constraints and practices, conducted in closely-working teams, were soon guiding germplasm research in beans, and post-harvest processing and marketing in cassava. Farmer-participatory approaches were developed in this context, initially to feed back farmers' preferences and evaluations to commodity-based research, but also allowing more effective understanding of poorer farmers.

In the latter part of the 1980s, social action research "experiments" aimed to generate social "technologies": forms of farmer organization that might empower farmers to better make demands on research organizations, and to work collaboratively. This action-focussed work developed some of the practical tools needed to address the structural equity challenges of agricultural development, and demanded fieldwork skills found outside of traditional disciplinary social sciences.

As the role of natural resource management (NRM) became formalized in CIAT in 1992, social research emerged on farmer decision-making and organization around individual and collective issues. Social sciences became concentrated in projects for NRM. In these specialized units, specialized social "technologies" were developed around producer organizations for agro-enterprises, locally-led research and innovation, self-organizing systems for higher-order organization of farmer-groups, and organizational structures for using decision-support tools for NRM. These social "High-Yielding Varieties", can give spectacular impact in the right conditions, but like HYVs were sometimes not as robust as existing local solutions where the right conditions and inputs (such as social capital and skills) were not available.

The implications of different forms of organization and management of social sciences are discussed. Social scientists report that they face a trade-off between following a career in their discipline, and following a career in the CGIAR. A message from the majority of participating CIAT social scientists is that successful integration of social and biophysical sciences depends more on successful integration of people than of disciplines: the formal organization may be less important than how well the team members get along.

CIAT's new direction lies in sustainable rural livelihoods, built on multi-disciplinary research on the foundations of competitive agriculture, agroecosystem health, and rural innovation.

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Introduction

The International Center for Tropical Agriculture (CIAT, its Spanish acronym) is based in Cali, Colombia, and is one of sixteen international agricultural research centers of the Consultative Group for International Agricultural Research (CGIAR). In this paper, we outline the history of social science research in CIAT and try to explain the growth of social science from zero to forming a key part of CIAT's organization and vision. Founded in 1968, CIAT is seen here as a 34-year case study into the effectiveness of different approaches to integrating social and biophysical sciences for development.

CIAT, like other CGIAR centers, is also itself a community, albeit one with peculiar dynamics due to the large proportion of "displaced" (expatriate) members. Interviews with CIAT staff as part of this study showed that these social and interpersonal aspects of life in CIAT form an important part of understanding the activities of the organization.

Social sciences are defined here as the academic and practical activities that are traditionally associated with the fields of anthropology, geography, sociology, and community development, irrespective of the formal training of the person carrying out these activities. In order to make this study consistent with simultaneous studies at the other CG centers, economics is not included as a social science.

This paper has five sections. First we outline the methodology used to compile this study. Then we give an overview of the history of CIAT before outlining several models in the evolution and use of social sciences in CIAT. Finally, we draw out themes and lessons from the application of social sciences in CIAT.

Methods

Data for this study were collected in three ways:

1. a convergent interview process (Dick, 1998) with 12 current and former CIAT social and natural scientists, and directors general. Together, these people represent over 124 person-years of experience of working at CIAT.
2. through key literature relating to CIAT, particularly the annual reports, and selected research publications
3. circulation of the arguments on which this study rests with all social scientists currently in CIAT, and former directors general, and a review of an earlier draft of this manuscript

Interviews were semi-structured, allowing the participants to raise what they saw as the key issues during their time at CIAT, their interpretation of the causes, and their best wisdoms of what should be done. The explanations that were given by participants generated a list of issues and theories, which were discussed with subsequent respondents. With each interview, some of the emergent theories gained more support, while others were refined, replaced or discarded. Biases are inevitable in this process. As CIAT employees, and colleagues of the participants in the study, there are limits on what we can say.

When participants were asked for the reasons underlying events and activities in which they had participated, frequently the replies included not only descriptions of people in terms of their roles, but in terms of their personalities, friendships, and alliances. As in any community (Argyris, 1999), part of the reasons behind activities were portrayed as belonging to this realm. None of these views is related here, but together they reinforce the conclusion that such issues are important in order to understand what has happened.

The interviews and literature do not give a single, united story of social sciences in CIAT. Different projects, different commodity programs, and different outposted sites have created a mosaic of co-existing approaches to integrating social sciences. In addition, each person brings their own perspectives and interpretations to the events. The interpretations in this paper are largely those given by the actors themselves in the story, to try to harvest the best wisdoms from the last 30 years. Where possible, we have tried to present the diversity of their viewpoints.

The CIAT annual reports have been used to show changes over time in staff, projects and organization, key changes in direction, and one interpretation of events and trends affecting the center. Total numbers of staff are reported, but records from the annual reports will over-estimate the number of staff where there is turnover, as both incoming and outgoing staff are recorded in the same year.

A brief history of CIAT

CIAT was founded in 1968 as an agricultural research institute for the neo-tropical lowlands, to take a systems approach to agricultural development. Its initial spread of 7 target systems, which included swine production systems and maize production systems, was felt to be too broad, and the structure was focussed in 1976 around four commodity programs: rice, beans, cassava, and forages. This commodity-based structure remained largely unchanged for 16 years, during which time social sciences gained a firm niche in the organization. From 1992, three new ecoregional programs and a fourth on land use were added, and CIAT divided into two streams: germplasm research and natural resources management (NRM) research. Most of the social scientists went to the NRM division, which started with 42% of its budget dedicated to socioeconomic studies. A CIAT-wide budget decline from 1989-1996 caused large changes in staff and organization, and in 1996 CIAT closed its programs, adopting project-based management of its research, with 16 projects, including the former programs. CIAT is currently (2002-2003) reorienting around a focus on sustainable rural livelihoods, based on the foundations of competitive agriculture, agroecosystem health, and collective rural innovation.

Figure 1 outlines the changes over time in the number of social scientists in CIAT, the number of staff in CIAT, and the organization of research at headquarters. The figure is discussed in later sections of this paper.

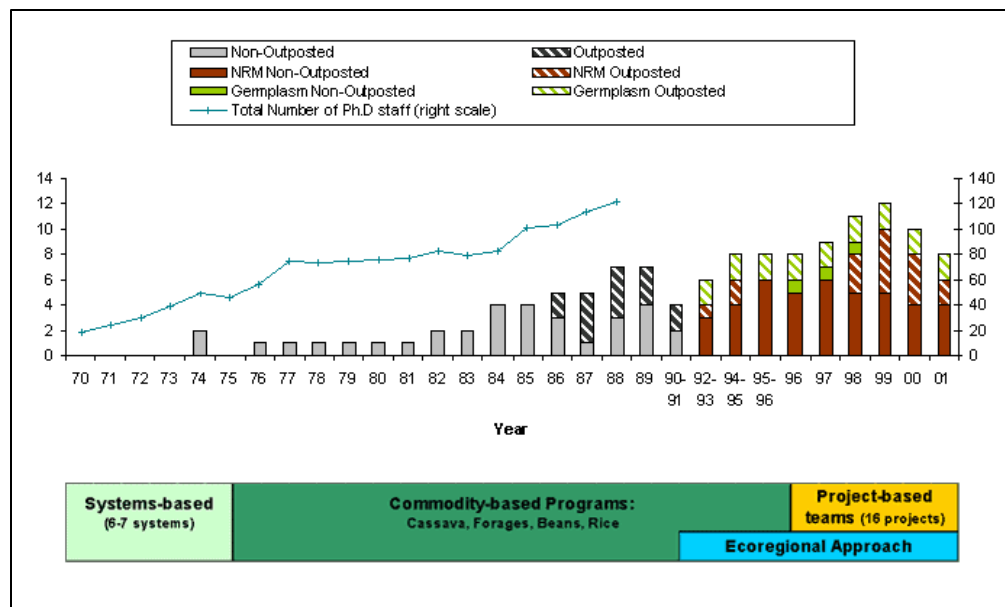


Figure 1. Number of research staff in CIAT with a Master's degree or above in anthropology, sociology or geography, and number of staff with a Ph.D in any discipline, 1970-2001. "Outposted" is defined here as outposted in a tropical field research site; hence "Non-Outposted" staff may not be at CIAT headquarters. Source: CIAT Annual Reports, 1970-2001. From 1992, CIAT divided into the NRM division and the Germplasm division

Results and analysis

CIAT before social scientists

From the earliest days, CIAT's mission has recognized social dimensions. For example, the 1968 "Program and Budget Document" which outlined the rationale for CIAT states:

"[CIAT is] a research and training institution specifically designed to engage decisively – in both the technological and social dimensions – with the closely related problems of economic development, food production, and adequate diets... In the developing nations, particularly, these new approaches must involve and influence every segment of society – the policy makers in government, within industry and business, in the market place, in the laboratory and experimental plot, in the community, and on the farm."

At first, these social dimensions were felt to fall outside of the mandate of the institution; they were a job for CIAT's partners. The institution had been born out of a focus on breeding and Green Revolution strategies, with an implicit focus on larger-scale producers and a trickle-down model of development. For example, the 1976 "CIAT Report" gives CIAT's mission objectives as:

"To generate and deliver, in collaboration with national institutions, improved technology which will contribute to increased production, productivity and quality of

specific basic food commodities in the tropics... thereby enabling producers and consumers, especially those with limited resources, to increase their purchasing power and improve their nutrition." [List of countries omitted]

It was not until 1974 that donors pushed the first social scientists onto a generally reluctant CIAT; until this time the social dimensions of CIAT's mission had been handled purely by economists.

Models of integrating Social Sciences and Biophysical Sciences

CIAT has integrated social sciences with biophysical sciences in three broad ways:

1. Social sciences had been concentrated in separate programs or projects that specialize in social issues (small farm systems program 1973-1975, the Participatory Research program from 1987 onwards, the Inter-center Participatory Research and Gender Analysis program from 1996 onwards, and the planned Rural Innovation Institute from 2003).
2. Social sciences had been integrated into commodity-based programs through multidisciplinary teams (cassava program from 1984, bean program from 1986).
3. Social sciences had been integrated in ecoregional NRM projects from 1992 (particularly the hillsides and forest margins ecoregions, and the Land Management project).

Social sciences started in CIAT in a separate program. Following pressure from the Ford Foundation, in 1973 the "Small Farm Systems Program" was started in CIAT with the goal of understanding small farming systems "in order that the impact of new technology on farm family welfare be understood" (CIAT Annual Report, 1973:217). This was the first experiment in integrating social sciences into CIAT, and while it produced work that would be difficult to distinguish from contemporary PRA (Participatory Rural Appraisal), it was disbanded after 2 years. Its brief history is outlined below.

The Small Farm Systems Program brought the first social scientists to CIAT and housed them in a multi-disciplinary team that included a visiting PhD anthropologist, an MS rural sociologist, a PhD economist, a PhD agronomist, a systems engineer and a programmer. At the time, there was distrust between the social and biological sciences. "Green revolution varieties were going to save the world", said a member of the Program, but social scientists were felt to be leading a campaign to highlight the lack of impact of green revolution varieties on the poorest: "Social scientists were seen in the institute as trouble makers, likely to go off station and generate criticism of station research". The then director general described the atmosphere between social and biological sciences as "conflictual".

The Small Farm Systems Program aimed to provide guidelines for identifying factors limiting production, for selecting research alternatives, assessing probable adoption, impact on food availability and income, and to suggest novel approaches. It aimed to have two principal clients: CIAT commodity teams and national agricultural development agencies. "The ultimate clients are, of course, farm families and the consumers of Latin America that benefit from the implementation of the process by national agencies." (CIAT Annual Report, 1973:220). Farmers' goals were given a central focus:

"An intrinsic feature of the systems approach is that it requires that the farmer's objectives be made explicit. For the farm family these objectives probably include income, nutrition, cash flow, security, health and education. There is no clear nor explicit understanding of these objectives as yet." (CIAT Annual Report, 1973:219)

The program used PRA-type approaches to rank farmers' and national researchers' perceptions of key production constraints at five sites across South America. They found strong differences in ranking between the perceptions of farmers and those of national researchers, and a broad diversity in farmers' goals at different sites. An agronomic and economic model was built from farm interview data in La Maquina, a 1954 settlement in Guatemala. The results were challenging to commodity research programs. They suggested that farmers' existing practices were close to optimal, with little additional benefit to be gained from the use of available technologies such as herbicides, improved seeds, credit, or more land. Additionally, the model suggested that government requirements for fertilizer use in order to obtain farm credit had created a "forced adoption" of fertilizers above optimal levels. A parallel study at Cacoatal, an established village on Colombia's north coast investigated the impact of adoption of improved rice varieties, finding both positive and negative effects.

In 1975, the new director general disbanded the project and team. Several reasons were cited. One team member reported that teamwork was poor in the program, with staff retreating to their professional disciplines, and not effectively integrating approaches. The project was said to have lacked focus on its goals and clients, with different team members pushing in different directions. Moreover, the director general saw flaws in the very model of having a separate program focussed on social sciences, independent of the powerful and relatively autonomous commodity programs. Given the conflictual environment between social scientists and breeders, the director general felt that there would be more integration by locating the social scientists within these commodity programs. The team was disbanded, and its members dispersed among the six commodity-based programs of the time.

In 1976, reorganization reduced the number of commodity programs to four: cassava, beans, beef (with forages), and rice. These programs were relatively autonomous, creating in effect four separate CIATs, each with their own approaches dictated by the nature of their crop. Each program would eventually develop its own way of integrating social sciences. CIAT was still expanding its staff rapidly, but not its complement of social scientists. Between 1975 and 1979, the number of senior staff, visiting scientists and postdoctoral fellows jumped from 34 to 72, but with no additional social scientist. In 1980, the first long-term social scientist, a rural sociologist, arrived at CIAT, but she was located in a separate "special project", outside of the mainstream commodity programs.

It was the Rockefeller program that introduced social science into the heart of CIAT - the commodity programs. Between 1984 and 1986, the first three anthropologists joined CIAT's commodity programs in beans and cassava, two of them Rockefeller Foundation appointees. By 1990, half of CIAT's social scientists would be Rockefeller-assigned. They arrived in a very different CIAT to that of today. "It felt strange not being a breeder in CIAT" said a contemporary. At least two did not call themselves anthropologists at first; instead choosing titles such as "cropping systems specialist" that were easier for biophysical scientists to identify with.

The institutional role of these early social scientists was "social science *in development*" (DeWalt, 1988): using social science to help define the target of technologies, and to help "sell" technologies effectively to farmers. In the early 1980s, social scientists were mainly involved in surveys, interviewing farmers to get their perceptions of technologies. But this institutionally-defined role formed only a small part of what they actually did, and it was the success of their additional activities that created legitimacy for broader involvement of social sciences in CIAT.

Three separate projects were widely acknowledged as having blazed a trail for social sciences in CIAT: cassava cooperatives in Colombia and Ecuador from 1984, bean research in Africa from 1984, and farmer-participatory research in the hillsides of Colombia from 1986. The projects each show different aspects of the integration of biophysical and social scientists. The projects are considered separately below, and commonalities are drawn out in the conclusions.

Cassava Cooperatives

Until the early 1980s, CIAT's cassava research had been driven by the goal of increased productivity. However, economic analyses prompted by an external review found demand for fresh cassava to be inelastic: greater production would depress prices and would not ease poverty. The Cassava Program reoriented to looking for a new product with an expanding market, helping farmers to establish marketing channels, and eventually to increase cassava production to meet the created demand. A pilot project in Colombia identified dried cassava chips for animal feed as a product with market potential. This pilot was successful (Gottrett and Raymund, 1999), but its impact was constrained by difficulties with the organization of farmers for operating the processing equipment and for marketing (Romanoff, 1993). What was missing was better *social technology*, to complement and enhance the existing biophysical technologies.

The project was extended into Ecuador, and the social aspects of farmer organization were addressed by a series of Ph.D anthropologists. Working in Ecuador gave these social scientists the "luxury of more time to do the work", and a freedom from headquarters to follow innovative approaches such as linking closely with the private sector, rather than with agricultural researchers. They facilitated the formation of a second-order union of cassava drying organizations, and this social technology became a technical and commercial success, elements of which endure today. Yet Romanoff (1993) stresses that the social technology itself was not innovative; the concept of cooperatives could not be considered new. We argue that the key was the existence of the practical developmental skills to facilitate the formation and maintenance of the association. This allowed production of an effective and functional group that provided a showcase within CIAT of a social technology that complemented biophysical research.

Bean Research

A contrasting approach to integrating social science research comes from CIAT's Great Lakes Bean Project in Africa. Here, teamwork and a close integration of social sciences with the development of biophysical technologies were reported to be the key. The project brought together a plant breeder, a plant pathologist, an anthropologist, an agronomist and

a nutritionist with the goal of increasing the productivity of common beans (*Phaseolus vulgaris*) in the Great Lakes region. As with the example of cassava cooperatives, the team had a large amount of discretionary freedom in their remote outposted site. Contemporaries reported that the team became close-knit and highly effective in working together. In collaboration with national programs, the team conducted a survey of bean production and consumption, identifying farmers' goals, preferences, views of their production constraints, and farmers' existing practices in experimenting with new bean varieties. Subsequent on-farm trials produced more detailed information about farmers' preferences. Farmers preferred risk-reducing strategies such as planting mixtures of bean varieties, and using early-maturing varieties. The study also found that the farmers making decisions about bean production were women. These findings reached back into the design of bean breeding. Many factors in addition to yield were considered in the production and testing of new varieties.

The Great Lakes project was an example of close teamwork between social sciences and biophysical sciences to produce an integrated understanding of the situation facing farmers, and a technology response that drew on both germplasm and social sciences.

Early Participatory Research

Our third and final example of pioneering research in CIAT that created broader legitimacy for social sciences is another social technology, but one that itself integrates biophysical research. By 1990, the role of farmer participation in the evaluation of technologies was widely acknowledged in CIAT, and was being promoted to the commodity programs by the small "Participatory Research Project" (to become the IPRA project), established in 1987. With support and pressure from the Kellogg foundation, IPRA first researched and then helped farmers to build the capacity of farmer groups to research and produce their own technologies, and to make demands on formal agricultural research systems. A social technology known as Local Agricultural Research Committees (CIALs, their Spanish acronym) was constructed from work with the El Diviso farmer association in Cauca, Colombia in 1990 (Ashby *et al.* 1997). The approach is a methodological development that supports a small group of farmers to form a research circle, accountable to their local community, that develops and tests new crop practices, varieties, marketing initiatives or whatever is of pressing interest locally. The success of the approach has been dramatic, with 249 CIALs in 8 Latin American countries by 1999, and participating and neighboring farmers reporting increased income and better food security (Ashby *et al.* 2000). These benefits accrue disproportionately in favor of the poorer participants.

Mainstream social theory provided frameworks and entry points through which social scientists with practical skills could experiment with social technologies in an agricultural context. However, practical developmental and facilitation skills were paramount in the successful formation of the first CIALs, and to ensure active participation of the poorer community members without domination by local elites (Ashby *et al.* 2000).

Social sciences gained legitimacy through the impact demonstrated by these and other projects. For the first time, a social scientist was made program manager in 1992, and the complement of social scientists in management positions has continued to increase since then.

In 1991, the CIAT mission statement was reformulated to include "preserving the natural resource base" as one of the guiding principles, and in 1992 CIAT reorganized its research programs into two divisions: one focussing on natural resources management, and the other on germplasm. Most of the social scientists went to the NRM division (figure 1), creating a new challenge: how to integrate social and biophysical sciences for research that is based around NRM, not commodities.

Social sciences in headquarters started to coalesce into social science-rich programs; the Land Management program with geographers, participatory research into IPRA, and the hillsides program with mixed social scientists. This brought a freedom for individuals to create specialist "niches", and to develop new social technologies as complements to biophysical technologies. Social research outputs flourished. In Colombia, Honduras, Nicaragua and Peru, watershed-level consortia were created to provide a platform for land users to negotiate collective NRM, on the hypothesis that greater social capital and collective action would broaden the types of technical change that could be achieved. Action research investigated how to organize farmers to make use of decision-support tools and to form agro-enterprises, and a second-order federation of CIALs was created in Colombia.

Impact from these initiatives was mixed. In many cases the organizations were effective, and outcomes for the poor were spectacular (Ashby *et al.*, 2000, Lundy *et al.*, 2002), building income and food security, reducing inequality, and building capacity for sustained and collaborative action. However, in other situations similar organizations struggled just to maintain themselves and achieved little impact. A cross-country analysis in 1999 found that similar approaches had been used to create collective action in each of CIAT's reference sites, and concluded that the approach being used was a "*social high-yielding variety*": very effective when planted in the right conditions, but that it relied on the existence of minimum levels of local human and social capital. Where these did not obtain, the high-yielding organizations were failing. Field skills to develop and implement novel strategies for collective action were identified as a key constraining factor.

Similarly, these organizational models and approaches were promoted within CIAT by the social science-rich programs, but encountered resistance from some biophysical scientists: "Scientists wanted participatory approaches but not the recipes", said one. Another argued that "Scientists didn't want a social-science packet... they wanted components". To address this, IPRA shifted its emphasis to developing approaches specifically for biophysical researchers.

Additional social research was being carried out to understand farmer decision-making for NRM, and to investigate the nature and location of poverty through Geographic Information System (GIS) mapping and on-ground participatory evaluations. Some projects marshaled social sciences around researchable chunks of NRM, such as soils or IPM (Integrated Pest Management), creating what one respondent called "NRM commodities" for research. On another level, in 1996 the inter-center Participatory Research and Gender Analysis (PRGA) program was formed to advance the state of the art of participatory and gendered research, and to work to institutionalize such approaches within CGIAR and partner centers.

Theory-led or Practice-led development of social sciences?

The acceptance of new social science technologies in CIAT has been led by the development of practical field skills, more than by the development of theoretical concepts. For example, the determining factor in the creation and evolution of CIALs, cassava cooperatives, and watershed-level consortia has been the practical skills to create such structures and demonstrate their impact, not the ability to conceive of them. CIAT has only recognized the theoretical underpinnings of these approaches (such as the role of power in development, and concepts of social capital) after the approaches themselves have demonstrated success.

As in 17th century physics, where the most effective researchers were often the ones with the best carpentry skills to build the apparatus to test their conjectures (Bragg, 1998), so effective social action research requires the skills to build the social structures to uncover new challenges. You can only test the types of organizations and relationships that you have the practical skills to build. Cernea (1991) argues that this is a characteristic of a young and evolving field, and that the practical approaches lack systematization and effective integration with the theoretical.

This may be changing. During the mid-1990's, CIAT's participatory research project had a major role in training, but from 1998 reoriented towards research on the effectiveness of CIALs, with experienced practitioners systematizing their skills. CIAT has recruited staff skilled in the practical approaches of community-development in Africa and at headquarters, strengthening the links between the practical and the theoretical. CIAT's new livelihoods approach is driven by a theoretical framework, but has a practical orientation

The trade-off for social scientists: a career in the CGIAR, or in the discipline?

"If you want to be a top-flight social scientist, the CG is maybe not the place to be. If you're willing to sacrifice your disciplinary career, CIAT is dynamite." So one participant introduced the issue of career paths for social scientists in the CGIAR.

Several responding social scientists felt that their work in CIAT was in some way "watered-down" social sciences. A common theme was that little of their work included novel social research hypotheses, and so made little contribution to social science theory. CIAT's focus on demonstrated impact was seen to encourage the application of established knowledge, rather than research to deepen understanding of issues. "There is not much call in CIAT for writing weedy social science papers", said one respondent, "what gets recognition is impact, such as enhancing adoption of technologies, or opening new opportunities for local communities... you can't expect a pure social scientist to come here and thrive." This creates a tension between the career path of the social science academic, striving to push the theoretical or practical edge of the field, and the more action-oriented career within the CGIAR. Most social scientists are at CIAT for 1-4 years (figure 2).

The trade-off lies in the perception of peer support and critical feedback. CIAT was said to lack a critical mass of social scientists and established mechanisms for supporting social science research. Frequently, lone social scientists are attached to a project, often outposted

(figure 1). In as much as the driving force behind scientific thought is debate and discussion, this may limit the advances possible in both theory and practice. Half of the responding social scientists commented that they sought their alliances outside of CIAT.

Partly to ease this difficulty, most of CIAT's social scientists choose not to be located at CIAT headquarters. Six of CIAT's current eight non-director social scientists are based elsewhere, and four are also affiliated with other institutions. CIAT projects provide a platform for practical fieldwork, and the outside affiliations provide part of the peer support.

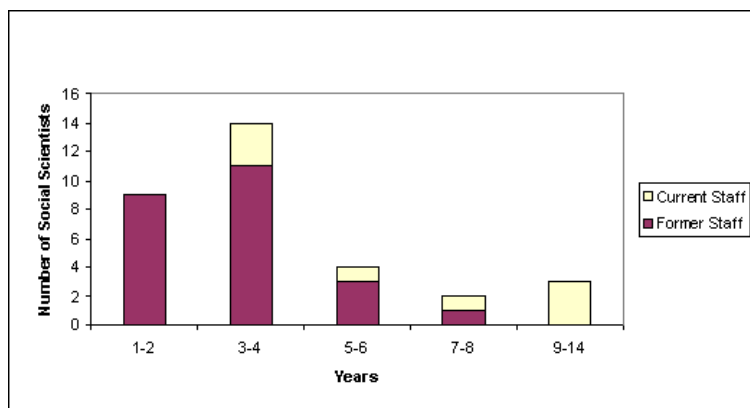


Figure 2 Duration of employment of research social scientists (excluding consultants) at CIAT, 1970-2001.

Blurring the Boundaries

Figure 1 captures only part of the growth in social sciences. The boundaries between social and biophysical research have been blurring over time. Several respondents highlighted that staff with biophysical science training are increasingly taking on research roles that were traditionally associated with the social sciences. The spread of participatory research activities encourages such blurring of disciplinary boundaries, so for example CIAT's project on participatory research approaches was managed between 1998 and 2000 by a researcher with formal training in ecology/entomology.

In addition, social scientists have changed by interaction with biophysical scientists. "I knew very little about working with biophysical sciences at first," said one, "and learned most of it on the job". Some social scientists have become "amateur" agronomists or plant breeders, and have reported that this has been a key to the success of their interactions with biophysical sciences: "... social scientists must be well versed biophysically in order to work well with bio-physical scientists," said one.

Opinion was divided on how broadly this co-option of social science activities has spread, or should spread through CIAT. Many saw it positively as a sign that social science considerations are helping to shape biophysical research, improving the orientation towards the poor.

From 1992, social scientists started moving into managerial positions, creating greater space and legitimacy for social science activities.

Personalizing, or Institutionalizing Social Sciences?

One interview respondent stated "It's *personalization* instead of *institutionalization* of social sciences that counts". All but one of the interview participants argued that personal relationships are at least as important as institutional roles for effective integration of social scientists and biophysical scientists. Three suggested that working together in the field can be a key part of generating this: "It's personality-based. We went to the field together, and built up trust"; "It's about getting that 'Aha' experience in the field. It's necessary to be together in the field", and "[strong working relationships are formed] when people go to the field together, not just writing articles together".

Two respondents suggested that as social scientists moved into more specialized programs, it was personal relationships outside of those programs that maintained effective bridges with biophysical scientists.

Conclusions

Donors led the initial rise of social sciences in CIAT, but as impact started to be demonstrated, more social scientists were brought on board and more arrangements for integrating social and biophysical sciences were tested.

Social sciences have come to be involved earlier in the project and technology cycle. During the 1970s and early 1980s, social sciences were used to "sell" technologies to farmers, and a program that claimed a broader mandate for social sciences was not viable in this system, and was closed. Through the 1980s, the role of social sciences expanded, including first a targeting role of understanding farmers' needs and goals, and by demonstrating success, reached back to the goals of breeding programs in beans and cassava. From the late 1980s, the processes of technology development started to be affected, as CIALs bought part of the research function under the control of farmers, speeding the traditional technology development process.

The examples of early pioneering social research in CIAT – cassava cooperatives, bean research and CIALs – suggest some common principles for developing new social science approaches. The researchers had freedom to operate in new ways: two of the three projects were in outposted sites, and the other was in a separate, externally funded project – a rarity at the time. The projects were all field-based and multidisciplinary. The researchers brought advanced practical field skills, allowing new forms of organization and relationship to be created and hence researched.

These practical skills often come from experience, as well as from formal training. This poses new challenges to an organization traditionally structured around levels of scientific qualification, as people with the practical skills may not be the Ph.D holders.

How can we organize social sciences for effective integration with biophysical sciences, and impact with the poor? Effective projects have taken place both when the social scientists are working relatively independently of biophysical scientists on complementary topics (such as for the cassava cooperatives, or IPRA), and also when the social scientists are deeply integrated into a multidisciplinary biophysical research team, such as bean research in Africa. The benefits and dangers of integrating and separating social sciences and biophysical sciences seem similar to those of integrating researchers and farmers. Separate social scientists have been able to generate new "high-yielding" social technologies that have sparked advances in the field, but at the cost of lower "adoption" of the technologies by biophysical scientists. Close-knit multidisciplinary teams lead to changes in both social and biophysical scientists, but may make an academic career path in the social sciences difficult to follow.

But this is only part of the story. The interviews suggest that CIAT could be considered a *gemeinschaft* community, in which people relate to each other firstly as people, and secondarily by their institutional roles. By considering just the institutional roles, we may miss a large part of the story of integrating social and biophysical scientists on a team level. Perhaps this is a lesson here that CIAT is not so dissimilar to the communities in which we work.

Some of the most dramatic impacts of the early social science work on biophysical research are now less visible precisely because the impacts have been so widespread, and are now internalized. As the debate around new approaches settles and they become accepted, it is easy to forget their once controversial origins. Consideration of farmers' goals, priorities, production constraints and markets are now almost universal, and do not command the novelty value that they once held in the condensed research highlights of the CIAT annual reports. Initiatives such as Forages for Smallholders Project are now routinely built around these considerations. Participatory approaches have to varying degrees infiltrated all of CIAT's research, and the role of farmer as the key to evaluating biophysical technologies is now unquestioned. Farmers are understood to be both men and women. A social scientist who joined CIAT in the mid 1990s commented:

When I arrived, the bio-physical scientists themselves saw the need for social scientists and social science inputs... All of my work was tied in with the work of bio-physical scientists; and I never had any feeling of being a bolt-on.

CIAT is currently moving towards a sustainable rural livelihoods framework for its research, based around multi-disciplinary research on the foundations of competitive agriculture, agroecosystem health, and rural innovation. A new "Rural Innovation Institute" will study how rural innovation works, investigate collective organization to scale up technology change, look for new ways to combine local and exotic knowledge, and develop rural policy.

What are the options for making best use of social sciences for impact?

1. Social sciences could be left mostly to partner organizations (as at CIAT 1968-1980). This will have implications for the choice of partner, and type of relationship with partners.
2. Natural scientists could be up-skilled in social sciences. This has been happening informally at CIAT, leading to changes in the ways that biophysical research is conducted.

This has implications for the supervision and mentoring of the social aspects of the work by an experienced social scientist.

3. Social sciences can be handled mostly within CIAT. This option also has implications for the choice of partner, and type of relationship with partners. The current perception that social scientists face a trade-off between developing a career in the CGIAR and developing a career in their discipline may need to be addressed, and this hinges on successful peer support and mentoring.

Perhaps in order to maintain an effective career path for social scientists we should ask not only what social sciences can do for the CGIAR, but what the CGIAR can do for social sciences.

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