The mission of the International Center for Tropical Agriculture (CIAT, its Spanish acronym) is to reduce hunger and poverty in the tropics through collaborative research that improves agricultural productivity and natural resource management.

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ISBN 958-694-030-6

Investing in Farmers as Researchers

Experience with Local Agricultural Research Committees in Latin America

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CIAT Publication No. 318
ISBN 958-694-030-6
Press run: 500
Printed in Colombia
May 2000

Ashby, Jacqueline A.
Investing in farmers as researchers : experience with local agricultural research committees in Latin America / Jacqueline A. Ashby, Ann R. Braun, Teresa Gracia, María del Pilar Guerrero, Luis Alfredo Hernández, Carlos Arturo Quirós, José Ignacio Roa. -- Cali, Colombia : Centro Internacional de Agricultura Tropical, 2000.
199 p. -- (CIAT publication ; no. 318)
ISBN 958-694-030-6

1. Participatory research. 2. Research networks. 3. Teaching materials. 4. Research projects. I. Braun, Ann R. II. Gracia, Teresa. III. Guerrero, María del Pilar. IV. Hernández, Luis Alfredo. V. Quirós, Carlos Arturo. VI. Roa, José Ignacio. VII. Centro Internacional de Agricultura Tropical. VIII. Tit.

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Foreword

In 1994 I was pleased to ask my colleague Blas Santos to evaluate an unusual project supported by the Kellogg Foundation. The project (which I had been involved with since its beginning and which I had watched grow from an idea to an impressive reality) was unusual because it was run by a large international research center that had developed an approach to carrying out some of its research in partnership with poor farmers in Latin America through Local Agricultural Research Committees, or CIALs.

"Could this be a real partnership we wondered," as we drove towards the imposing archways of the CIAT experiment station, framed by the rugged chain of mountains where the other half of this partnership works and lives. Knowing that scientists tend to see semiliterate farmers in rural communities as incapable of research, we were skeptical. But in the course of the next few days, as we left the CIAT greenhouses and laboratories to visit groups of farmers, community leaders, and NGO staff in remote villages, we began to feel convinced that here indeed was a catalyst for social change.

In a world where over 800 million people are chronically malnourished and their number is still growing, it is vital to help rural people innovate and find sustainable livelihoods for themselves. Strengthening capacity for self-help requires a combination of local initiative, training, financial capital, and technical support. The CIALs combine these four elements to support communities in carrying out their own "R&D" for agriculture.

Since we first visited the CIALs, their number has grown to 249 in eight countries. The committees are helping generate net benefits for their communities estimated at US$5,330 per year for an average annual cost of $325 per CIAL. These figures do not take into account the spillover benefits for community development that many CIALs have achieved: for example, the microcredit fund; the local health program; the increase in women's self-esteem; or the inclusion in land reform, catalyzed by CIALs.

During our visit to the CIALs, we discovered many people practicing the defining principles of our work in the Kellogg Foundation: personal

responsibility, the courage to act, a genuine respect for diverse voices, and civic participation. We found scientists enthusiastic about the insights they obtained from interacting with diverse women and men farmers from a variety of ethnic backgrounds. We listened to farmers explaining what motivated them to assume the personal responsibility of volunteering for the community research team. From community members, we heard about having more food in the "hungry season" because of a participatory research process that mingles the best of science with local knowledge. And we observed the power of committed people to persevere in the face of conventional wisdom and to change the world they live in.

Dan E. Moore
Vice-President for Programs
Kellogg Foundation

Preface

In 1998 the CIAT-IPRA team decided to commission a short promotional book on the CIALs. It would tell their story to the general public, to the many people involved in grass roots development with poor communities all over the world, and to the donors who support their work. Many people contributed ideas, practical fieldwork, and information to the development of the CIALs. So this book about that process was conceived as a story to be told by an outsider, who would be an experienced writer and journalist.

Free-lance writer Simon Chater agreed to come to Latin America and write the story. He spent several weeks bumping along dirt roads, walking up mountains, visiting communities in the Andes and Central America, and interviewing people from all walks of life who have been involved with the CIALs. Simon brought to the task a deep empathy with the rural people he met on the trail of the CIALs but also a healthy skepticism about the benefits of organizing poor farmers into local agricultural research committees. As Simon crafted the story, the text evolved into a serious analysis of the strengths and weaknesses of what he baptized "the CIAL movement."

A draft was sent out to a long list of reviewers. Many raised important questions and suggested that more information be added to the book.

At that time the IPRA team was carrying out a formal study of the CIALs' impact in the pilot area of Cauca, Colombia. Our research was designed to provide the data and analysis for a different and more technical book, oriented to a scientific audience. As this study advanced, we began to integrate results from the research into the story to address some of the questions raised by the reviewers, especially in the chapter on impact. We also added a summary of the entire book called "The CIALs at a Glance." Gradually, the ideas and content of the two books began to merge and kept growing. As a result, even though the book is written in the third person, it acknowledges our research team as the authors.

Like the CIALs, the book has just kept on growing. But we have had to stop writing and adding material, even though some exciting

developments, such as the CIAL expansion beginning in Colombia and Venezuela, are barely touched upon. We probably will not write our scientific book yet, returning instead to action research in the field until it is time to tell the next installment in this story.

The authors wish to thank Sam Bickersteth, Simon Carter, Michael Cernea, Larry Harrington, Raul Ho, Sally Humphries, Nick Menzies, Gordon Prain, Niels Röling, Daniel Selener, Bhuwon Sthapit, Louise Shaxon, Louise Sperling, and Joachim Voss, who read and commented in depth on early versions of the text.

Other contributors include Douglas Pachico and Verónica Gottret, who both played an important role in the impact study; Leonel Rosero, who processed the impact data; Jorge Alonso Beltrán, Ligia García, Freddy Escobar, and Jorge Luis Cabrera, who have given constant support to this work; Carlos Trujillo (who is a CIAT employee as well as a farmer and community leader in Cauca), his family, and his parents; Don Luis and Doña Lucila Trujillo; Dan Moore and Blas Santos; and the late Gustavo Nores, CIAT Director General from 1990 to 1994.

We also wish to acknowledge the many scientists who have aided the CIAL process, among whom are Anthony Bellotti, Ted Carey, Jeremy Davis, Wania Fukuda, Clair Hershey, Carlos Iglesias, Claudia Jiménez, Edwin Bronson Knapp, Julia Kornegay, Stephen Lapointe, Carlos Lascano, Alfredo León, Rogelio Lépiz, Brigitte Maass, Bernardo Ospina, Shivaji Pandey, Michel Valés, Ronald Vernooy, and Oswaldo Voysest.

Finally, we are especially grateful to our colleagues in national programs throughout Latin America who have made this process a reality, among whom are Carlos Amaya, Héctor Andrade, Manuel Arévalo, María Eugenia Baltodano, Angela Bolívar, Enrique Castillo, Nelly Endara, Luis Humberto Fierro, Santiago Fonseca, Nelson Gamero, Antonio Gandarillas, Edson Gandarillas, Juan Gonzáles, Sally Humphries, José Jiménez, Pablo Zelan Mejía, Fausto Merino, Suyapa de Meyer, María Elena Morros, Bolívar Muñoz, Lourdes Palacios, Marlene Iveth Posas, Verónica Proaño, Miguel Rodríguez, Pedro Rodríguez, Teodoro Romero, Juan Carlos Rosas, Daniel Selener, Roberto Sevilla, Fredy Sierra, Héctor Fabio Sierra, Oswaldo Soruco, Graham Thiele, Dominga Tijerinos, Alfonso Truque, Ronald Vernooy, and Nolberto Zambrano.

The CIALs at a Glance

Participatory approaches to research and development (R&D) that are appropriate for poor farmers have become widespread in the past decade. This book describes experiences with one such approach, the Comité de Investigación Agrícola Local (CIAL), or Local Agricultural Research Committee.

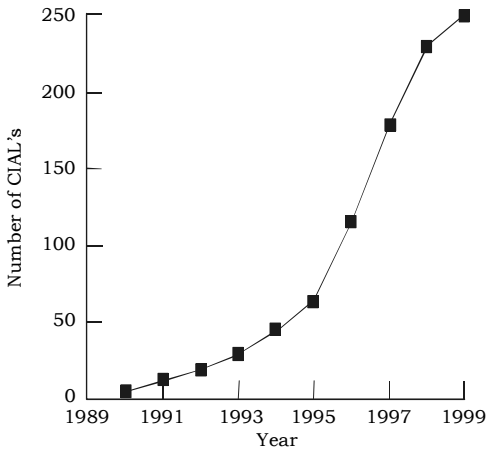
The CIAL concept was developed by a team at the Centro Internacional de Agricultura Tropical (CIAT). The CIAL is a farmer-run research service that is answerable to the local community. The community elects a committee of farmers chosen for their interest in research and willingness to serve. The CIAL conducts research on priority topics identified through a diagnostic process, in which all are invited to participate. After each experiment the CIAL reports its results back to the community. Each committee has a small fund to offset the costs and risks of research and is supported by a trained facilitator until it has matured enough to manage the process independently.

The steps in the CIAL process are:

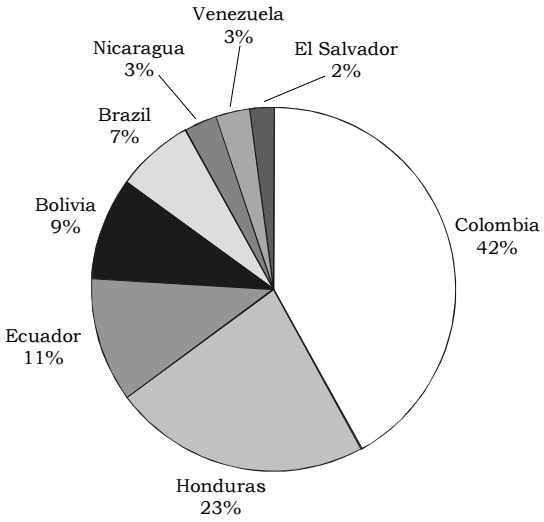
- Motivation
- Election
- Diagnosis
- Planning
- Experimentation
- Evaluation
- Analysis
- Feedback

There are 249 active CIALs in eight countries of Latin America.

Growth of the CIALs

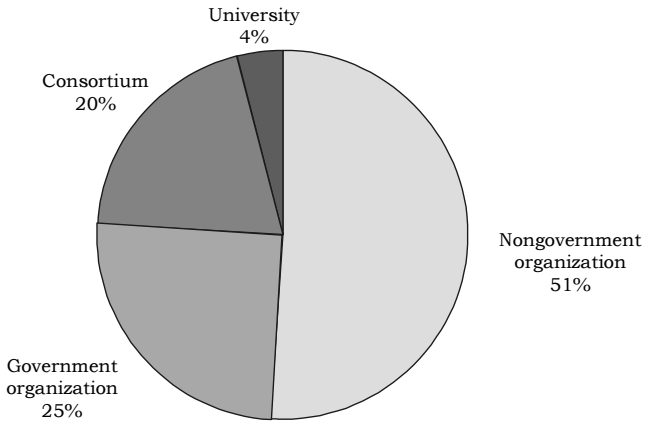


Host countries



Half of the CIALs are supported by nongovernment and a quarter by government organizations. Twenty percent are facilitated by consortia consisting of two or more cooperating organizations. A total of 36 organizations are working with the CIALs.

Types of organizations facilitating CIALs



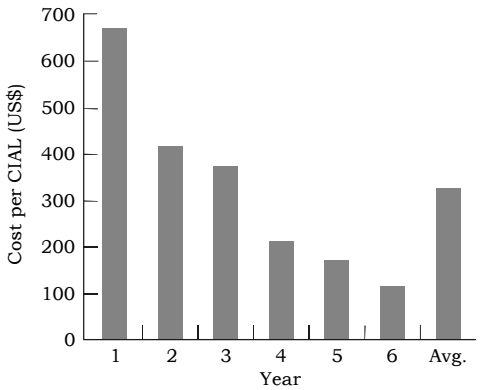
The CIAL process has proved to be replicable, provided that the facilitating organizations, the CIALs themselves, and their host communities adhere to these basic principles:

- Relationships between the CIAL, the community, and external actors are founded on mutual respect and accountability and shared decision making.
- Partners in the research process share the risks of research.
- Research is conducted by systematically comparing alternatives.
- Knowledge is generated by building on experience and learning by doing.
- Research products belong to the community.

Partner organizations share the risks of research with communities by providing seed money to establish the CIAL fund. Launching a CIAL program also requires investment in training staff to facilitate the CIAL process effectively.

The costs of establishing and facilitating a CIAL are highest during the first year, when most of the investment in training is made and the CIAL fund is launched. In subsequent years costs depend primarily on the number of visits made by the facilitator to each CIAL and on the number of CIALs attended by each facilitator. When averaged over different kinds of facilitating organizations, the estimated cost per CIAL is US$670 for the first year and $325 per year over a 6-year period.

The institutional cost of supporting a CIAL



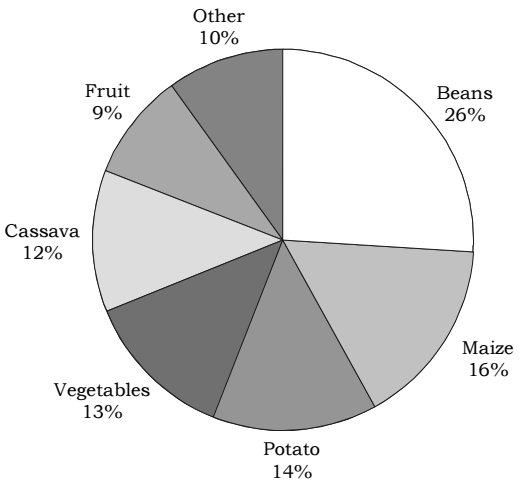
Second-order associations, formed by the CIALs of a specific region or country, are a cost-effective way of providing additional support and ensuring sustainability.

Other factors that influence success and sustainability include:

- Adequate training of CIAL members in the participatory research process
- Systematic application by the CIAL of the basic principles of formal research
- Investment in the training of skilled paraprofessionals
- Regular feedback by the CIAL to the communities
- Adequate upgrading of facilitator skills
- Farmer control over the CIAL process
- Presentation of a range of technological options to CIALs by formal research services
- Links between the CIAL and experimenting farmers in the community
- Adequate orientation of the community by the facilitator to the uncertainties and risks involved in research
- Exposing decision makers and managers to the CIAL concept.

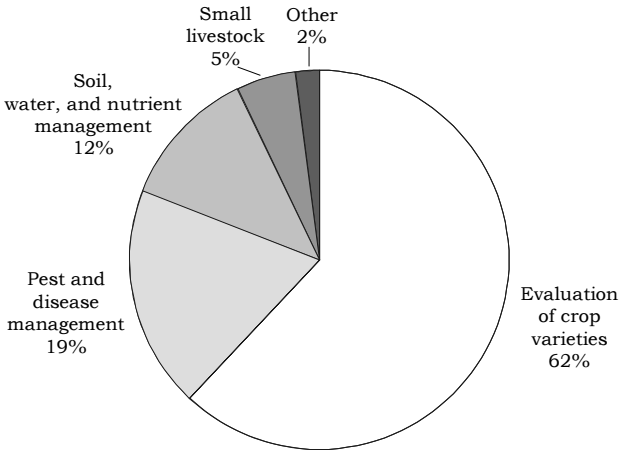
Most CIALs begin with the aim of improving food security by raising the productivity of staple crops, such as beans, maize, potatoes, and cassava.

Crops researched



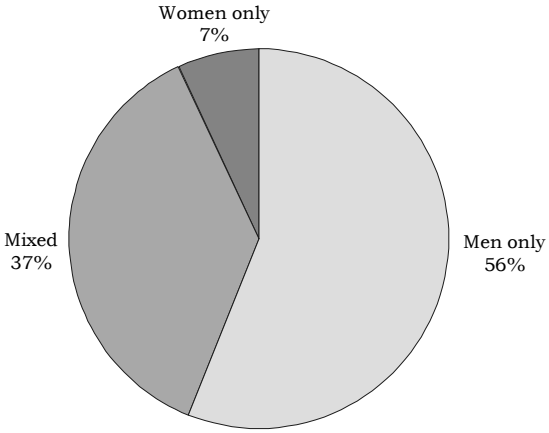
As food deficits are resolved, income generation becomes a priority, and research centers on diversification of the farming system, often through fruit, vegetable, or small livestock production. Eventually, research on more complex issues emerges, including management of pests and diseases, soil, water, and nutrients.

Research themes



The results of CIAL research may be widely disseminated, and participation by marginalized groups, including women, landless laborers, and indigenous communities, is encouraged.

CIALs by gender



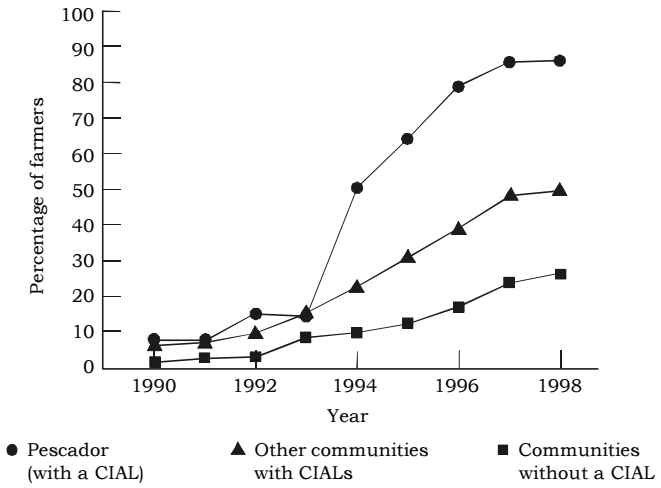
As CIALs mature, they gain proficiency in the research process and become less dependent on support from the facilitator. The CIALs in Cauca, Colombia, required experience with at least four experiments to consolidate their understanding of basic aspects of the scientific method, such as experimental design, treatments, replication, and the need for a control. Developing the capacity to manage all the steps of the CIAL process independently also took at least four cycles of diagnosis, planning, evaluation, analysis, and providing feedback to the community.

Experience in Colombia, where the concept was first tested, has shown that the CIAL can benefit the wider community as well as individual CIAL members. The benefits vary according to the maturity of the committee and the topic under research. They include:

- Increased local capacity in formal research methods
- Improved local planning, management, and organizational skills
- Higher crop yields
- More local experimentation
- More experimentation with soil conservation practices
- Higher biodiversity in cropping systems
- Improved access to credit
- Greater availability of improved seed
- Improved food security
- Establishment of small enterprises
- Increased social status of women and other marginalized groups
- Improved access to formal research services and products.

Adoption of the products of a CIAL's research is a clear sign of its success as a local research service. An example from Cauca, Colombia, demonstrates the potential of a CIAL to stimulate broad adoption of technology it has tested. Over 80% of farmers from the village of Pescador adopted a bean variety recommended by the local committee. The CIAL also had impact beyond its own community. Fifty percent of farmers in three nearby communities with CIALs and over 20% of farmers in four communities without CIALs also adopted the variety.

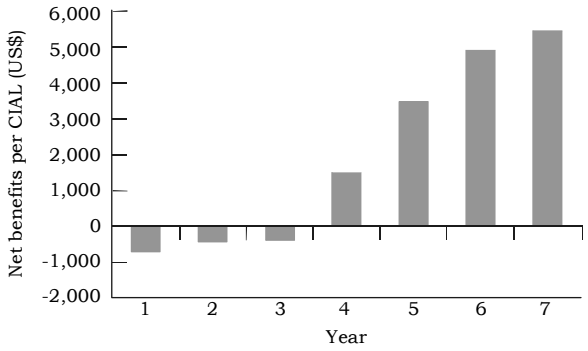
Adoption of a bean variety recommended by a CIAL in nearby communities with and without CIALs



Mature CIALs often launch small businesses, selling improved seed or other products or services. Many take on a broader role in the community, seeking access to credit and training, preparing and submitting proposals, and acting as ambassadors in relationships with R&D actors.

The effect of the CIALs on their communities and on formal research services transcends dollars and cents. Nevertheless, CIAT estimates the return on the investment made in developing and applying the CIAL approach at 78%.

Return on investment in the CIALs



The CIAL movement is still young, and its future evolution is uncertain. If properly managed, CIALs can deliver substantial growth and equity benefits, although their effects on the sustainability of production are less predictable. By allowing adaptive research to be devolved to the farming community, CIALs cut the costs of formal research while increasing its impact. The long-term financial sustainability of the CIALs and their second-order associations is a major challenge that remains to be addressed.

Un Vistazo a los CIAL

En la última década se ha generalizado el uso de enfoques participativos en la investigación y el desarrollo (I&D) que sean apropiados para los agricultores de escasos recursos. Este libro describe la experiencia hecha con uno de estos enfoques, el Comité de Investigación Agrícola Local (CIAL).

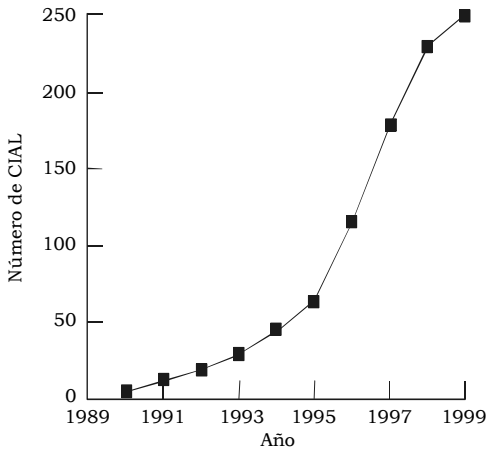
El concepto CIAL fue desarrollado por un equipo del Centro Internacional de Agricultura Tropical (CIAT). El CIAL es un servicio de investigación basado en el agricultor y es responsable de su acción ante la comunidad local. La comunidad conforma un comité de agricultores escogidos por su interés en la investigación y por su disposición para servir. El CIAL investiga temas prioritarios que han sido identificados mediante un proceso de diagnóstico, en el cual todos son invitados a participar. Después de cada experimento, el CIAL presenta los resultados a la comunidad. Cada comité tiene un pequeño fondo para subvencionar los costos y riesgos de la investigación, y es apoyado por un facilitador capacitado hasta cuando el CIAL haya adquirido la madurez suficiente para manejar el proceso en forma independiente.

Los pasos de un proceso CIAL son:

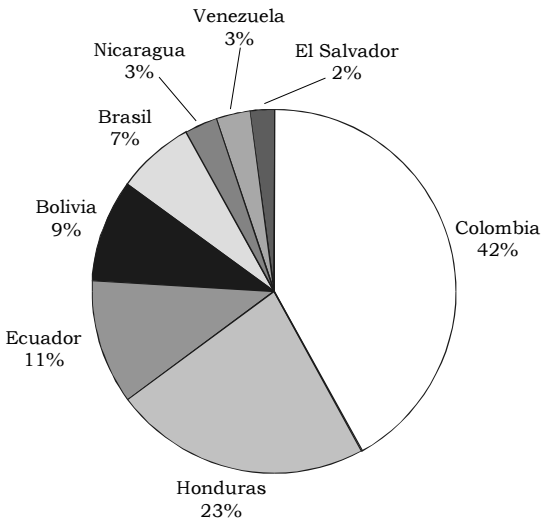
- Motivación
- Elección
- Diagnóstico
- Planificación
- Experimentación
- Evaluación
- Análisis
- Retroinformación

Hay 249 CIAL activos en ocho países de América Latina.

Crecimiento de los CIAL

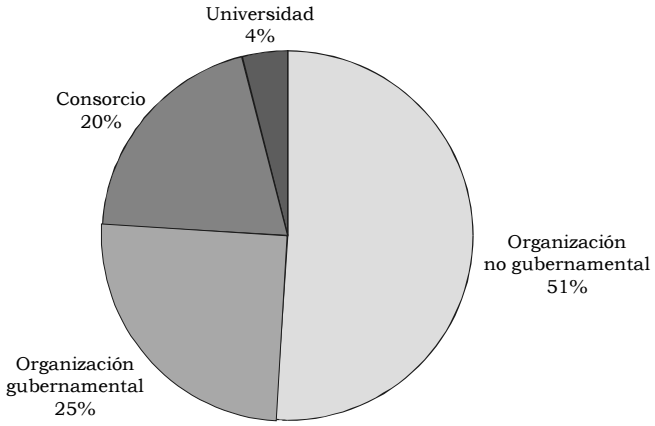


Países anfitriones



La mitad de los CIAL son apoyados por organizaciones no gubernamentales y una cuarta parte por organizaciones gubernamentales. El 20% es facilitado por consorcios que constan de dos o más organizaciones colaboradoras. En total, 36 organizaciones trabajan con los CIAL.

Tipos de organizaciones que facilitan los CIAL



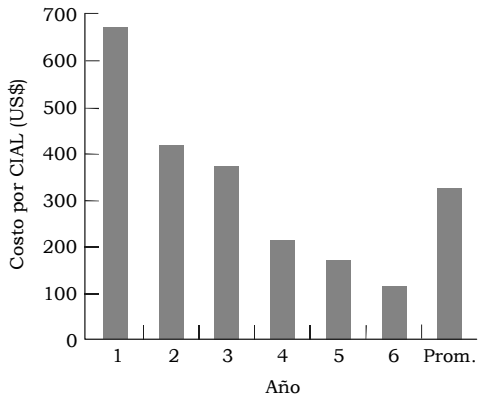
Se ha demostrado que el proceso CIAL puede aplicarse en otros sitios, siempre y cuando las organizaciones facilitadoras, los mismos CIAL y sus comunidades anfitrionas manifiesten adhesión a los siguientes principios básicos:

- Las relaciones entre el CIAL, la comunidad y los actores externos se basan en el respeto mutuo, la responsabilidad y la toma de decisiones compartida.
- Los socios en el proceso de investigación comparten los riesgos de la investigación.
- La investigación se lleva a cabo mediante la comparación sistemática de las alternativas.
- Los conocimientos se generan partiendo de experiencias y del aprendizaje en la acción.
- Los productos de la investigación pertenecen a la comunidad.

Las organizaciones socias comparten los riesgos de la investigación con las comunidades al proporcionar capital semilla para establecer el fondo del CIAL. El establecimiento de un programa CIAL también requiere de la inversión en la capacitación del personal para así facilitar el proceso CIAL en forma eficaz.

Los costos de establecer y promover un CIAL son más elevados durante el primer año, cuando se hace la mayor parte de la inversión en capacitación y se inicia el fondo del CIAL. En los años siguientes, los costos dependen principalmente del número de visitas hechas por el

El costo institucional de apoyar un CIAL



facilitador a cada CIAL y del número de CIAL asistidos por cada facilitador. Cuando se promedia sobre diferentes clases de organizaciones facilitadoras, el costo calculado por CIAL es de US$670 durante el primer año y de US$325 por año en un período de 6 años.

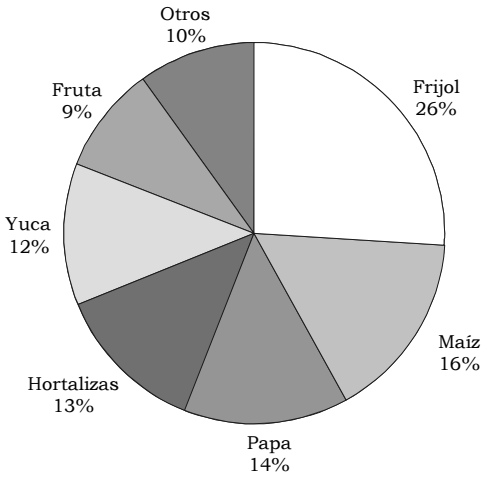
Las asociaciones de segundo orden, formadas por los CIAL de una región específica o de un país, son un método efectivo y de costo razonable para proporcionar apoyo adicional y asegurar la sostenibilidad del Comité.

Hay otros factores que influyen en el éxito y la sostenibilidad de un CIAL, como los siguientes:

- Capacitación adecuada de los miembros del CIAL en el proceso de investigación participativa
- Aplicación sistemática de los principios básicos de la investigación formal por el CIAL
- Inversión en la capacitación de paratécnicos competentes
- Retroinformación continua a las comunidades hecha por el CIAL
- Mejoramiento acertado de las habilidades de los facilitadores
- Control del proceso CIAL por los agricultores
- Presentación de una gama de opciones tecnológicas a los CIAL por los servicios de investigación formal
- Vínculos entre el CIAL y los agricultores experimentadores en la comunidad
- Orientación adecuada de la comunidad por el facilitador respecto a las incertidumbres y los riesgos implícitos en la investigación
- Presentación del concepto CIAL a los encargados de tomar decisiones y a los administradores.

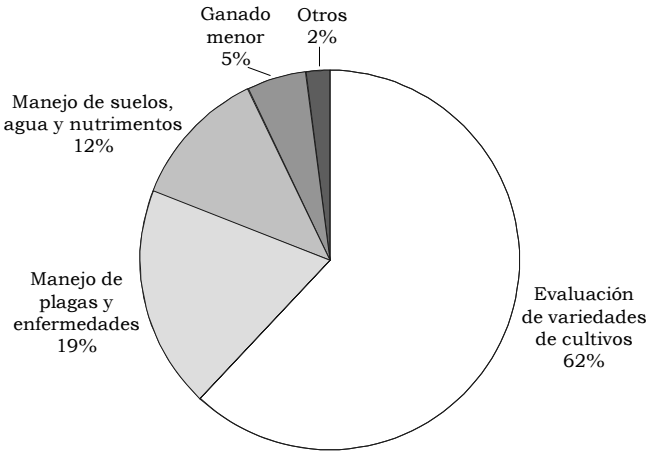
La mayoría de los CIAL empiezan con la intención de mejorar la seguridad alimentaria mediante el aumento de la productividad de los cultivos de primera necesidad, por ejemplo, el frijol, el maíz, la papa y la yuca.

Cultivos investigados



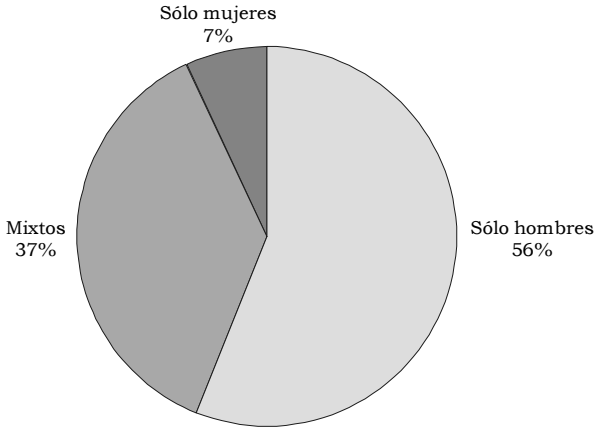
En la medida en que se resuelve el déficit de alimentos, la generación de ingresos se convierte en una prioridad y la investigación se centra en la diversificación del sistema agrícola, que se obtiene a menudo mediante la producción de frutas, hortalizas o ganado menor. Con el tiempo, se hará investigación sobre temas más complejos que incluyen el manejo de plagas y enfermedades, de los suelos, el agua y los nutrimentos.

Temas de investigación



Los resultados de la investigación realizada por los CIAL pueden difundirse ampliamente, y se invita a participar a los grupos marginados, entre ellos las mujeres, los trabajadores sin tierra y las comunidades indígenas.

Los CIAL según el género



En la medida en que maduran los CIAL, toman el control del proceso de investigación y se vuelven menos dependientes del apoyo del facilitador. Los CIAL en Cauca, Colombia, necesitaron de experiencia en cuatro experimentos, al menos, para consolidar su comprensión de los aspectos básicos del método científico, como son el diseño experimental, los tratamientos, las repeticiones y la necesidad de un testigo. Para desarrollar la capacidad de administrar todas las etapas del proceso CIAL en forma independiente, se necesitaron también cuatro ciclos, al menos, de planificación, conducción, evaluación y retroinformación a la comunidad.

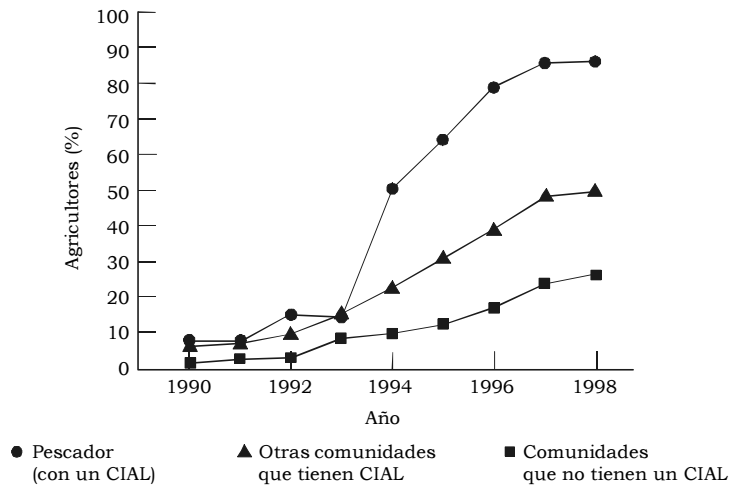
La experiencia hecha en Colombia, donde se probó el concepto por primera vez, demostró que los CIAL pueden beneficiar a una comunidad más amplia, así como a los individuos que la integran. Los beneficios varían según la madurez del Comité y el tema que se investiga y son, entre otros:

- Mayor competencia para los métodos de investigación formal en la localidad

- Mejor planificación, capacidad de manejo y habilidades organizacionales a nivel local
- Mayor rendimiento en los cultivos
- Más experimentación a nivel local
- Más experimentación con prácticas de conservación del suelo
- Mayor diversidad biológica en los sistemas de cultivo
- Mayor acceso al crédito
- Mayor disponibilidad de semilla mejorada
- Más seguridad alimentaria
- Establecimiento de pequeñas empresas
- Mejor posición social de las mujeres y de otros grupos marginados
- Mayor acceso a los servicios y a los productos de la investigación formal.

La adopción de los productos de la investigación de un CIAL es un signo claro de su éxito como servicio de investigación local. Hay un ejemplo en Cauca, Colombia, que demuestra el potencial de un CIAL para estimular la adopción amplia de tecnología que el Comité había evaluado. Más del 80% de los agricultores del pueblo de Pescador

Adopción de una variedad de frijol recomendada por un CIAL en las comunidades vecinas que tienen CIAL y en las que no lo tienen

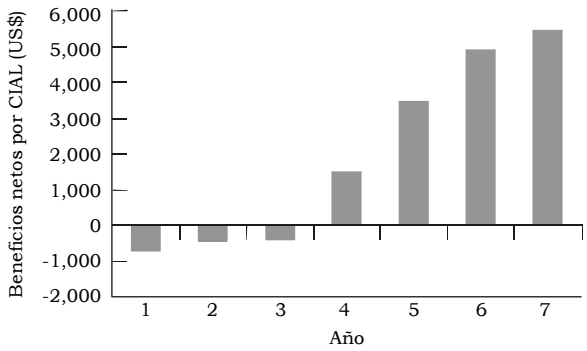


adoptaron una variedad de frijol recomendada por el comité local. El CIAL hizo también impacto más allá de su propia comunidad. El 50% de los agricultores de tres comunidades vecinas a la comunidad que tenían un CIAL y más del 20% de agricultores en cuatro comunidades que no tenían un CIAL adoptaron también la variedad.

Los CIAL que ya son maduros establecen a menudo pequeños negocios donde venden semilla mejorada u otros productos o servicios. Muchos adoptan un papel más amplio en la comunidad y buscan el acceso al crédito y a la capacitación, preparan y presentan propuestas, y sirven de embajadores en las relaciones que se entablan con los actores de I&D.

El efecto que hacen los CIAL en sus comunidades y en los servicios de investigación formal va más allá de una ganancia en pesos. No obstante, el CIAT calcula que el retorno a la inversión en el desarrollo y la aplicación del enfoque CIAL es de un 78%.

Retorno a la inversión hecha en los CIAL



El movimiento de los CIAL es aún joven y su evolución futura es incierta. Si se manejan adecuadamente, los CIAL pueden producir beneficios sustanciales respecto a la equidad y al desarrollo, aunque sus efectos en la sostenibilidad de la producción agrícola sean menos predecibles. Al permitir que la investigación adaptativa retorne a la comunidad agrícola, los CIAL pueden reducir los costos de la investigación formal y, al mismo tiempo, aumentar su impacto. La sostenibilidad financiera, a largo plazo, de los CIAL y de sus asociaciones de segundo grado es uno de los principales retos que deben enfrentarse.

Coup d'œil sur les CIAL

Depuis une dizaine d'années, la recherche-développement a de plus en plus recours à une démarche participative pour appréhender les problèmes des petits producteurs. Ce livre décrit l'application de ce type d'approche dans le cadre du Comité local de recherche agricole (*Comité de Investigación Agrícola Local* - CIAL).

Le concept du CIAL a été mis au point en Amérique latine, par les chercheurs du Centre international d'agriculture tropicale (*Centro Internacional de Agricultura Tropical* - CIAT).

Le CIAL est une entité de recherche paysanne au service de la communauté locale qui élit un comité de paysans choisis pour leur intérêt pour la recherche et leur motivation.

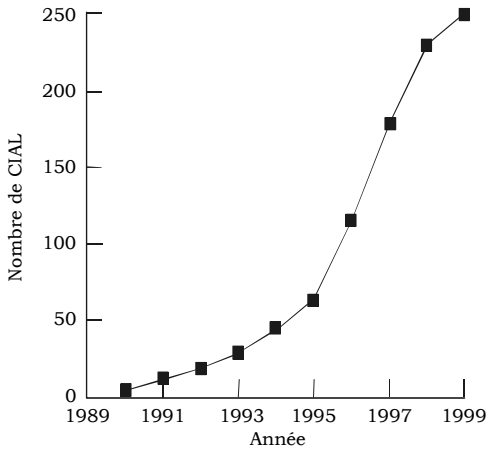
Le CIAL conduit des recherches sur des thèmes prioritaires identifiés grâce à un processus de diagnostic auquel tous les acteurs sont invités à participer. A l'issue de chaque essai, les résultats sont restitués à la communauté. Chaque comité dispose d'un petit budget destiné à couvrir les coûts et les risques de la recherche, et il bénéficie de l'appui d'un agent facilitateur jusqu'à ce qu'il puisse prendre seul les rênes.

Les étapes par lesquelles passent le CIAL sont les suivantes:

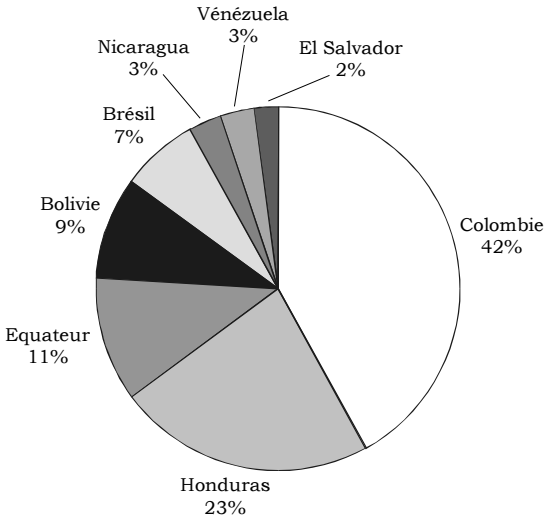
- Motivation
- Election
- Diagnostic
- Planification
- Expérimentation
- Evaluation
- Analyse
- Rétro alimentation

Il existe 249 CIAL répartis dans 8 pays d'Amérique latine.

Développement des CIAL

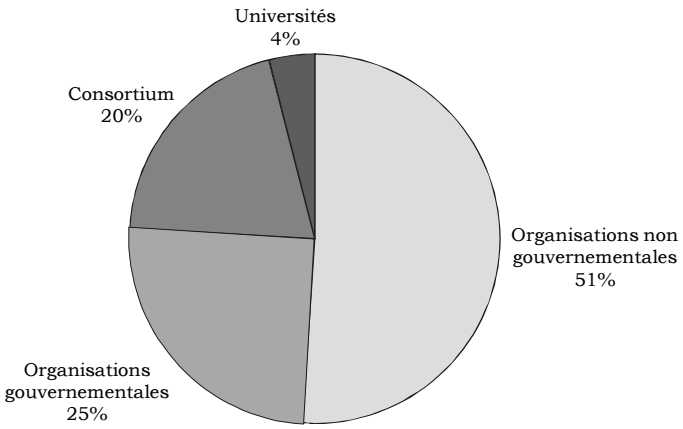


Pays d'accueil



La moitié des CIAL a été mis en place par des organisations non gouvernementales, et un quart par des organisations gouvernementales. Vingt pour cent reçoivent l'appui de consortiums composés de deux ou plusieurs organisations coopératives. Un total de 36 organisations travaille avec les CIAL.

Type d'organisations ayant appuyé la mise en place des CIAL



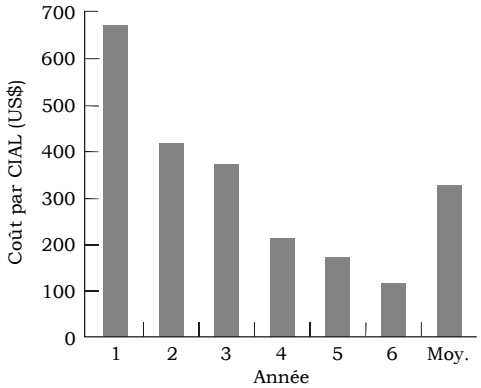
Il s'est avéré que le processus pouvait être reproduit, à condition que les organisations facilitatrices, les CIAL eux-mêmes et les communautés d'accueil respectent les principes de base suivants:

- Les relations entre le CIAL, la communauté et les acteurs extérieurs sont fondées sur le respect et la responsabilité mutuels, et l'association aux prises de décisions.
- Les partenaires partagent les risques de la recherche.
- La recherche est systématiquement conduite en comparant différentes alternatives.
- Les connaissances produites doivent reposer sur l'expérience et l'apprentissage pratique.
- La communauté doit s'approprier les produits de la recherche.

Les organisations partenaires partagent les risques de la recherche avec les communautés en apportant un financement de départ qui permet l'établissement du budget du CIAL. Toute institution qui lance un CIAL doit investir dans la formation de son personnel pour lui donner les moyens de faciliter efficacement le processus.

Le coût de l'établissement d'un CIAL est plus élevé la première année, durant laquelle la plus grande partie de l'investissement est dirigée à la formation et à la constitution du budget du CIAL. Les années suivantes le coût dépend en premier lieu du nombre de visites effectuées par le facilitateur à chaque CIAL et du nombre de CIAL visités. En moyenne, et en considérant les différentes organisations facilitatrices, le coût estimé pour chaque CIAL est de US$670 la première année, et de US$325 les années suivantes, sur une période de 6 ans.

Le coût institutionnel d'un CIAL

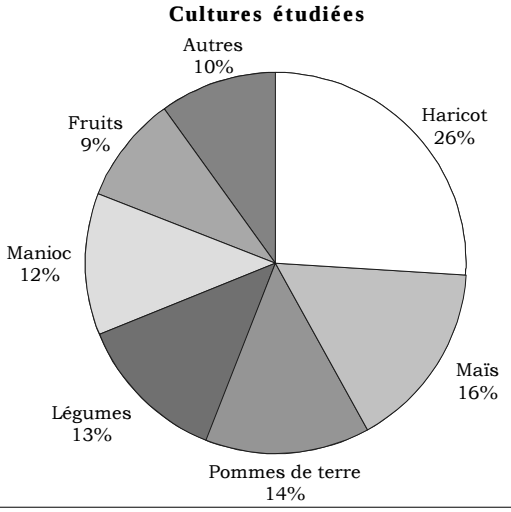


Des organisations de deuxième niveau, constituées par les CIAL d'une région ou d'un pays donné, apparaissent comme un moyen efficace pour apporter un appui supplémentaire et assurer la pérennité des actions.

Autres facteurs de succès et de pérennité des CIAL.

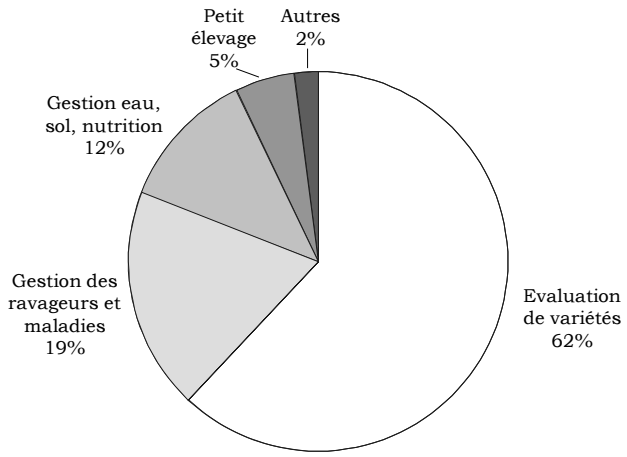
- Formation des membres du CIAL à la recherche participative
- Application systématique par les CIAL des principes de base de la recherche formelle
- Formation de para professionnels compétents
- Rétro alimentation régulière des CIAL à la communauté
- Mise à niveau des compétences des agents facilitateurs
- Contrôle du processus du CIAL par les paysans
- Mise à la disposition des CIAL d'un éventail d'options techniques par la recherche formelle
- Liaison entre les CIAL et les paysans expérimentateurs de la communauté
- Information de la communauté faite par les agents facilitateurs sur les risques et incertitudes liés à la recherche
- Information des preneurs de décisions et des gestionnaires au concept du CIAL.

Lors de la création des CIAL, le but premier de la majorité d'entre eux a été l'amélioration de la sécurité alimentaire par l'augmentation de la productivité de cultures de base, comme le haricot, le maïs, les pommes de terre, et le manioc.



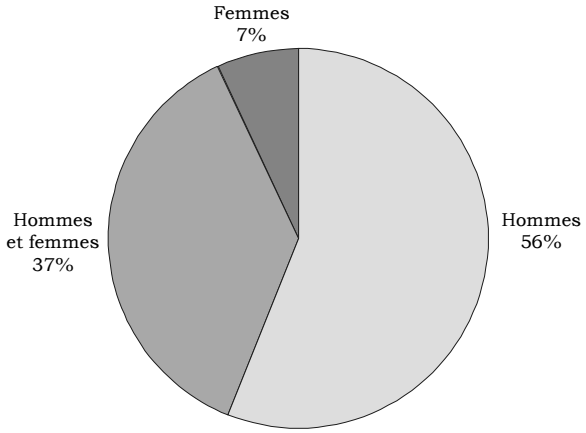
Au fur et à mesure que le déficit alimentaire se réduit, la génération de revenus monétaires devient une priorité. L'orientation de la recherche se porte alors sur la diversification des systèmes de production, incluant souvent les fruits, les légumes et le petit élevage. A l'occasion, la recherche s'oriente sur des thématiques plus complexes, telles que la lutte contre les maladies et les ravageurs, la gestion du sol, de l'eau et l'alimentation minérale.

Thèmes de recherche



L'approche adoptée permet une large diffusion des résultats de recherche et favorise la participation des groupes marginalisés: femmes, travailleurs sans terre, communautés indigènes (Indiens).

Les CIAL: répartition par genre



Au fur et à mesure de leur évolution, les CIAL acquièrent plus de compétences dans le processus de la recherche et deviennent moins dépendants de l'aide des agents facilitateurs. En Colombie, les CIAL de la région du Cauca ont mis en place au moins quatre expérimentations pour consolider leur compréhension des bases méthodologiques de la recherche, telles que le dessin expérimental, les traitements, les répétitions et la nécessité de l'utilisation d'un témoin. L'apprentissage de la gestion indépendante de toutes les étapes du processus de la mise en place d'un CIAL a également demandé au moins quatre cycles de planification, conduite, évaluation et rétro alimentation à la communauté.

Comme l'a montrée l'expérience menée en Colombie, où ce concept a été testé initialement, la méthode du CIAL rend service tant à la communauté dans son ensemble qu'à chacun de ses membres. Les bénéfices qui en résultent varient selon le degré de maturité et le thème de recherche mis en œuvre.

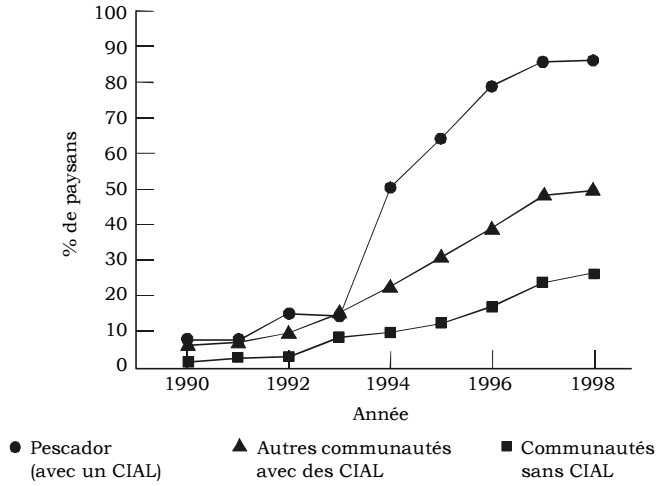
Ils incluent:

- Un accroissement de la capacité locale en recherche formelle
- Une amélioration au niveau local de la planification, de la gestion et de la capacité d'organisation
- Un accroissement de la production agricole
- Une augmentation de la capacité locale d'expérimentation
- Une augmentation des expérimentations utilisant des pratiques de conservation des sols
- Une augmentation de la biodiversité dans les systèmes de culture
- Une possibilité d'accès au crédit
- Une plus grande disponibilité de semences améliorées
- Une meilleure sécurité alimentaire
- La mise en place de petites entreprises
- Une amélioration du statut des femmes et des groupes marginalisés
- Un meilleur accès aux services et produits de la recherche formelle.

L'adoption des produits obtenus par un CIAL et un signal clair de son succès en tant que service local de recherche. L'exemple de la région du Cauca, en Colombie montre le potentiel qu'a un CIAL de

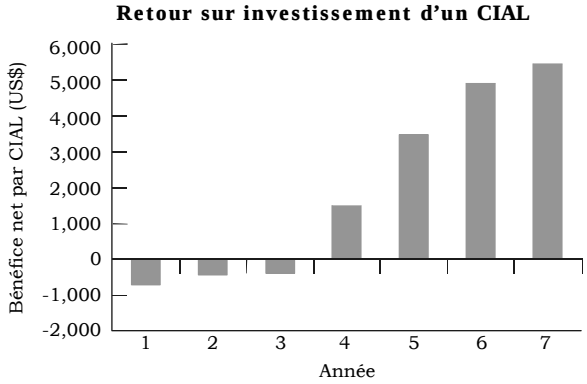
stimuler la large adoption de la technologie qu'il a créée. Plus de 80% des paysans du village de Pescador ont adopté une variété de haricot recommandée par le comité local. L'impact du CIAL va au-delà se sa propre communauté. Cinquante pour cent des paysans de trois communautés voisines possédant un CIAL ainsi que plus de 20% des paysans de quatre communautés ne possédant pas de CIAL ont également adopté la nouvelle variété.

Adoption d'une variété de haricot recommandée par un CIAL, par des communautés voisines possédant ou non un CIAL



Certains CIAL ayant atteint une certaine maturité se lancent dans la création de petites entreprises, qui commercialisent des semences améliorées ou d'autres produits ou services. Nombreux sont ceux qui jouent un rôle plus important dans la communauté. Ils cherchent à avoir accès au crédit et à la formation, élaborent et présentent des projets, et enfin agissent comme ambassadeurs auprès des acteurs de la recherche développement.

Les retombées de l'activité des CIAL sur leurs communautés et sur les services de la recherche formelle transcendent les bénéfices financiers. Néanmoins le CIAT estime que le retour sur investissement de la mise en place d'un CIAL avoisine les 78%.



Le mouvement des CIAL est encore récent et son évolution ne peut être prédite avec certitude. S'ils sont gérés de façon adéquate, les CIAL devraient apporter des bénéfices substantiels en termes de croissance et d'équité. En revanche, leur effet sur la pérennité de la production est moins prévisible. En plaçant la responsabilité de la recherche adaptative entre les mains de la communauté paysanne, les CIAL permettront aussi de réduire les coûts de la recherche institutionnelle, tout en augmentant son impact. Cependant, la viabilité financière à long terme des CIAL et des organisations de second niveau apparaît comme un défi majeur auquel il reste à trouver une réponse.

Power to the Poorest

This book is about a new kind of institution—one in which poor farmers take charge of an agricultural research process that benefits both them and their community. What is the institution, how does it work, and how did the idea originate?

A prize-winning process

Bumping up the track in their 4-wheel drive, the ministry officials from Quito were not expecting much. Most farmers of the high Andes were poor, downtrodden, and inarticulate people. Would this community be any different?

At 3,500 meters, the track leveled out abruptly on a bare shelf of hillside. Round a corner a small, tin-roofed building came into view amidst windswept fields. Outside it a sign: "Comité de Investigación Agrícola Local (CIAL), 11 de Noviembre." They had arrived.

The building's interior was Spartan, furnished only with wooden benches and a small, wobbly table. The officials took their seats, introductions were made, and the reason for the visit was explained. The officials, from the Ministry of Social Welfare, were responsible for awarding a prize to the best-organized farmers' group in Ecuador. They were here to judge the entry submitted by the 11 de Noviembre group.

Then the presentations began. Leonidas Gualpulema, a local farmer and the group's leader, described how and why the group had formed. After him Alfonso Villarroel, another farmer, talked about the results it had achieved.

As the two men spoke, the officials felt their interest quicken. The group had tackled a problem vital to the livelihoods of the community; that much was clear. Yields of potato, the community's main subsistence and cash crop, had been falling for several years as pests and diseases took hold. With the support of an agronomist from the local branch of the research service, the group had obtained resistant lines and had run its own trials to compare these with traditional varieties.

Thus far it sounded like conventional on-farm research. Yet there were some intriguing differences. Clearly, the speakers no longer thought of themselves as just farmers. They were, they explained, also researchers. Just like researchers in the formal research system, they had collected data from their experiments and analyzed the results. They spoke confidently and knowledgeably, not just about the technology they had tested but also about the research methodology they had followed, using words that farmers did not normally use, such as "treatment" and "replicate." They seemed, in short, to be in control of the entire process. The agronomist, a man called Fausto Merino, had played a comparatively modest role—supporting the group without dominating it.

Even more intriguing was the way the whole thing had been set up. The group had been elected by the local community, which had also decided the topic to be researched. It had formed a committee of four people, each with a clearly defined role. It even had a fund to finance the research. And it had reported the results back to the community—something that formal researchers often neglected to do.

By the time they left, the officials were deeply impressed. The group had demonstrated something new to them—that farmers can take the lead in conducting adaptive research, becoming active, responsible partners in the research process. Moreover, they could do so in a way that was sensitive to the needs of the local community, who had seemed fully supportive of the work and well informed about its results. Above all, the group radiated an energy and optimism that gave the lie to the conventional image of the marginalized Andean farmer.

A few weeks later, the 11 de Noviembre group learned that it had won the prize, not so much for its results as for the process it had followed to obtain them. When Gualpulema and Villarroel traveled to Quito to receive the prize on the group's behalf, they were proud to see their small community, normally a quiet backwater remote from the

mainstream of national debate, featured in the national press and on television. On their return they held a meeting with the rest of the group, at which it was decided that the prize money, around US$1,000, should go towards the purchase of a small diesel-powered mill, a labor-saving piece of equipment long needed in the community.

Originally dependent on external support, the group is now able to sustain itself as a small business. It sells seed potatoes of the varieties it has tested and provides milling services for barley and other crops. Its customers include most farmers in the local community and people from further afield. Visitors from other villages often say they would like to start a similar group of their own.

What *is* a CIAL?

Villarroel and his colleagues are members of a Comité de Investigación Agrícola Local (Local Agricultural Research Committee), or CIAL for short.

A CIAL is a new kind of institution—a farmer-run research service that is answerable to the local community. CIALs experiment with

locally unknown and unproven farming methods, comparing them with established practice. The committees then report on their findings and disseminate the most useful ones to the community's farmers.

The CIALs arose to meet the needs of poor farming communities that have little or no access to agricultural and extension services. They provide a way of producing reliable recommendations for the highly variable agroecological conditions, cultural preferences, and economic constraints of smallholder farming in the tropics. Though their roots are in Latin America, the CIALs could also prove applicable in Africa and Asia.

The task of a CIAL begins where experiment station research leaves off—that is, at the stage when neither scientists nor farmers can say with confidence whether an innovation will be appropriate for a specific location. The alternatives tested by a CIAL may originate within the farming community or come from the formal research system, or they may be a hybrid of the two. The CIAL is both a means of accelerating the spread of technology already available and a platform for evaluating, adapting, and disseminating new technology. Once a network of mature CIALs has formed in an area, the need for intensive coverage by research and extension services is greatly reduced, because poor rural communities have successfully assumed the task of testing and adapting technology themselves. The CIAL also provides a channel for communicating the needs of poor farmers back to the formal research system.

The CIAL differs from formal agricultural research and development (R&D) institutions in one vital respect. Whereas formal research tends to be dominated by scientists, ownership of the CIAL lies entirely with the local farming community. The community elects the CIAL's members, decides on the topics to be researched, and feeds its reactions to the results back into the research process. It also evaluates the performance of its CIAL, which can continue working only if it counts on the community's good will. Community ownership of the process ensures that research is relevant to local needs, making the adoption of results more likely. Because farmers are responsible for the process, the CIAL empowers people who have previously had little control over their lives and few opportunities to improve them.

Though many CIALs develop into larger groups, all have at least four members:

- A leader, usually recognized as a dynamic member of the local community
- A treasurer, responsible for managing the CIAL's finances
- A secretary, who takes minutes of meetings, records data, and writes the CIAL's reports
- A communicator, responsible for disseminating the results of the CIAL's research and advising those who wish to test or adopt them.

Each CIAL is supported by an external facilitator, who visits the community periodically. The main tasks of the facilitator are to introduce the idea of the CIAL and advise on its implementation, to provide training in the techniques of participatory, adaptive research, and to establish and maintain links with the formal R&D system. The effectiveness of the CIAL in empowering local people depends on how the facilitator behaves. His or her role is to guide the process, not control it, and to feed in ideas, not impose them.

The facilitator is often an agronomist from a sympathetic formal research or extension service or from a nongovernment organization (NGO). Alternatively, he or she may be a paraprofessional recruited from the farming community (often a former CIAL member). In either case the facilitator should be well trained in the CIAL process and familiar with the principles of participatory research.

The CIAL follows a cyclical process, often depicted as a staircase (Figure 1), which has the following stages:

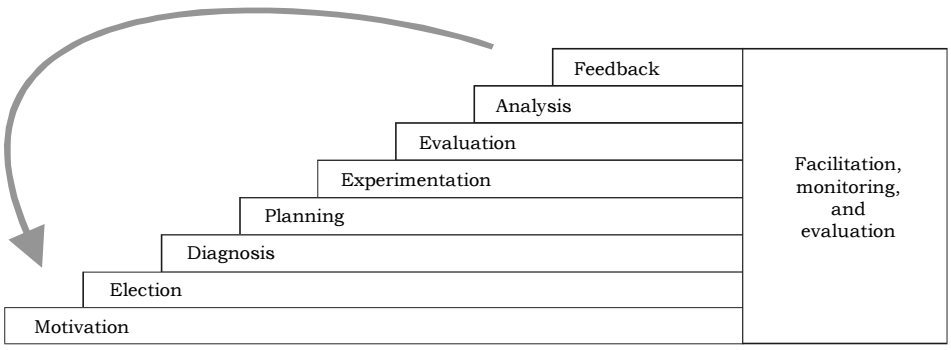


Figure 1. The CIAL process.

- *Motivation.* The facilitator invites the entire community to a meeting to introduce the CIAL idea and to get the process going, if the community is interested. At this meeting the facilitator must avoid creating false expectations that could jeopardize the whole process by making it clear that the CIAL is a community-owned and managed research service. The facilitator also asks the participants to analyze what it means to experiment with new technology. Local experience with experimentation and its results are discussed, together with the possibility of obtaining new technology from outside the community. The facilitator talks about the risks inherent in research and explains why there are no easy or instant solutions. He or she then explains the nature and purpose of a CIAL and asks the community to decide whether or not it wants to start one.
- *Election.* If the decision is positive, the community next elects a committee of four members to conduct research on its behalf. The main selection criteria are community-mindedness and an interest in experimentation. Committee members must also be willing to serve for at least a year and to participate in training on the research process. Many CIALs have several volunteers, who assist elected members.
- *Diagnosis*. The CIAL's research topic is chosen through a group diagnostic process that takes place at another open community meeting. The facilitator (or the CIAL leader) explains that the aim is to identify an agricultural topic that can be researched, not to focus on development or nonagricultural issues. Topics are identified, using simple tools such as flip charts. The group then examines each topic, considering the chances of success, who and how many will benefit, and the likely costs of the research. Communities commonly decide to evaluate new crops or crop varieties, measures for controlling crop pests and diseases, and fertilizer use.
- *Planning.* With the support of the facilitator, the CIAL members seek further information and advice on the research topic and the design of their experiment, consulting other farmers or resource persons from the formal R&D system if they wish. They decide on the objectives of the experiment, the treatments and control, the materials and methods to be used, the inputs needed, the data to be collected, and the criteria for evaluating results. Responsibilities for the various tasks associated with the experiment are assigned to different CIAL members.

- *Experimentation.* The CIAL members implement the experiment, using the CIAL fund to pay for inputs. They may be assisted by other members of the community. Data are collected as planned.
- *Evaluation.* The CIAL meets with the facilitator to evaluate the data collected. Conclusions are drawn and preparations made to present the results to the community.
- *Analysis.* The CIAL asks itself, "What have we learned?" This stage in the process is especially important when new crops fail or the experiment produces unexpected results.
- *Feedback.* The CIAL presents its activities, results, and expenditures at regular, open meetings of the community. Committee members may support their presentation with simple posters showing research results. If the CIAL feels confident about these results, it may make recommendations based on them. The community then decides whether the CIAL should continue with the experiment, switch to a new topic, or cease its activities altogether.

Monitoring and evaluation, like facilitation, take place throughout the CIAL process. The purpose is to ensure that the process operates as it should and that those responsible for it are held accountable. The community monitors the performance of the CIAL and is free to add, remove, or replace committee members at any time. The CIAL is expected to keep records of its experiments and to make these available to community members, upon request. It must also account to the community for its use of the CIAL fund. The CIAL, in turn, monitors the performance of its facilitator, who is held responsible for the quality of support provided. The results of this evaluation are made publicly available.

"At the start, we felt ridiculous sowing such small plots. Later, when some varieties didn't do well, we saw how important it was to start small."

Leonidas Gualpulema, Leader, 11 de Noviembre CIAL, Ecuador

The facilitator guides the CIAL through three successive experiments. In the first experiment, known as the exploratory or preliminary trial, the CIAL tests innovations on small plots. These may have several treatments, such as different crop varieties, fertilizer amounts or types, and sowing dates or densities. The exploratory trial is a mechanism for eliminating options that are unlikely to succeed under local conditions. If the objective of the first experiment is to compare the performance of different crop varieties, eight to ten of these may be planted, including at least one local control. The area planted encompasses three to four replicates of eight to ten rows, each 5 meters long.

The treatments considered to be most promising are then tested on larger plots in a second experiment. If the purpose is to compare varieties, this second experiment might consist of five materials planted in ten rows 10 meters long.

Finally, two or three top-performing choices are planted on a still larger area in a third experiment, often called the production plot. A production plot of top-choice varieties might consist of three or more replicates of 20 to 30 rows 20 to 30 meters long. Afterwards, the CIAL may continue with commercial production or switch to a new research topic.

Starting small is central to the CIAL process. The small plots, though they may invite ridicule at first, enable committee members to test new technology without taking too much risk.

Each CIAL finances its activities through a small, self-managed revolving fund. This usually begins with a one-off donation of seed money (typically US$30 to $120) from outside the community.

"The CIAL is a means of testing new technology at low risk."

Tomás Barahona, Leader, Lavanderos CIAL, Honduras

The purpose of the fund is to absorb the risks involved in research. If the research is successful, the CIAL should be able to cover the costs of its experiments by selling produce from its commercial or communal plots. In this way the fund can grow year by year, enabling the CIAL to continue its research, distribute profits to its members, or invest in new equipment or services. Gradually, the CIAL becomes a self-sustaining small business. If the research is unsuccessful or the money runs out, the community may organize fund-raising events to recapitalize the fund.

The CIAL as synthesis

Like most successful ideas in rural development, the CIAL blends the traditional and indigenous with new elements from outside the farmers' environment.

Let us begin with the traditional and indigenous. Traditional farming used to be perceived as a static system, in which farmers unquestioningly did what their parents had done. But during the 1980s, social scientists began uncovering a rich seam of spontaneous experimentation in traditional systems. They learned that many farmers are avid collectors of new crop species or varieties, which they test in

small niches on their farms. Others seek new ways of controlling pests and diseases, maintaining soil fertility, and preventing erosion. This "hidden research system" constitutes a vast resource for technology development and dissemination that has been essentially ignored by formal public-sector research and extension services.

At about the same time, development workers in NGOs and a few scientists in the formal research system began criticizing formal research for its lack of impact on the farming systems of the poor. The criticisms were of two main kinds.

First, scientists were accused of adopting a "top-down" approach to technology design, in which farmers' needs and opinions were not adequately taken into account. This approach resulted in technologies that were too expensive or too laborious for small-scale farmers. The formal research system was thus unable to produce technologies that met the highly varied needs of poor farmers in the diverse and risk-prone environments of rainfed agriculture.

A clear example of the justice of this criticism is the blanket fertilizer recommendation. Even today, scientists and extension workers regularly recommend that farmers use expensive (and often unavailable)

commercial fertilizers in amounts that far exceed what they can afford. The same recommendations are made year after year for large areas, even though actual needs vary so greatly over time and space that such recommendations are virtually meaningless.

The criticism was somewhat less justified in the case of new crop varieties. Many turned out to be more suitable for poor farmers than the critics believed.

But even these technologies often need more local testing than the formal research system can handle. The extreme variability of upland, rainfed farming environments gives rise to a mosaic of diverse varieties scattered across the landscape. Under these conditions it is difficult to match new germplasm to agroecological conditions and users' needs.

The second main criticism of formal research was that it had weak links to development. Scientists generated new technologies but did little or nothing to secure their adoption. Extension services, underfunded and demoralized, felt little ownership of the research products and were often completely ignorant of them. Government seed services were particularly ineffectual. As a result of these shortcomings, even the more relevant technologies were not being made available to farmers.

In response many in the NGO movement tried to develop and disseminate technology independently of the formal research system. They relied instead on the farmers' capacity for experimentation and on farmer-to-farmer transfer of research results. Often, however, these groups romanticized traditional knowledge and technologies, which in some cases failed to meet expectations. Nonetheless, this approach has often led to improvements in traditional production systems, though it has not so far delivered the substantial increases in productivity and incomes that are needed to lift farmers out of poverty.

Others in the NGO movement conceded that the products of formal research could be useful. But they insisted that farmers have a stronger say in designing and selecting new technologies for further evaluation.

The NGO workers' relative lack of specialized technical training was both an advantage and a handicap. On the one hand, these practitioners promoted a more open diagnostic process, in which farmers were free to choose research topics, unfettered by the opinions of disciplinary scientists. On the other, many of them lacked the

technical knowledge to diagnose farmers' problems accurately and did not know where to look for solutions. Some NGO workers improved in this respect, but the gap between formal research and the NGO movement slowed the learning process.

Scientists in the formal system had mixed reactions to the first criticism. Some felt it was unfair. Farmers, they argued, had been involved in formal research ever since the early 1970s, when the farming systems research movement knocked down the fence separating research stations from farmers' fields. As far as these scientists were concerned, conventional on-farm research was adequate, since it tested products developed on the basis of accurate diagnosis of farmers' needs.

Others, however, agreed that farming systems research had lost its way, getting bogged down in a sterile debate about methodological issues at the expense of its original emphasis on putting farmers at the center of research. Much on-farm research still treated the farmer as little more than a provider of land and labor. The scientist set the research agenda, supplying farmers with ready-made solutions developed on research stations. Often, these solutions reflected the scientists' interests rather than the farmers' priorities.

Scientists who were dissatisfied with farming systems research tried to make their research more responsive to farmers' needs. They altered the diagnostic and design phases of research to allow for more active farmer participation. Participatory plant breeding (PPB) approaches were developed to improve farmers' input into technology generation. Often, however, the research agenda was still restricted to subjects in which the scientists had expertise. In addition, the degree of farmer participation was still controlled by the scientist, who saw participation as a way of improving the efficiency of research rather than empowering farmers.

Formal scientists responded more positively to the second criticism, concerning the weak link between research and development. Many increased their emphasis on technology transfer through on-farm research, seeking stronger collaboration with extension services. Some researchers worked with farmer groups rather than individuals as a means of expanding their work while cutting its costs. Seed services and national varietal release committees came under increasing pressure from plant breeders and research managers to do their jobs properly.

Most importantly, formal researchers—at least in Africa and Asia—started working with NGOs. They collaborated mainly in seed multiplication and dissemination but in other activities as well, including participatory research and development projects. The rigid linear model began to give way to a more flexible one in which research and development were integrated.

Against this background the CIAL methodology ties together different traditions in agricultural R&D. It provides the NGOs and the more radical formal scientists with an open diagnostic process and a way to build on farmers' capacity for experimentation. At the same time, it creates demand for the products and services of formal research by offering a powerful new means of adapting and disseminating the new technology that poor farmers so badly need.

CIAT's experience

In 1982 a sociologist named Jacqueline Ashby began work on a collaborative project involving CIAT and the International Fertilizer Development Center (IFDC). The project was to prove a turning point for CIAT, which so far had little experience in participatory research.

Funded by the Ford Foundation, the project involved on-farm testing of fertilizer recommendations in Colombia's Cauca Department. Ashby had been recruited to persuade farmers to adopt the recommendations, but she found them unwilling to do so. The farmers thought that use of fertilizers in the amounts recommended by the project was too risky in the uncertain environment in which they farmed.

For Ashby the experience raised fundamental questions about how the recommendations had been formed. When the Ford Foundation project ended, she turned to the Kellogg Foundation for help in funding a new project that would simultaneously train researchers in a participatory approach, while further developing the principles, processes, and tools for such an approach. The Kellogg Foundation, which had long had a policy of "investing in people," expressed keen interest and committed funds for a 3-year project from 1987 to 1990. Entitled "Investigación Participativa con Agricultores" (Participatory Research with Farmers), or IPRA, the project was implemented by a new team of social scientists and agronomists recruited by CIAT—the CIAT-IPRA team.

The project caught the mood of the moment. During its 3-year span, it exposed over 600 professionals to participatory research, reaching beyond Colombia to Ecuador, Bolivia, and Brazil as interest in the approach grew.

The methodology development component of the project was based in Cauca Department, where Ashby worked with farmers to find

out whether increasing their participation in the diagnostic and design phases of research would alter the conclusions reached and hence the recommendations made. The farmers were divided into two groups, both testing the same treatments, namely different levels of management of beans and potatoes. One group took management decisions independently, while the other was able to consult with scientists.

The results had a clear message: Researchers who fail to involve farmers as active and autonomous partners early in the research process run the risk of developing irrelevant technology that will not be adopted. Farmers who made decisions independently had lower crop yields and reached different conclusions about input use from the farmers with access to researchers. Having a researcher around to advise them reduced the uncertainty felt by farmers, who then increased their use of inputs in the trials. The results also showed that, if farmers are involved early in the research, they may select potentially useful options for testing that would have been rejected by researchers working on their own.

Dan Moore, vice-president of the Kellogg Foundation, acknowledged the project's achievements but challenged the CIAT-IPRA team to go a step further. He pointed out that, although farmers had participated in the project, their involvement had still been initiated and controlled by scientists for the sake of improving the research process rather than the lot of the farmers. Could participatory research be established on a sustainable basis in local communities? And could a process be devised that would be fully owned and controlled by farmers?

Seed-time

At about the same time, farmers were putting a different question to CIAT researchers at Pescador, one of the Kellogg project's sites. As the project drew to a close, the farmers asked: "What happens when CIAT leaves?"

For researchers the simplest questions are sometimes the hardest to answer. Had nothing come out of the project with which the farmers could continue independently? Ashby and the CIAT-IPRA team drove down to Pescador to talk the issue over with the farmers.

What they found fascinated them. The farmers wanted to keep doing their own research in small groups, sharing the results with the wider local community. But they needed the help of an agronomist to get them started. They also needed funds to support their research and asked Ashby to help raise them.

The seed scattered by the farmers fell on fertile ground. Ashby and her colleagues returned to the office to write a proposal to Kellogg that defined the CIAL concept and outlined a plan to test it.

The Cauca laboratory

If one had to choose a single adjective to describe rural life in Latin America's Andean region, it would be "unfair."

No one who has visited the region can forget its distinctive topography: flat plains flanked by steep ranges of hills, rising to the occasional snow-capped peak. In the plains life is easy. Well-watered, fertile pastures and cropland, coupled with moderate temperatures, make for an ideal farming environment. The hillsides, in contrast, present extremely difficult conditions. Apart from the odd area in which the hills open out, flat or gently sloping land is scarce. Farmers scratch a living from soils on steep slopes prone to erosion and landslides. As the nutrients wash down to the valleys, soil fertility is in constant decline. At the higher altitudes, these problems are compounded by low temperatures, hail, frost, and—surprisingly—drought.

Reflecting this topography, society is highly polarized. From the times of the *conquistadores* onwards, the powerful and rich have colonized the plains, displacing the defenseless and the poor, who take refuge in the hills. The process of displacement continues today, as the wealthier urban classes buy *fincas* in the lower hillside areas close to cities, forcing up prices to levels that the locals cannot afford, and as large farmers expand their *haciendas* with impunity, driving out settlers from land officially classified as "unused."

The combination of population growth, declining crop yields, and acute land scarcity is forcing smallholder agriculture to expand into higher and higher areas, at the expense of the remaining forest. Many who live here suffer from hunger and malnutrition, especially in the weeks before harvest. These higher areas are home to the region's original indigenous peoples, who are today its poorest citizens. In some countries the higher areas are also a refuge for guerrilla movements, paramilitary groups, and drug traffickers.

"June is the hardest month. The maize and bean harvests haven't yet come in, so people run out of food and money. Often children go hungry to school. We don't sell anything during that month. In the past 10 years, life has stayed the same or got worse. The land used to be fertile, but now maize yields have gone right down."

Village Shopkeeper, Carreto, Honduras

Cauca Department (Figure 2), on CIAT's doorstep in southern Colombia, is one of the country's poorest and most inequitable regions. Its smallholders, while representing more than 80% of the region's population, own just 22% of the land, often farming areas of less than 2 hectares. Here they grow a wide array of food and cash crops, including maize, beans, coffee, and sugar cane, usually at very low levels of productivity.

This area, the location of the previous Ford and Kellogg projects, provided the ideal testing ground for the new CIAL concept. Its highly diverse, risk-prone farming systems presented formal R&D with a daunting challenge, to which it had not proved equal. Scientists had developed few improved technologies for the region, and these had not been widely adopted in farmers' fields. At the same time, though, Cauca's rural communities were well known for two traits that would provide a firm foundation for the CIAL process: their community spirit and the passion of their farmers for spontaneous experimentation.

In 1990 the CIAT-IPRA team launched five pilot CIALs in Cauca. These host communities were chosen to test the concept in different institutional settings. Three of them—El Diviso, Sotará, and San Bosco—already had strong farmers' associations, suggesting a

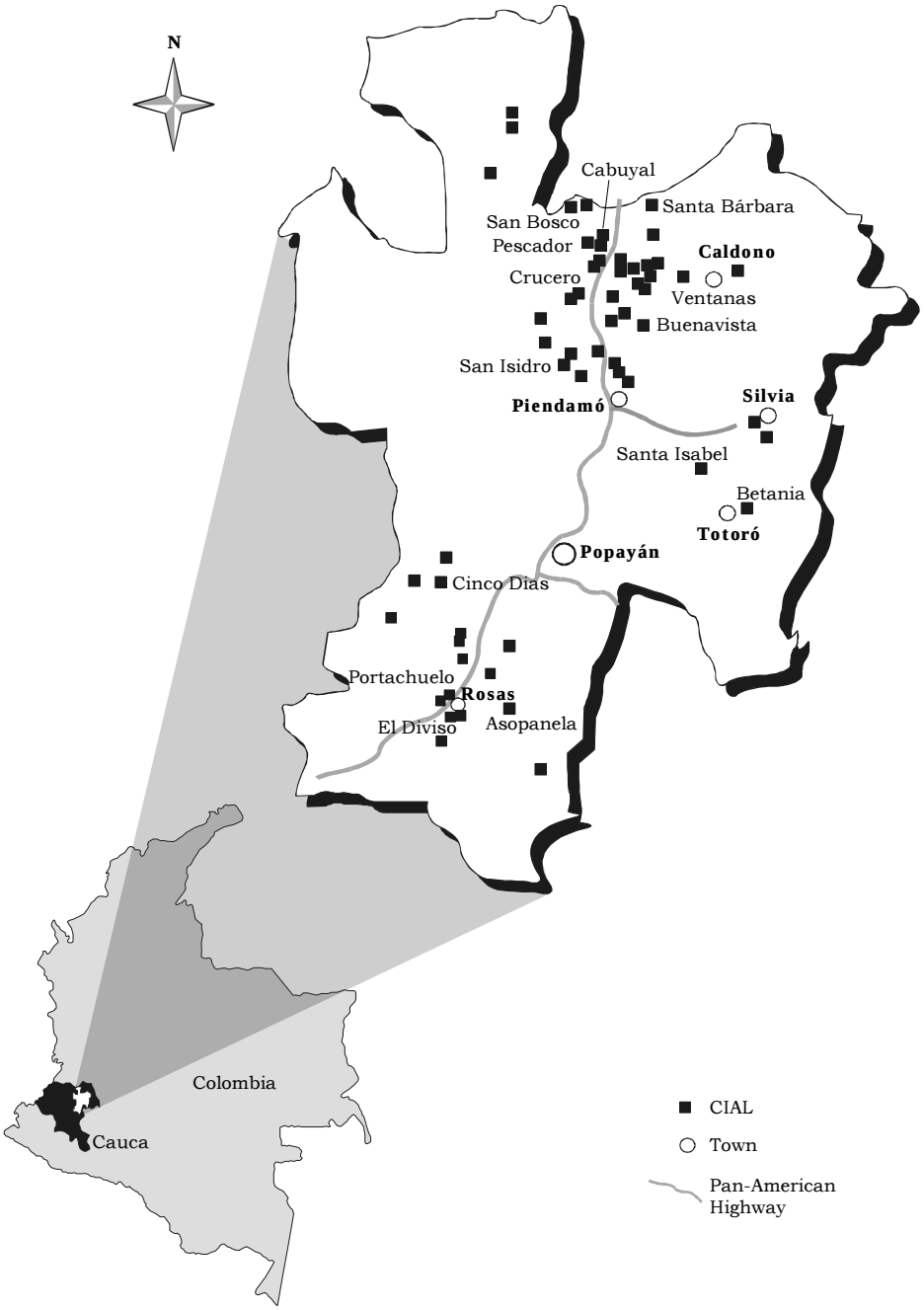


Figure 2. The CIALs in Cauca Department, southern Colombia.

strong sense of community. A fourth, at El Crucero de Pescador, provided an opportunity to involve an NGO in establishing and guiding the CIAL, while a fifth, Cinco Días, had no pre-existing institutions that might support the process.

In a word

To sum up:

- The CIAL is a new concept in rural R&D, offering hope for poor farmers.
- It is a farmer-based research service answerable to the local community.
- It empowers local people by putting them in control of the research process.
- It is a synthesis of different traditions in research, building on farmers' experimentation, while drawing on the products and services of the formal research sector.

The Opening Flower

What sort of people become CIAL members? What do farmers want out of their CIALs? And in the opening stages of the process, what do they actually get?

A new sense of self

"I've woken up as a farmer and as a researcher." Thus Ernesto Quintanillo, leader of the CIAL at Palmichal in Honduras, sums up what he has gained from the CIAL process.

As a farmer Quintanillo had plenty of experience in the traditional practices used to raise crops and livestock in the poor hillside areas of his home province of Santa Bárbara. But he lacked access to improved technology, which seldom reached this remote community suspended high above the plains where the government seed and extension services are based. Like many of his friends, Quintanillo had noticed how the traditional variety of maize had become susceptible to pests and diseases in recent years. Yields had fallen steadily, and he seldom had a surplus for sale. Applying fertilizer did not solve the problem, since the plants just grew tall and then fell down in the wind. And without fertilizer the soil was becoming exhausted, accelerating the decline in yields.

Until recently, Quintanillo could see no way out of his predicament and felt that the future held little for him. But things have started to change for the better. Through their participation in the CIAL, he and his fellow committee members have been able to test new maize varieties that greatly

increase their yields. Of the several on offer to them, they have chosen one called Guyape that has good resistance to pests and diseases, does not fall over and—most important—has good cooking qualities and taste when made into *tortillas*. With the support of the agronomist who works with their CIAL, they have learned how to get the best out of Guyape by sowing it more densely and applying chicken manure. They have also learned the techniques of seed selection and multiplication, required to keep the variety pure and to build a surplus of high-quality seed for sale to others.

If Quintanillo has gained a new lease on life as a farmer, as a researcher he has acquired a whole new identity. He speaks of a new self-confidence in his own powers of observation and analysis and a new ability to express himself. He has discovered his qualities as a leader and is eager to pass on what he has learned. This is not a false identity borrowed from others. Rather, becoming a researcher has brought out in Quintanillo qualities that were latent and needed fuller expression. Like all CIAL members, Quintanillo was elected by his community, because in their eyes he met certain criteria identified as desirable for a CIAL leader.

I've woken up as a farmer and as a researcher. I can observe and evaluate, not only our CIAL trials but also my own farming and that of others. I feel I can teach others all that I have learned.

Ernesto Quintanillo, Leader, Palmichal CIAL, Honduras

What makes a farmer-researcher?

Que no sean egoístas—Don't be selfish! The words look down from posters on the walls of many a community room in the 249 villages across Latin America that now have a CIAL. The posters, which variously describe the aims of the CIAL, the roles and responsibilities of its members, and the results achieved in experiments, are one means by which the CIALs explain themselves to their local communities. They are also a way of reminding CIAL members of what is expected of them.

Community-mindedness is the first essential quality of a CIAL leader or member, since the CIAL will stand or fall over the long term according to how it is perceived by the people it serves. CIALs that are seen as hoarding knowledge or resources instead of sharing them with others will not be supported.

The CIAL concept draws on the tradition of sharing and serving others that is the strength of poor societies in so many parts of the world. In much of Latin America, a sense of community still pervades rural life. It is reflected in local politics (the community is the lowest

"What sort of people make good CIAL members?

They should:

- Be willing to work for the community
- Like doing research
- Be responsible and concerned
- Be good communicators
- Be able to solve problems
- Be willing to take time for the CIAL
- Be good farmers
- Not be selfish
- Like learning from and teaching others."

Adapted from a poster, Flor Naciente CIAL, Ecuador

Adelmo Calambáz

You would not believe it now, but Adelmo Calambáz used to be deeply shy. "When we first met him, he wouldn't say a word," says Teresa Gracia, sociologist with the CIAT-IPRA team.

Adelmo is of humble origin. Born in San Bosco, Colombia, of landless Indian parents, he left primary school after 3 years without being able to read or write. When his father fell ill, responsibility for feeding his large family fell to him as the eldest son. Adelmo became a laborer, rising every day at 4:00 am to set off on a 3-hour walk to reach the small plot he rented to grow the family's maize. There he worked without rest or food until late afternoon. After the long trek home, he would eat and fall asleep.

Exhausted and barely able to break even, Adelmo decided on a change. With his mother's support, he reduced his solitary toil on the distant plot to 3 days a week, devoting the other two to voluntary activities in the village itself. Only through work with others, on behalf of the whole community, could he himself advance.

The decision proved a turning point. With others in the village, Adelmo formed a literacy group and began work on a community garden. The group met in the evenings at the house of Doña Ruth Bueno, the village's largest farmer and a leading light in the community. There he met Ruth's son, a schoolteacher who taught the group and who became his friend and mentor. It was while the two were seeking ways of enabling the group to develop that they heard of the CIAL concept and wrote to CIAT asking for help in starting up the San Bosco CIAL.

Because of his reputation for hard work and community-mindedness, Adelmo was elected the new CIAL's secretary and later its leader. Undeterred by the failure of their first experiment, on potatoes, he and his fellow members persevered and after a few years began selling seeds of a new maize variety. Soon a milling enterprise was also established.

Adelmo's work with the CIAL has transformed his situation. He now has a house in the village and his own land nearby—2 hectares on which he grows maize, beans, plantain, and coffee. In recognition of his outstanding contribution to the community, he was recently elected chairman of the *junta comunal* or village council. He has also become an ambassador for the CIAL process, often being invited to visit other communities to tell them of his experiences.

But the biggest change of all is in Adelmo's perception of himself. "I am a different person," he says. "I have more confidence in my abilities and feel I could now manage to farm a much larger area. My training in the CIAL has helped me learn to speak in public. I'm no longer afraid of outsiders and don't feel uncomfortable going to government offices."

Zuly Pajoy

"Do you like being a researcher?" "Sí." A smile lights up the young face. "Sí! Because when I do research, I learn."

The speaker is 14-year-old Zuly Pajoy, who lives with her parents at San Isidro, a village in the cassava-growing country of Colombia's Cauca Department. Zuly is the youngest member of a seven-strong, all-women CIAL that is seeking alternatives to cassava, which became unprofitable when the processing sector slumped in the mid-1990s.

Opportunities to learn mean a lot to Zuly. She was born in the village, where she studied up to fifth grade in the local primary school. But after that she had to stay at home to help her mother with the housework, since San Isidro has no secondary school. Local government's answer to the village's long-running campaign to get one is that it has no money to pay for a teacher. Sixty other pupils in the village are in Zuly's position.

Fortunately, Zuly has acquired another interest, one that takes her out of the house. Unlike other girls in her village, she likes farming. While still a school-girl she joined a group of women learning about chicken production. The group, originally organized by the local branch of the extension service, later evolved into a CIAL.

The CIAL is conducting research on soybean, a new crop for the area. The learning experience has not been easy, Zuly says. The first trial, sown in an El Niño year, was lost to drought. The crop grew well in the second year, but shelling the harvested beans by hand was tedious and time-consuming—so much so that some members of the group wanted to give up. A borrowed threshing machine came to the rescue. Now the group has been granted a loan to buy its own machine.

Last year Zuly received her first ever invitation to pass on what she has learned to others. She visited CIAT for the first time, where she made a presentation on the San Isidro women's CIAL to a workshop on participatory research. "I was nervous beforehand, but when I started speaking I relaxed," she says. The scientists in her audience were impressed. "If only we could learn to explain things so simply and clearly," said one.

Zuly's dream is to go to agricultural college—but that would mean leaving San Isidro and the CIAL. Living elsewhere would cost money that Zuly's parents do not have, at least not at the moment. They have told her she must wait until her older brother, now at high school, has finished his education.

Until her dream becomes a reality, Zuly is content to go on "learning by doing" through her participation in the CIAL. What has she learned from her research? "That you have to persevere to overcome difficulties, that you have to be patient." And Zuly smiles again.

level in the administrative hierarchy), in village infrastructure (most villages have a community room), in the way work is organized (many communities have a day in the week when all work together), and in the conduct of farming (community land is worked in common, and the harvest is shared). In many villages the CIAL takes its place among other committees that organize collective aspects of village life, such as sport, health, and adult education.

The second essential quality of a CIAL member is curiosity. CIAL members must "like doing research" *(que les gusta ensayar).* This quality is also strongly present in poor rural societies. The CIAL builds on the farmers' natural tendency to experiment, adding to it skills and principles taken from formal research. The CIAT-IPRA team has found that farmers can grasp the basic principles of experimental design and data analysis and can greatly enhance the value of their results by applying them.

The posters go on to list other criteria for CIAL membership. Some of these are personal qualities, such as the ability to communicate or the desire to learn from and teach others. Others are practical considerations, such as the amount of time the person can devote to CIAL work. Some qualities pertain to specific committee functions. The secretary, for example, must be able to read and write, while the treasurer must be trustworthy.

The community looks for all these qualities when it chooses CIAL members at the motivational meeting that begins the research process. Moreover, the facilitator supporting the CIAL during its early stages instills these qualities in elected CIAL members. Of course, being human, not all CIAL members will have them in equal abundance!

Aspirations

CIAL members almost invariably cite the opportunity to learn as a central reason for joining. "This is our school of agriculture," said Eliverio Orellana, leader of the CIAL at El Paraíso in Honduras. Farmers' desire to learn is every bit as ardent as that of researchers. For them learning is a means of empowerment, of taking control of their lives. It is also an exit route from poverty. Indeed, with credit usually unobtainable and government services to the rural poor in retreat, learning and self-help are often the *only* ways forward that preserve the social fabric and remain within the law.

Though hopeful about the CIAL process, most members, and especially the leaders, are cautious in their short-term expectations. "We don't expect to get rich, but we can get some extra income by improving our farming," says Orellano. This partly reflects the natural pessimism of the rural poor, born of unrelenting economic stagnation. But the cautiousness of CIAL members is also a deliberate policy. They carefully avoid raising the community's expectations to unrealistically high levels.

Aspirations often differ according to age group and standing within the community. Older and poorer members tend to be concerned about sheer survival—a reduction in the risk of farming or at best an easing of hardship. "We hope to breathe more easily," as one farmer from El Tontolo, Honduras, put it. Younger or better-off farmers have higher expectations, though even they do not expect to get rich. One older CIAL member summed up the difference between the generations by pointing to his son, also a member of the group: "I am 43, so for me it's too late. He'll learn faster than I can and will do what I cannot."

Women's aspirations are similar to men's, except in one vital respect. Both men and women are interested in increasing food security and cash income, but women often see a separate CIAL of their own as a route to emancipation. "We wanted to do something for *us,*" said one member of an all-female CIAL at Cinco Días in Colombia.

Through such groups the women aim to earn income that can be kept separate from that of their husbands and used as they see fit—albeit usually to benefit the family rather than themselves.

Often, the women seek psychological as well as material emancipation. They use their groups to maintain a distance from the men that allows them the freedom to discuss and laugh and joke together. At El Tontolo, where the women already had their own market gardening group before the CIAL started, the men were not permitted to join. "Our husbands have realized they cannot stop women from thinking and deciding, so they've given us the freedom to do that," says Susana Domínguez, the group's coordinator. The CIAL thus becomes an instrument for improving the lot of women in societies where they are still routinely repressed.

Sometimes the early stages of the CIAL process enable members and the community to develop explicit, shared aspirations. At Palmichal in Honduras, CIAL members speak of a "dream" their group has created and increasingly shares with the community through meetings and other interaction. In the dream the community undertakes collective action to protect natural resources by planting trees and abandoning the practice of burning to clear land. These are long-term objectives that can be sought once the immediate need for increased food security has been met. It remains to be seen whether this dream can be realized, but shared aspirations of this kind bode well for future community support of the CIAL.

In other cases there is a less explicit connection between the objectives of CIAL members and those of the community. When the members of one newly formed CIAL were asked about its objectives, each expressed his own ambitions. "I want to become an expert in seed selection," said one. "I'd like to learn how to make the most efficient use of my land," said another, while a third said: "I want to learn to be a *really great* farmer." After all had spoken, there was a pause, and then someone added, as an afterthought: "Oh yes, and we'd like to serve the community too!"

Food first

When rural communities choose the research topics, independently of formal research, their preferences provide an accurate reading of farmers' most pressing problems.

Most communities assign first priority to their major food crops (Figure 3). Thus, in Honduras most CIALs are working on common beans and maize—the two most important ingredients of the staple diet. In the Andean regions of Ecuador and Bolivia, farmer-researchers emphasize potato and broad bean, which are key to the very survival of Quechua-speaking indigenous communities in these remote highland areas. In Colombia the CIALs are researching a more diverse array of commodities and topics, but food crops still occupy pride of place.

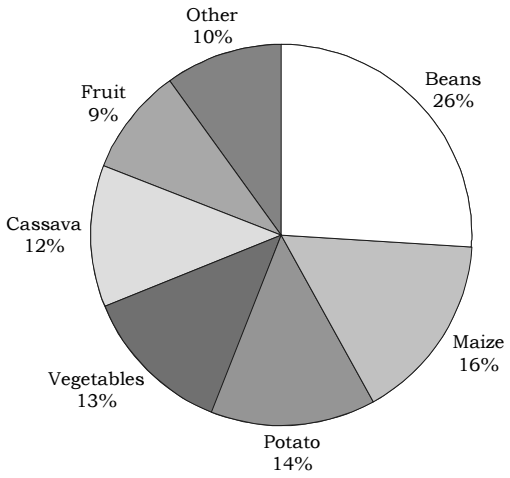


Figure 3. The crops researched by CIALs.

These choices reflect the poverty and hunger that still afflict most hillside regions of Latin America. Many CIALs have been set up in places neglected by conventional research and extension. Others work in areas that receive only half-hearted support from projects that do not meet farmers' real needs. When asked what they want to learn, CIAL members typically cite the basics of more productive farming—the use of new varieties, fertilizer application, better sowing dates and densities, good seed selection, and low-cost feed for small livestock. Most hillside communities have had little experience with these practices, which are taken for granted in the wealthier lowlands.

In the few areas where food security is strong and the rural economy has diversified, CIAL research covers a broader range of themes (Figure 4). Under these conditions the committees seek to raise incomes by taking up new crops or adding value to the traditional

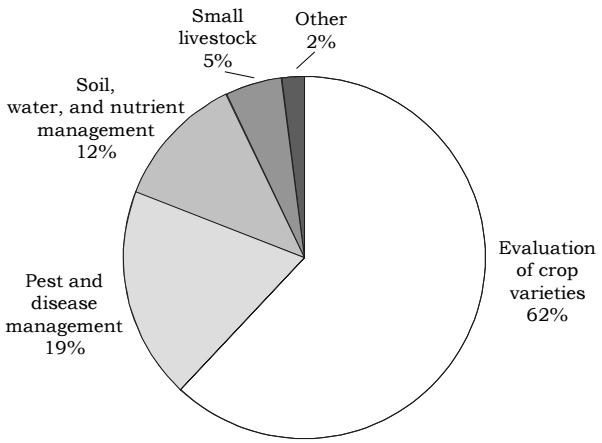


Figure 4. The main CIAL research themes.

ones through improved processing. In Colombia's Cauca Department, for example, CIALs are researching *mora* (a kind of blackberry suitable for fruit juice production), sugar cane (for processing into *panela*, a form of brown sugar that makes a popular energy-giving drink or snack),

cassava (dual-purpose varieties for starch production and domestic consumption), soybean, potato, and several vegetables. But they also conduct trials on the staple food crops, maize and common beans. In Cundinamarca Department, which has the vast urban market of Bogotá on its doorstep, CIALs work on several commercial crops, including snapbean.

Many CIALs conduct research aimed at protecting natural resources, while at the same time they explore new crop varieties. At El Paraíso in Honduras, for example, farmers are testing live and dead barriers to control erosion in a steeply sloping field sown to new bean and maize varieties.

Younger CIAL members are particularly interested in such research, often seeing it as a necessary response to the poor practices of previous generations. At Palmichal in Honduras, one farmer-researcher described the CIAL's challenge as "getting out of the mess we're in as a result of the way our parents exploited the land." Some members of this CIAL have sworn "never to burn again." Their decision represents a sharp

break with the past in a region where burning vegetation to clear land for cultivation is a longstanding tradition.

This progression in CIAL research mirrors shifts that are evident in the formal research system. Both give first priority to satisfying food needs. But research has also begun to seek ways of increasing incomes through diversification and processing. Finally, as environmental degradation has started to threaten livelihoods, researchers have taken action to protect natural resources.

Why become a CIAL member?

Being a CIAL member quickly brings benefits. The most tangible ones are exposure to new farming practices and technologies, together with increased status in the eyes of the community. These are the CIAL member's immediate rewards for being seekers and disseminators of knowledge.

Thus, at Lavanderos in Honduras, CIAL members said the rest of the community treated them "like consultants," often coming to them for advice on technical issues. Some CIAL members may already have served as unofficial advisors before the CIAL was launched. For them joining the CIAL merely confirms that role. But for others the transformation is more dramatic. "Before I joined the CIAL, I was nothing," said one man. "Now everyone comes to me for advice."

In the early stages of the CIAL process, when the support of the facilitator is most intense, non-CIAL members of the community may notice, and even envy, the more frequent contact that CIAL members have with urban professionals and visitors. This was the case at San Bosco in Colombia, where many in the community thought that such contacts led to economic advantages over others. Later, when the CIAL's research results were widely disseminated, these suspicions evaporated.

Through their contact with the facilitator, CIAL members learn about the techniques of formal research, which can enrich their own traditional experimentation. A study conducted by the CIAT-IPRA team showed that this learning facilitates both the formal and informal research processes. Around 75% of plots in CIAL trials produce results that can be analyzed statistically, in addition to being interpreted by farmers.

By learning the techniques of formal research, farmers also learn to speak a common language with scientists, thus improving the mutual understanding between them. "We know what you do," one CIAL member in Colombia's Cauca Department told a group of visiting scientists, "because we do research here too."

CIAL members may even start behaving like formal researchers. The CIAL leader at Lavanderos in Honduras, for example, is careful not to give away too much seed of the new bean varieties the committee is evaluating. "We need to do another year's testing before we can be sure enough to recommend anything," he says, displaying a caution more typical of the plant breeder than of the farmer. Group members even scoff at each other's experiments, just like formal researchers sometimes do. One CIAL in Colombia's Cundinamarca Department conducted research on hilling of potatoes as a means of controlling a burrowing pest. When it announced that the practice was effective, one member of a neighboring CIAL remarked, "I knew that 30 years ago."

The experience of working as a team with a common purpose boosts morale. Because the CIAL has clearly defined objectives and, through its fund, the means to achieve them, members soon sense that success could be just around the corner. The hard work and energy of the CIAL sometimes stand in marked contrast to the apathy and aimlessness that characterize other groups in the same village.

All too conscious of their powerlessness in the past, CIAL members quickly acquire a taste for the self-reliance that now lies within their grasp. "We want to build our capacity to do research *on our own,*" says Tomás Barahona, leader of the CIAL at Lavanderos, Honduras. At nearby El Tontolo, CIAL members noticed how dependent they were on the help of their facilitator in obtaining inputs. Together, they worked out a strategy for overcoming the problem, using the CIAL fund to sow a collective plot that would raise enough cash to buy the inputs themselves. Operations of this kind are typical in the second year of the

"The difference between CIALs and other farmers groups is that CIALs know what their goal is. They know they can achieve it, and they have the commitment to do so."

Hernando Castro, Extension Agent, UMATA Rosa, Colombia

"We can get inputs when the agronomists help us, but when we try by ourselves we lack resources. We analyzed this problem in our CIAL and decided to sow a collective plot, half maize, half beans. We'll select the best seeds for sowing next year, then sell the rest at market. Half the proceeds we'll use to build our research fund and the other half we'll share between us."

Taurino Castellanos, Secretary, El Tontolo CIAL, Honduras

CIAL, as members realize they can use the fund to plan an exit route from poverty, while at the same time building their research capacity.

Teething problems

Being a CIAL member is not for everyone. Many groups experience a turnover of at least one of their members in the opening year.

CIALs often go through a difficult period during their early development. This typically occurs a few weeks after foundation, when the initial rush of enthusiasm experienced at the motivational and diagnostic meetings has worn off. Some members feel that the research topic chosen by the community does not match their own priorities and lose interest. Others drop out because the CIAL takes up too much time that they would rather spend doing their own farming. Women in particular find it hard to fit in CIAL activities because of their many other commitments. When people drop out, the remaining members of the committee seek community approval to replace them, usually with volunteers who have shown enthusiasm for the CIAL from the start.

Neighbors often mock CIAL members for the small size of the plots they start. "You'll never get rich that way" is a frequent taunt. CIAL members may get discouraged by such remarks, especially if the facilitator has not reinforced the idea that starting small minimizes risk, while providing a learning opportunity and a firm foundation for further experimentation.

Most CIALs start their work as community research services with the aim of improving food security by increasing the productivity of basic staples. Women's CIALs are often concerned with improving family nutrition and may decide initially to investigate the production of protein sources, such as soybeans or small livestock. As food security and nutrition improve, CIALs generally begin to seek ways of generating more income, often by diversifying production. Many groups experiment with fruits or vegetables at this stage. Others address problems with pests, diseases, low soil fertility, and soil degradation.

Looking for a more productive variety and testing a new crop are examples of research on simple, straightforward problems. These can be solved through experiments conducted on a small plot and involving just one variable. Pest, disease, and soil management problems pose much greater challenges for a CIAL. These are complex, open-ended

problems, involving issues of scale, trade-offs between various options, and interactions between variables.

The CIALs do not always progress naturally from simple to complex research issues. Food security is not the main priority of all CIAL communities. And even CIALs working to improve food security may decide to tackle a more complex research question if their staple crop is endangered by soil degradation or pests. Moreover, apparently simple questions, such as the feasibility of growing a new crop, may prove more complex than was expected.

At Pasca in Colombia's Cundinamarca Department, a CIAL conducted its first experiment on integrated pest management (IPM) for potato. The trial failed because the plots were too close together, causing the treatments to become confounded. Juan Guerrero, the CIAL's leader, says the CIAL may not be able to continue since the local community, skeptical from the start, is now far from supportive.

At El Diviso in Cauca Department, the success of the first CIAL prompted a group of women to launch a second one. Whereas the first had worked on maize, the area's major food crop, the second committee opted for peanut, a much riskier crop, given the area's unpredictable rainfall pattern. Harvests were poor, and the women found shelling the crop too laborious. They have become demoralized and have stopped attending the CIAL meetings. It is uncertain whether their CIAL will continue.

Both experiences raise questions about role of the facilitator in

"For farmers as for formal researchers, finding out what *doesn't* work is just as valuable as a positive research result."

Jacqueline Ashby, Director of Research, Natural Resource Management, CIAT

managing the process of learning to do research. If CIAL members have unrealistically high expectations at the outset, the group may falter when its early results do not meet these expectations. In cases like Pasca, the facilitator must be able to help CIAL members conceptualize the scale issues involved. At El Diviso, the facilitator should have introduced information on the rainfall requirements of the crop during the planning stage. This would have prompted the CIAL to reconsider the idea of testing peanut.

CIALs can overcome setbacks like these, provided they reach a common understanding that their primary purpose is to generate knowledge, not to raise incomes. It is crucial that the facilitator reinforce this point while the CIAL concept is still new to a community. At Ventanas in Cauca, the community asked the CIAL to conduct research on a long-stemmed green onion, for which there was steady demand from nearby urban markets. The facilitator did not appreciate the CIAL's function as a local research service. Indeed, he was impatient with the whole idea of research and sought instead to achieve a quick development success.

"An experiment is a success as long as we learn something from it."

José Domingo García, Leader, Ventanas CIAL, Colombia

The CIAL carried out a well-designed experiment, which showed that it was *not* profitable to grow green onion locally. Instead of perceiving this to be a useful result, the CIAL members blamed each other for the "failure" and stopped working together. The facilitator blamed himself for the fact that the CIAL had not made money. Only when a CIAT-IPRA team member called the CIAL members and the facilitator together to conduct a fresh analysis of the experience did the group realize that the experiment had been a success after all. The group redefined success as an experiment from which the community could learn something. The CIAL at Ventanas went on to become a strong, creative group.

Lessons in the risks of research can come especially hard when CIALs ignore the recommendation to start small. At San Bosco in Cauca, the CIAL conducted its first experiment on potato, a new crop for the area. The varieties tested soon showed vigorous above-ground growth, luring the CIAL into a decision to skip the rest of the research process and go straight to commercial production. Eager to cash in at the end of the current season, CIAL members worked hard to clear and plant a large area while there was still time. But with the harvest came disillusion: To their dismay, the potatoes they dug up were tiny!

That the CIAL continued at all was due to the courage and determination of two members, Adelmo Calambáz and Eliécer Sandoval. They borrowed some oxen, plowed under the failed crop, and as soon as the season allowed, sowed cassava and common bean, more dependable crops that are widely grown in the area. To their relief the two were rewarded with a good harvest that enabled them to pay off the debt incurred by the failure of the first experiment. They then made a fresh start by calling a new diagnostic meeting.

Many other CIALs have shown perseverance in the face of setbacks. At San Isidro in Cauca, for example, a women's group decided to conduct research on soybean in search of alternatives to cassava. The crop yielded well but proved extremely difficult to shell by hand. Some of the women wanted to give up, but the men in the village urged them to continue. Now the women are looking for funding to help them buy a threshing machine.

Eventually, perseverance is rewarded with the first signs of success. These may take unexpected forms. One back-handed complement the community can pay the CIAL is to steal seed from its trial plots—a sure sign that the improved varieties being tested are exciting interest. One CIAL that had lost its seed to pests and diseases—or so it thought—appealed to neighbors to give back any seed they had taken. Red-faced, the neighbors had to confess they were able to replace most of the lost harvest, as they had taken enough to multiply large quantities.

CIALs going through difficulties can often gain strength from visiting other groups that are further advanced. María Gutiérrez was the secretary of the newly formed 11 de Noviembre group in Ecuador when she was invited to travel to Colombia to attend the annual meeting of the CIALs in Cauca Department. There she met members of the El Diviso CIAL, which had successfully launched its own seed production and milling enterprises. They invited her to visit their community after the meeting. The visit rekindled her belief that her own CIAL could succeed as well. Fired with a new enthusiasm, she returned to Ecuador, where she persuaded her dispirited fellow CIAL members to continue with their research.

"The people from El Diviso told me how they had experimented with maize and how, at first, nobody in the community paid any attention. Then, as soon as they got good yields on the production plot, the community became interested. I was especially thrilled to see their milling machine. At 11 de Noviembre we already had the idea that we might get one, but I still needed convincing."

María Gutiérrez, Secretary, 11 de Noviembre CIAL, Ecuador

"The farmers expect you to arrive with something for them. Breaking this down is difficult."

Iván A. Reinoso, Director, Santa Catalina Research Station, INIAP, Ecuador

Today the 11 de Noviembre group, like the CIAL at El Diviso, is selling seed and providing milling services to its own community and others. And it too receives visitors from other communities that have heard about its work and are interested in starting their own CIAL.

Old habits die hard

"I wish they'd stop calling me 'Doctor'," says Héctor Andrade, plant breeder with Ecuador's national agricultural research institute. He is referring to the habitual deference shown by farmers to those they consider their social superiors. The habit irks Andrade, who tries to treat the farmers he works with as his equals.

The deference is a symptom of *paternalismo*—a set of traditional attitudes that can subtly undermine the CIAL process in its early stages, causing both sides to fall back on conventional behavioral norms rather than accepting the challenge of working together in new, more egalitarian ways. The chief ingredient of *paternalismo* is a culture of dependence on the part of farmers, accustomed to participating in research projects as passive recipients rather than active protagonists. Such farmers typically join CIALs to receive inputs rather than to serve the community. The culture of dependence is reinforced by the natural tendency of formal-sector scientists to dominate situations because of their superior education and social status.

Andrade points out that while older farmers are especially prone to paternalism, younger ones are more at ease with researchers and more demanding in their relationships with them. This problem should, therefore, gradually solve itself as education and living standards in rural areas improve.

Another problem that can afflict the CIAL process right at the outset is "participation fatigue." This debilitating condition arises in communities where too many past projects have left too few lasting improvements in living standards.

At Silisgualagua in Honduras, for example, few people attended the motivational meeting to launch the CIAL. Villagers thought the project was a rerun of a previous one that had used small demonstration plots to introduce innovations. That project had left its participants with few lasting changes for the better in their lives, so they were not enthusiastic about a repeat performance.

CIAT-IPRA encountered an acute case of participation fatigue when its researchers told communities in Cauca's Cabuyal watershed about the CIAL process. The watershed had for several years been the site of previous CIAT research, some of which had introduced useful innovations to farmers. "Not CIAT *again,*" said villagers. "We've already got all we need from you." The six or so CIALs in the watershed are today among the weakest in Cauca. Many participants say they are tired of meetings and just want to get on with their own lives.

Such problems occur rarely, however. For most communities the idea of starting a CIAL is a welcome one.

"We've been deprived; we've stagnated, been frozen in time. There is little education here. But this is a way to learn, a way to move forward."

Olga Ati, Leader, Flor Naciente CIAL, Ecuador

Room with a view

If the altitude does not take your breath away, then the beauty of the setting will. At over 3,000 meters a ruined farmhouse in the traditional *hacienda* style stands amid green pastures and cropland, with a view towards the snows of Chimborazo, Ecuador's highest mountain.

Inside the farmhouse a group of Quechua-speaking women wearing brightly colored *ponchos* sit on benches arranged round the walls of the one room that still has both a ceiling and a floor. Most are undernourished, many have coughs and colds, some are exhausted from working the land while ill and hungry.

But despite their sufferings, these women radiate optimism and determination. They have just finished clearing 100 hectares of land on

the *hacienda*. Last year the land and the house were allocated to them by Ecuador's land reform agency after protracted negotiations with the previous owner and a 10-year struggle to raise the necessary money. The women have renamed their community 19 de Septiembre—the day the deeds to the property became theirs.

One of the first things the women did as a new community was to arrange a visit to the 11 de Noviembre group, where they met María Gutiérrez and her colleagues. Inspired by what they saw, they decided to form their own CIAL, which they have named Flor Naciente, the opening flower.

The women have designated the one useable room in the farmhouse as Flor Naciente's meeting place. That room is their toehold on a better future.

Today they are gathering to decide the CIAL's research priorities. Potato tops the list of priorities for most of the women. They must grow the crop to feed their families, but its yields have fallen owing to pests and diseases. Today's meeting is thus concerned with bare survival. But a few years from now, if their research is successful, the women plan to start a seed potato business and then venture into other crops, such as barley and broad beans. Eventually, their dream is to have enough money to renovate the house and turn it into a training center for other farmers.

"Flor Naciente," "Esperanza," "Nuevo Pensamiento," "El Progreso"—the names that people give their CIALs, like those of the communities that host them, speak to us of their belief in a brighter future—one that is free from hunger and poverty. The CIALs are a promise these communities make to themselves, an assertion of their determination to succeed through the pursuit of knowledge and the power of collective action.

In a word

To sum up:

- Most poor farming communities welcome the idea of launching a CIAL.
- Putting farmers in control of research gives them a new sense of purpose in life and enhances their status in the community.
- Most communities initially ask their CIALs to conduct research on their most important food crops.
- The CIAL process can be frustrated by apathy or a culture of dependency among farmers.
- The facilitator plays a key role in guiding CIAL members, as they learn the research process.

The Mature CIAL

When CIALs reach maturity, the benefits of their research begin to be felt by the whole community and beyond. In this chapter we visit El Diviso, a community of 83 families in the south of Colombia's Cauca Department, to examine the impact of a CIAL that is now in its eighth year.

First fruits

As the first rains fall, the road to El Diviso carries a larger than usual volume of travelers. Most arrive on foot, but some come in *chivas*—Colombia's colorful open-sided buses—and a few in cars or pick-up trucks. Farmers from outlying areas are on their way to the community's CIAL to buy maize seed.

"Our seed has become well known for its high quality," says Medardo Carlosama, the CIAL's leader. So much so that it has brought about a dramatic change in people's sowing practices, with farmers who used to sow unsorted grain now willing to pay the much higher price (over four times as much) for selected seed. During the 4 years it has been in commercial production, the CIAL has sold 7 tons of seed with an estimated value of US$7,000.

Small-scale farmers, each buying 3 to 4 kilograms, are the main customers. Most are from El Diviso, but the numbers coming from further afield are rising steadily. The business has also attracted custom from the local branch of the extension service and the Coffee Board, which have bought seed in bulk to distribute to farmers participating in their programs. The extension service, which previously had no alternative supplier, is using the seed to run demonstration plots in six other communities.

Despite the broadening customer base, meeting demand from the El Diviso community remains the CIAL's top priority. Seed is sold to community members at a price 30% below the normal market price, placing it within the reach of many farmers who previously could not afford it.

"We're recognized as seed producers. People come here looking for us, asking for our maize."

Medardo Carlosama, Leader, El Diviso CIAL, Colombia

Use of the seed has transformed the community's food security. In the early 1990s, many went hungry in the months immediately before harvest. The traditional maize grown at that time was a tall variety that had to be sown at a low density, was unresponsive to fertilizer, gave only one ear per plant, and took so long to reach maturity that only one crop per year could be grown. The plant often fell over in the high winds of August, as the crop approached maturity. Yields, at around 820 kilograms per hectare, were falling while demand was rising, as farmers struggled to feed not only their own growing families but also the extra laborers recruited to harvest coffee.

The most popular of the varieties recommended by the CIAL, in contrast, is a shorter plant that can be sown at a higher density, gives three ears instead of one, responds well to fertilizer, and reaches maturity in 4 months, allowing farmers to harvest two crops a year. All that adds up to a substantial gain in production, which has risen by nearly 50% to an average of 1,200 kg/ha per season. This is still low compared to what could be achieved through further intensification, but the gain has been nevertheless more than enough to move the community into food surplus. The improved variety was developed by national researchers from germplasm supplied by the Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT).

Besides increasing, production has become more stable—an important advantage for farmers exposed to the risks of cropping in unpredictable rainfed environments. The shorter cycle of the new maize enables it to perform well when rainfall is poor, ironing out the extreme yield fluctuations of the traditional variety from year to year. In the El Niño year of 1997, farmers who had not adopted

the varieties promoted by the CIAL lost their entire crop to drought, while those at El Diviso reaped a good harvest. At the start of the next season, the queue to buy seed at the CIAL was swollen by farmers who had lost their own seed and had decided, belatedly, to switch varieties.

The surpluses created by the CIAL's work have raised family farm incomes substantially. The CIAT-IPRA team estimate the value of additional maize production derived from El Diviso's seed at US$70,000 to $80,000 annually.

Despite—or perhaps because of—the profitability of its seed enterprise, the CIAL has retained its orientation towards serving the community. "If there's demand for research on a particular crop and we know it's suitable for our environment, we'll respect that demand," says Carlosama. Next on the CIAL's list of priorities is common bean, the community's second most important food crop and one for which Carlosama and his colleagues are receiving a growing number of requests. They plan to start by learning from the bean experiments already conducted by neighboring CIALs.

Adding value

Seed production is generally the first enterprise launched by mature CIALs that have chosen to conduct research on varietal selection. Many go on to invest the profits in new threshing and milling equipment, providing a further service to the community.

At El Diviso having a mill in the village center saves everyone time—a long trudge to a distant town or a whole day spent milling by hand an amount that takes 3 minutes by machine. It also saves money, as the CIAL undercuts the higher prices charged by larger scale millers. Milled maize has a higher retail value than the unprocessed crop, helping to raise farmers' incomes from grain surpluses still further. Another advantage is that the machinery can be used to mill other cereals besides maize and to process ripe coffee berries.

Many households feed some of their surplus maize to animals, whose products also have a higher cash value than the grain. People in the village say the number of chickens kept has risen sharply in recent years. Women in poor households, especially, have gone into egg production to earn extra cash.

Another project under consideration by the CIAL is to make and market a feed concentrate using maize and other ingredients. This would give a further boost to the village's poultry production and could also be used to feed pigs.

Unexpected benefits

For most of El Diviso's inhabitants, going shopping in the distant market town was a time-consuming chore, performed only when the needs mounted up to the point at which the trip became absolutely necessary. Nowadays, however, the villagers are more likely to return to the local shop to get those forgotten extras. Thanks to a one-off donation by the CIAL, the farmers' association that runs the shop is able to carry a wider range of goods than is normally available in a country district.

The donation is just one of the unexpected benefits that have flowed from the CIAL's work.

For the CIAL itself, the most important of these additional benefits is access to more land. In 1996 the CIAL members joined with two other farmers in the community to make an application to the Instituto Colombiano de Reforma Agraria (INCORA). As a recognizable organization of at least six people with a proven track record in implementing a clearly defined project, the CIAL fulfilled the agency's

"Since the CIAL, more and more institutions are coming here offering credit and training."
Medardo Carlosama, Leader, El Diviso, CIAL, Colombia

conditions for an allocation and gained an extra 40 hectares of land. Used for seed production, the land is the very basis of the CIAL's growing prosperity.

In a land-scarce rural society, extra land is a vital exit route from poverty. To the north of El Diviso, lies the village of San Bosco, the majority of whose inhabitants are landless laborers. When the leader of the CIAL at San Bosco heard about El Diviso's successful application, he decided to visit El Diviso to learn more. Now he too has launched a similar application to INCORA.

It was one of many such visits. "People come from near and far," says Carlosama, "and they ask us about all sorts of things." As Cauca Department's most successful CIAL, El Diviso has become a showcase for the methodology, spreading knowledge of its benefits and providing advice and help to others along the way. Many groups going through difficulties in their early stages have been given new hope by the glimpse of their future afforded by a visit to El Diviso. It is impossible to calculate the economic value of such visits, but it must far outweigh their costs.

Besides helping other communities, the CIAL at El Diviso has attracted more support from other institutions to El Diviso itself. For example, it has forged links with the Servicio Nacional de Aprendizaje (SENA) to obtain assistance in developing its feed concentrate. According to Carlosama, the credit and training opportunities open to local smallholders have increased markedly since the CIAL began.

"I used to see livestock and sugar cane as our main priorities. Now, with these new maize varieties so much in demand, we're making that a priority instead."
Medardo Mellizo, Extension Agent, UMATA, Rosa, Colombia

The CIAL has also influenced the priorities of formal research and development (R&D) institutions. A local extensionist noted that, in response to demand from farmers, his office was switching its priorities from livestock and sugar cane to multiplying and disseminating maize varieties selected by the CIAL.

Self-sustaining R&D

One of the most exciting benefits from the CIAL's work is the creation of what amounts to a self-sustaining local R&D program. The program helps the community's farmers diversify into new commercial enterprises by reducing the high cost of credit.

On every kilogram of maize seed sold, the CIAL makes a small contribution (around US$0.20) to a rotating fund set up at the CIAL's

request by the local farmers association. Members of the association can borrow from the fund at 20%, well below the 35% interest rate obtainable commercially. The loans are conditional on the farmer's receiving prior training in the production of a new commodity. So far, loans have been granted to farmers venturing into the production of tomatoes, beans, maize, pigs, and chickens. Training has been provided by several NGOs and by SENA. Farmers applying for a loan must submit a written proposal, which is vetted by the association with advice from the CIAL. The CIAL also helps identify sources of training.

"The CIAL is extremely useful. I talk about it wherever I go."
Medardo Carlosama

"It's all based on the experience we had in the CIAL," says Carlosama, who regards the program as an important new development in the village. "The CIAL has made many farmers in our community more interested in innovating."

Carlosama, like many CIAL leaders, remains modest in his assessment of the CIAL's impact. But even he cannot help concluding, with just a hint of pride in his voice, that life has got better in El Diviso since the CIAL began. And he has become an ambassador for the CIAL process on the many trips he makes to other communities that have yet to start their own CIAL.

In a word

To sum up:

- The El Diviso CIAL has moved its community from food deficit to food surplus.
- The CIAL has established profitable seed production and milling enterprises.
- Benefits have also been felt in livestock production and in access to land, credit, and training.
- The CIAL has drawn the attention of formal research and extension services to farmers' concerns and priorities.

The Community's Verdict

Whether or not the rest of the community supports its work is the litmus test of an effective CIAL. In the early stages, support depends critically on the degree to which a CIAL keeps the community informed about its progress. In the longer term, it is vital that the benefits of research are widely shared.

The village that changed its mind

The people of 11 de Noviembre had a problem. Some members of their community—a tiny village high in Ecuador's Andes—wanted to be excused from *minga*.

Minga, or community service, is a common custom in the rural areas of Andean countries. One day a week, all working members of the community come together to perform tasks that will benefit all—such as repairing paths or roads or cultivating fields in common. At 11 de Noviembre, the community had decided to grow an extra potato crop for market, raising money to improve the village's scant facilities and services.

The 12 individuals who thought they ought to be exempt from this project had formed a special committee for agricultural research. They claimed their work for the committee should be seen as equivalent to *minga,* because it was for the benefit of the whole community. But was it really? The plots they had started were so small compared to the communal plot. They

would not produce a large enough harvest to make a profit. And even if there were a profit, would not the 12 just keep it to themselves? The rest of the village remained skeptical and refused their request to be exempted.

That was 3 years ago, when the CIAL at 11 de Noviembre had just begun. By 1998 the community had reversed its decision. Thanks to the CIAL, most of its farmers now had access to new varieties of potato, and the village had its own milling service for barley and legumes. Almost everyone had benefited, and the CIAL's case for exemption from *minga* had been accepted as a result.

The community and the process

Communities interact directly with their CIALs at three formal meetings during the CIAL process: the motivational meeting, the diagnostic meeting, and the feedback meeting.

At the motivational meeting, the community decides whether or not to have a CIAL and if it decides in favor elects the CIAL members. The main criteria for election are community-mindedness and an interest in doing research. Much evidence suggests that the people elected not only meet these criteria but have a reputation for being hard workers into the bargain. The CIAL leaders at San Bosco and El Diviso are prime examples of this kind of person.

The people elected to the CIAL may already be recognized as community leaders. Sometimes they have better farms and are wealthier or more influential than the community's "average" members. This does not

matter, provided they are willing to share the results of the CIAL's research with others.

The motivational meeting is also the occasion for laying out the CIAL's ground rules and for explaining its central purpose as a research service. Other important clarifications are that the CIAL fund belongs to the community, not the committee, and that CIAL members are elected by the community to act on its behalf.

The diagnostic meeting is crucial for achieving community ownership of the CIAL process. In principle research priorities are decided through an open, fair process, in which anyone may participate. In practice, however, it may not quite work out that way. Jacqueline Ashby, who led the CIAT-IPRA team until 1998, comments: "The research agenda is set by the community, but the community itself is heterogenous, consisting of young and old, male and female, wealthy and poor, landed and landless. Not all these groups will be represented at the meeting, so the resulting priorities can be priorities only for some." Those least likely to attend are the ones who feel research cannot benefit them—precisely those who are probably marginalized already.

Some communities overcome this potential bias by launching more than one CIAL. The first addresses an issue of high priority for the majority, such as a major food crop. The second is typically started by a marginalized group—often women—looking for new enterprises that could provide an exit from poverty. Other CIALs, particularly in Honduras, have increased their base of community support by forming large committees with four elected members and an average of eight volunteers.

The process followed during the diagnostic meeting is designed to minimize the chances that participants will choose a topic of interest only to a few. Anyone present can

propose a topic, which is added to a list displayed on a flip-chart or blackboard. All the topics listed are then screened according to a set of questions related to the costs and benefits of conducting research on them, including the crucial question, "Who will benefit?" Some CIALs use special ranking exercises designed to increase the participation of underprivileged or less articulate members of the community.

CIAL members have a strong incentive to ensure that the diagnostic meeting results in a topic that is relevant to the broader community. A faulty diagnosis—one that sets them to work on a minority concern—makes it difficult for the CIAL to maintain the community's support. Lack of support can inhibit the CIAL process, as community members withhold their contributions of labor to communal tasks, such as sowing trials, or stop attending meetings.

As a result, few communities give the impression of having had a closed diagnostic process with a foregone conclusion. The 11 de Noviembre CIAL, like many others, displays on a poster in the community room the number of votes cast for each commodity short-listed during the meeting. This is the sign of a healthy debate at the meeting itself and of a CIAL keen to communicate with those who were not at the meeting.

Communities have been known to change their minds about the research topic chosen. At El Diviso, for example, the first diagnostic meeting resulted in a decision to experiment with squash. The following week the community met again to discard this topic in favor of research on maize, because this would benefit more people. In these cases the

role of the facilitator can be crucial. He or she must resist the temptation to push a special interest.

The feedback meeting is the chief means of ensuring that the CIAL remains accountable to the community. At this meeting the CIAL's communicator reports on the research results achieved, while the treasurer explains how the fund has been used and how any profits are being distributed. The meeting is the community's opportunity to sack committee members and elect different ones if it wishes to do so.

In communities with a strong CIAL, the feedback meeting takes place after each experiment, at least until it has reached the production stage. Some CIALs allow the meetings to lapse after the first or second experiment. Though the reasons for this vary, the lapses are more likely to be the result of unclear results than a deliberate attempt to withhold valuable information. Ambiguous results and uncertainty about their meaning are part of the process of learning to do research. CIALs that obtain unclear results may not like to share them with the community for fear of embarrassment or blame, followed by a loss of support. It is vital that the facilitator help members draw lessons from the research process.

CIAT-IPRA coordinator Ann Braun notes that feedback to the community is potentially the weakest step in the CIAL process and the part most frequently criticized. In Colombia the Corporación para el Fomento de los Comités de Investigación Agropecuaria Local (CORFOCIAL), a second-order organization of CIALs established in Cauca Department, has signaled its concern about this issue by introducing a tough new rule for the CIALs under its umbrella. If a CIAL fails to present its results to the community, it will not receive support from CORFOCIAL when it sows its next experiment.

The three meetings are the most important formal means of communication between the CIAL and the community, but there are others. Many community rooms in CIAL villages have posters displaying the results of research. In some groups the secretary produces a written report describing the trials and their findings. Although this is not usually made widely available, anyone who asks to see it may do so.

Almost all CIALs have a communicator responsible for creating awareness and providing advice and help to others, often through field days or visits to other CIALs. Members can often be contacted individually in the community room or at their homes. And during the cropping season, there are plenty of opportunities for informal dialog across the garden fence or in the experimental plots. At Palmichal in Honduras, one CIAL member said: "People pass by my fields and ask me what I'm doing, so I have a teaching process under way."

Sometimes a larger group or even the whole community becomes involved not only in setting priorities and evaluating results but also in conducting the trial. The people of Nuevo Pensamiento in Nicaragua's Somoto Department help their CIAL researchers sow the trial, collect data on crop growth and resistance to pests and diseases, harvest the crop, and help calculate the yield. Carlos Arturo Quirós, the CIAT-IPRA team member who has monitored this group's progress, says that community implementation leads to strong ownership of the trial's results.

In Northeast Brazil a larger group of 12-15 people commonly accompanies the four elected members whenever they are engaged in trial activities. Participants in these larger groups often train each other in research methods and new innovations, helping to spread knowledge while increasing the quality of the trial and the reliability of its results. Many core CIAL members in this region are part-time farmers who leave the community for long periods to work elsewhere. Members of the extended CIAL fill in for them while they are away. The larger group is thus a useful adaptation of the CIAL methodology to an increasingly mobile rural workforce.

The fund is critical for ensuring that the community owns the CIAL process and finds its results useful. CIAT-IPRA experience shows that, as long as facilitators reinforce the message of community ownership from the start, the community is able to specify how the fund should be used and to hold the CIAL accountable. This same principle of social

control has been used successfully elsewhere, for example, by the Grameen Bank in Asia.

Some communities have challenged the CIAL over its use of the fund. At San Bosco, for example, committee members had to pay the fund from their own pockets when, as a result of poor record keeping, they could not account for the sale of produce from their experiments.

Working with a small, one-off fund for which the CIAL is accountable has clear advantages over an open-ended budget provided by an external agency. The CIAL is thus more likely to make decisions about inputs based on the costs that ordinary farmers are prepared to pay, unbiased by the subsidies and gifts associated with much conventional on-farm research. One reason the CIAL's results have credibility in the local farming community is that they reflect local economic realities.

A good test of the community's acceptance of a CIAL is its willingness to replenish the fund should it become depleted as result of experiments that do not produce a marketable surplus. Some communities have held a dance or a raffle to raise money for the fund. Others have set aside a communal plot to grow a "safe" crop for sale, just in case the riskier, CIAL experiment fails. Communities in Honduras have led the way in finding means to replenish and increase the CIAL funds. Seventeen CIALs have developed commercial projects for producing maize, beans, pigs, and chickens. The committees borrow small amounts to initiate these projects and then invest any profits in the CIAL fund.

Are the CIALs elitist?

Elitism is the criticism most frequently leveled against the CIAL concept by other workers in participatory research and development. Elitist CIALs, it is alleged, retain knowledge and resources for their own use instead of sharing them with the community.

To what extent is this criticism justified? In the short term, the CIAL process undoubtedly creates a small group of farmers with privileged access to new technology and information. The CIAL fund, in particular, creates a freedom to innovate that other farmers in the community do not have. Over the long term, however, this difference should disappear, as the CIAL disseminates its results to the broader community.

As more CIALs reach maturity, there is mounting evidence to refute the charge of elitism. Community acceptance of the 11 de Noviembre

CIAL is a clear indicator that its results were successfully disseminated. In Colombia at El Diviso, where the CIAL is now 8 years old, an estimated 80% of the community's families have benefited from the committee's research. A study of the CIAL at San Bosco found no significant difference in the economic circumstances of CIAL members (including their immediate families) and the rest of the community 6 years after the CIAL was established. Almost all the non-CIAL members of the community who were interviewed said they had been positively affected by the CIAL's work, citing the availability of seed of new varieties and milling equipment as the chief benefits.

According to a study in Colombia's Cauca Department, non-CIAL members in each community sampled were reasonably well informed about the committee and its activities. Half of them knew about the CIAL trials and their objectives, while 40% understood the trial results in detail. Clearly, these groups are communicating well with a large proportion of their communities.

The most convincing evidence for spreading benefits of the CIALs' work comes from the personal testimony of non-CIAL members in the community. Romelia Salazar, who lives and farms at San Bosco, tells how the work of the CIAL has made life easier for her and for many others in this once impoverished village. She credits the CIAL for having helped to make the steep hillsides more stable and productive. Particularly striking is her statement that the whole community has benefited and that the CIAL's activities, far from being divisive, have united the community.

Most CIALs that are testing new food crop varieties seem likely to evolve along the lines of El Diviso and San Bosco. In such cases the CIAL launches first a seed production and then a small-scale milling enterprise. Both types of enterprises bring benefits that spread widely within the local community and beyond. The profit motive of individual CIAL members is not at odds with the CIAL's objective of sharing results widely. In fact, it contributes to this end.

"The new maize milling machine is a wonderful service for the whole community. Before we had to mill maize by hand or go all the way to Mondomo."

Romelia Salazar, Farmer, San Bosco, Colombia

"Previously, our community was isolated. The CIAL has opened the door for institutional support. For example, the UMATA of Santander came and organized a women's group to raise chickens."

Romelia Salazar

Elitism is therefore not a problem with this type of CIAL. But there are other types in which it might arise. The temptation to hoard knowledge or resources is perhaps greatest in specialized processing enterprises, especially when these are competing fiercely in a shrinking market.

The Asopanela CIAL in Cauca, for example, was formed within an existing farmers association to improve the efficiency of small-scale production and processing of sugar cane to make *panela,* a kind of crude sugar used to make energy-giving drinks and snacks. The price of *panela* had fallen dramatically when modern, medium-sized sugar plants, short of orders for refined sugar, began competing with the small-scale producers. The CIAL sought to recapture the association's market by making "organic" *panela*, a higher value product that excludes the use of a bleaching chemical known to cause human health problems. It also sought ways to increase the efficiency of the ovens used for boiling the crude sugar. And it began testing new, more productive sugar cane varieties.

When the CIAL's research showed promise, other producers who had dropped out of the association before it formed a CIAL wanted to rejoin. Understandably, the CIAL required that these producers meet the new quality standards as a condition for rejoining. Failure to do so would have risked rejection of the enterprise's bulked produce. The CIAL also levied a hefty re-entrance fee, effectively keeping some producers out. Since then the committee has started selling its expertise in adapting ovens to other associations, so far only on a cost-recovery basis. It also plans to establish a regional school for teaching organic production of *panela*.

The Asopanela CIAL is evolving into a small business that protects and develops its market, but it cannot be accused of elitism. Indeed, Ann Braun believes the group needs to get more hard-headed about

marketing its expertise. To banish any suspicion that it may have benefited at the expense of other community members, the CIAL has announced that it will donate the research fund, now 40% larger than at the committee's foundation, to a new CIAL being formed to conduct research on plantain.

Another form of elitism may be suspected when CIAL members invite their relatives to join the CIAL. Of the 12 members of one group in Honduras, nearly all are related to each other by blood or marriage. CIALs of this kind risk being seen as a "cosa nuestra"—a family business intent on protecting the interests of a clan or grouping within the community. However, there is no evidence that such groups do in fact withhold information or resources from nonmembers. In isolated rural communities, it can be difficult to form a CIAL with members who are *not* related.

Honduras is an interesting case for many reasons. The CIALs there have mushroomed from two pilot committees established in 1993 to 57 in 1999. Nearly all are located in deeply impoverished hillside areas. Illiteracy is endemic. Alcoholism and violence are frequent problems.

A baseline study conducted in CIAL communities by University of Guelph sociologist, Sally Humphries, used well-being ranking tools to study the nature of the CIALs and their communities. Her results suggest that CIAL members come disproportionately from better-off families. Only 7% of CIAL members were landless versus 19% of nonmembers. Eighty-one percent of CIAL members were literate versus 42% of nonmembers. In-depth interviews in 11 communities indicated

that those outside the CIAL felt that members were receiving special help.

One of the facilitating organizations, Investigación Participativa en Centro-América (IPCA), which supports 29 CIALs, has adopted a new strategy to address the perceived inequalities. IPCA has actively sought to increase the number of people present at the initial motivation meetings. Women, for example, have been personally invited and advised that they may form CIALs independently of men. IPCA has also encouraged the formation of large CIALs with more than four members, as a way of raising the CIAL's profile and combating the idea that it helps only an elite group. IPCA's success underscores the importance of good monitoring and evaluation by the supporting organization. With careful and timely management, tendencies towards elitism can be nipped in the bud.

Lastly, there are cases of elitism by default. CIALs in their early stages sometimes have a weak sense of responsibility to the community because the CIAL process is new to them. They may be more accustomed to collaborating with conventional on-farm research projects, which do not require that they report back to the community. The CIAL is especially likely to think of itself as just another on-farm research project when formal research or extension services launch CIALs in areas where they have worked before. Under these circumstances both farmers and technical staff can find it difficult to shake off old working habits and expectations.

Poverty and the community spirit

As a rule, CIALs tend to work well in poor communities where there is a strong self-help tradition and strong social cohesion. Where farming is more commercial and therefore more competitive, it is harder to generate and retain community support. In these areas farmers have access to alternative sources of innovation and inputs, so there is less need for a CIAL.

Experiences in the contrasting environments of Cauca and Cundinamarca illustrate this tendency.

Cauca is one of Colombia's poorest departments, yet it is host to some of the most successful CIALs, including San Bosco, El Diviso, and Asopanela. Villages where the CIAL was formed within a pre-existing farmers' association or self-help group have shown a particularly high success rate. These institutions, which often organize communal production and other cooperative ventures, foster the spirit of solidarity that makes the CIAL process work.

In market-oriented Cundinamarca, in contrast, the community spirit is less evident. "Farmers here tend to work by themselves," one CIAL member at Pasca remarked. At Arbelaez, where the CIAL is conducting research on snap beans for the urban market, tensions in the committee are rising, as members experience conflicting demands on their time. This stands in marked contrast to San Bosco, where landless laborers make time for CIAL activities despite their long working day. Where time is money, farmers are less generous with it.

There are exceptions to the rule, however. Being a poor community is not always synonymous with having a strong self-help tradition. Some hillside communities are deeply divided along political or ethnic lines, frustrating collective action or at least making it controversial. In such places the fate of the CIAL depends greatly on the perceived impartiality of its members and those who support it. One CIAL in Colombia's troubled Cabuyal watershed ran into difficulties because a technician recruited locally was a controversial choice in the eyes of the indigenous community. They resented his relatively large land holdings and the low wages he had paid them as laborers.

In troubled communities the CIAL appears as a fragile vessel, tossed on the tides of local feeling and easily wrecked when tensions ignite into violence. Yet it is equally true that the CIAL process can help to heal past divisions. In El Salvador the community of San Francisco consists of refugees who have returned to the land after 10 years of civil war. Some are from the area originally, whereas others have come from elsewhere. The existence of the two groups creates the potential for conflict, fueled by unequal access to resources and unsettled scores

from the past. However, representatives of both groups are on the CIAL, which is addressing the shared need to increase basic food supplies. "Our common maize culture unites us," they say.

The difficulty of launching and sustaining CIALs in market-oriented areas is part of a broader trend that has been well documented throughout the Andean region. Communal institutions in general are breaking down there, as rural communities enter the market economy and households depend increasingly on cash income. It remains to be seen whether the CIAL process and structure can be adapted to work well as these new conditions take hold.

Do CIALs reach marginalized people?

When landless laborers in San Bosco wrote to the CIAT-IPRA team asking for help in forming a CIAL, the letter sparked a lively debate. Some members of the team felt the area was too poor to be able to benefit from the CIAL process and that landless laborers, in particular, would not have the time and energy to do research. Others argued that to ignore such a request would be to betray those most in need of a CIAL. Launching a CIAL in San Bosco would be the ultimate test: If it could work there, it could work anywhere.

Luckily for San Bosco, the latter view prevailed. The community got its CIAL, which today is one of the most successful in Colombia. There, as at El Diviso, the main achievements are the introduction and testing of new maize varieties, the formation of a seed production enterprise, and the establishment of a milling service.

The pattern of farming in San Bosco reflects its location, in an area of steeply sloping hillsides prone to erosion and declining soil fertility. Good land holdings close to the village are scarce. When the CIAL was founded, most of its adult male inhabitants, including three out of four CIAL members, had to walk for 3 hours to reach fields that they leased in more productive, lower lying areas. It was here that they cultivated most of the maize and other crops on which their family's survival depended.

The CIAL's work has benefited these landless laborers in several ways, the most important being a radical change in their land use. The maize

varieties introduced by the CIAL can be grown on slopes close to the village. By sowing at higher densities and by using fertilizer, farmers can produce maize sustainably in areas where the risk of erosion and declining soil fertility once ruled out the crop. This frees up time and resources to cultivate more lucrative crops in the more distant plots. Some laborers have even been able to relinquish these plots in favor of newly cleared land closer to their homes.

The San Bosco CIAL discovered that when the traditional variety, *Yunga,* was grown at higher densities with fertilizer, its performance was superior to that of any of the improved varieties they had tested. Their facilitator introduced them to a scientist who showed them techniques for producing and selecting top-quality maize seed. *Yunga*, a landrace variety, continues to be the most widely grown variety in the area and has become one of the mainstays of San Bosco's seed production enterprise.

Several other benefits from the CIAL's work accrue to the landless, just as they do to farmers who have land. These include locally available improved seed and the village's new milling enterprise, which saves everyone in the community time and money. Regardless of whether they own land, most families in the community enjoy a maize surplus. Many are now able to keep chickens—an ideal enterprise for households with little land.

Another marginalized group that participates in the CIALs consists of poor indigenous farmers. Ethnic groups, such as the Totoró, Guambiano, Paéz, Coconuco, Embera, and Yanacona live in some of Latin America's least hospitable environments—highland areas close to the upper limits of cultivation and remote from markets. Yet such areas have bred some of the most active and successful CIALs. One of these, at Totoró in Colombia, has reintroduced a crop that the community lost over 20 years ago.

The CIAL process started at Totoró when village elders told visiting CIAT-IPRA agronomist José Ignacio Roa how they used to cultivate wheat before it became susceptible to fungal diseases. Nowadays, they have to walk many kilometers to the town of Popayán, where they buy bread of inferior quality. Roa wrote to the Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT), which he knew could provide resistant germplasm. Today the CIAL is experimenting with no less than 14 new wheat varieties, and there are plans to restore the community's abandoned flour mill.

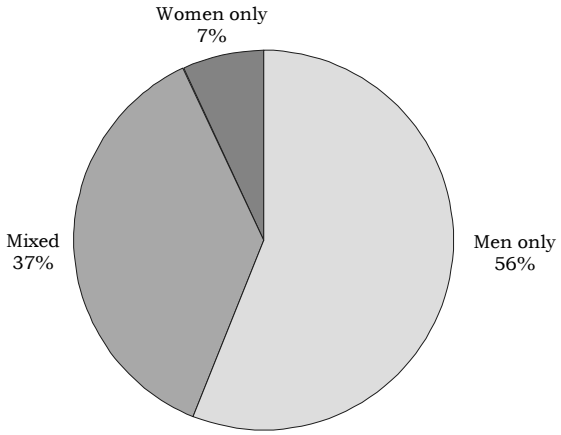


Figure 5. CIALs by gender.

Women form a third marginalized group in many rural communities. Of all the CIALs formed so far, around half consist entirely of men (Figure 5). In Colombia's Cauca Department, for example, 50% of CIALs include men only, while 46% are mixed. In the mixed groups, women are in the minority (31%), most often participating as secretary (Figure 6) because of their higher educational levels and literacy skills.

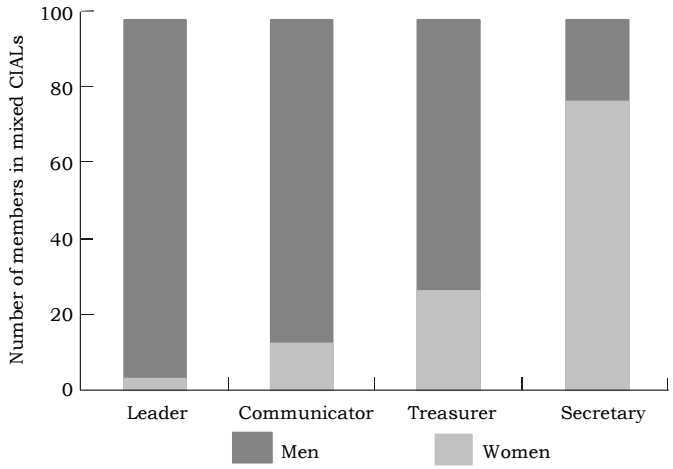


Figure 6. Women's roles in mixed CIALs.

Pilar Guerrero, a sociologist with the CIAT-IPRA team, feels that women should have their own CIALs. "They tend to drop out of mixed CIALs because of *machismo*," she says.

When mixed or all-male CIALs select and disseminate new crop varieties, women in the community benefit alongside the men. Indeed,

women are often the final arbiters of the acceptability of a variety, since they do most of the processing and cooking. At Palmichal in Honduras, Andrea Hernández, the wife of a CIAL member, was among the first to submit the maize varieties selected by the CIAL to their final test—performance in the frying pan when *tortillas* are made. At El Diviso women in the community rejected one of the maize varieties selected by the CIAL, because they found it too hard to separate the grain from the cob.

Granted that women benefit from mixed CIALs, all-women's groups are likely to work better for women in the community as a whole, if only because they specifically set out to do so. So far, few all-women's groups have been formed—only 7% of CIALs in Colombia and 13% in Honduras. Among those groups several have shown courage and determination as well as a robust good humor in their struggle to appropriate the CIAL process and make it work for them, despite a discouraging lack of support from the men. Here is the story of one such group.

Revolt in the kitchen

"When the men organized their CIAL, the only role assigned to us women was to cook and wash up for them at their meetings." The speaker is Ana Margot Campo, a member of the Cinco Días women's CIAL at Alfonsa, Colombia. Campo was one of several women present at the motivational meeting that had launched Alfonsa's first CIAL, back in 1990. She and the others had listened in silent resentment as the men had simply left them out.

A few weeks later, Campo was among the women toiling away in the community hall's small kitchen during one of the men's meetings. As usual, the women were grumbling about the men, relieving the tedium of their chores through mockery and laughter. But they grew serious when one of them said, "Why don't we start our own CIAL?"

The women were enthusiastic about the idea but decided to keep it under wraps. They knew that if they announced it to the men they would only be laughed at.

Over the next few weeks, as the men continued with their own meetings to discuss the business of the community's official CIAL, a parallel, unofficial planning process took place behind the community hall's kitchen door.

The kitchen proved the ideal place to conduct the group's diagnostic work. The women discussed the pros and cons of each ingredient as they prepared it and tossed it into the pot. Beans? The men are already researching that. Plantain? That's a man's crop. Coffee? No, not profitable enough. In the end the group settled on *mora*, a blackberry that is ideal for processing in the home and would bring in some badly needed extra cash.

After simmering for several weeks, the women's plans came to a boil and could no longer be concealed from the men. When the women told the men of their intentions, the reaction was predictable: half patronizing disbelief, half an attempt to muscle in on what sounded like a possible money earner. "You women won't be able to do the fieldwork," the men argued, "so we ought to help you." The women replied that they wanted to be a "women-only" group. Just as they took care of the housework and children by themselves, so too would they manage the fieldwork.

The women posted announcements in the village shop to recruit more members. They then launched their research, comparing different varieties of *mora* bush for fruit productivity and quality. Initially dependent on the men's group for funds, the new CIAL soon broke away to start its own bank account when the money promised by the men never materialized.

The women's research has now reached the production plot stage. In material terms its impact is still modest. The *mora* bushes have been plagued by a disease, frustrating the commercial production of jam and fruit juice.

But the women say their activities have had a profound effect on family life and on their status in the community. Once relegated to the role of housewives, they are now considered researchers, just like the men. There has been a shift towards a more equitable sharing of household tasks, with men who once refused to cook or to look after children now standing in for their wives on evenings when they go out to meetings.

"We women used to be considered housewives only. One evening I went out to a group meeting and returned to find that no one in my family had cooked supper. I told them this must never happen again! Now, when I go out I come back to find the children in bed and the supper on the table. My husband and eldest daughter do the work. The same is happening in other houses in the village. It's a revolution in family life and the way we share work. The men now accept our status as researchers."

Ana Margot Campo, Communicator, Cinco Días CIAL, Colombia

The revolt in the kitchen has become a revolution, whose effects have spread throughout the home. And its impact should soon be felt materially, as well as psychologically. Despite their early setbacks, the women plan to scale up production and to sell their produce, first in the village shop and then in a nearby market town.

In a word

To sum up:

- In mature CIALs the benefits of the CIALs' research are widely shared in the community.
- CIALs maintain and add to the diversity in the local pool of crop varieties.
- Elitism in CIALs can occur, but it can be overcome through skillful management.
- Marginalized groups participate strongly in the CIALs' work.

Can You Repeat That?

To fulfill its potential for alleviating poverty, the CIAL process will have to be widely adopted. That means the process must be robust enough to be replicable in different institutional and cultural settings, without losing the essential characteristic of farmer empowerment that makes it effective.

A new challenge

Experience in the Cauca laboratory showed that the CIALs could benefit poor farmers. But could it work outside Colombia? And could organizations other than CIAT support the process?

That, in essence, was how senior staff at the Kellogg Foundation renewed their challenge to the CIAT-IPRA team at the end of the pilot phase. The team responded by proposing a new phase aimed at disseminating the CIAL process more widely in Latin America. Launched in 1995, this phase initiated CIAL programs in Bolivia, Ecuador, Honduras, and Nicaragua, while expanding the efforts in Colombia. El Salvador, Venezuela, and Brazil joined the project at their own request.

Three “big ideas” characterized the dissemination phase. The first was to create a multiplier effect by training trainers in each participating country. The aim was to form core national teams of agricultural research and development (R&D) professionals and farmers familiar with the methodology and able to teach it to

others. Second, a high concentration of CIALs would be developed in sites close to partner institutions. These "focus" sites would serve as a training ground from which the methodology would radiate out to other areas. The third idea was to form a triangular relationship in each participating country between an agricultural university and/or national research institute, a nongovernment organization (NGO), and farmers' associations at the community level.

The rationale for the triangular relationship was that it would broaden the dissemination effort and enhance its impact by bringing the different strengths of each type of institution into the CIAL program. Experience in Cauca had shown that the strongest CIALs were formed in villages that already had an active farmers association. Involving universities was a way of drawing them more into the mainstream of national development. By introducing the CIAL process into their curricula, they could also help build the human capital needed for national agricultural R&D. The NGOs were obvious partners because of their strong links with rural communities and their commitment to participatory approaches to development.

Disseminating the methodology

In practice it proved difficult to get a model triangular relationship established. Either the three types of institutions were not all operating in the same area, or if they were one or the other turned out not to be fully committed to the CIAL process or proved unable to support it effectively. Like many big ideas, the triangular relationship foundered when it hit the real world.

Fortunately, this did not impede dissemination. Individual movers and shakers, rather than institutional partnerships, proved to be the key resource in building successful CIAL programs.

The CIAT-IPRA team estimates that by the end of 1999 the number of active CIALs had reached a total of 249 (Figure 7) in eight host countries (Figure 8). Numbers alone do not tell the whole story, of course, since they give no indication of the quality of the CIAL process. However, successful CIALs have been established in all participating countries.

Progress in each country can be summarized as follows:

- *Bolivia*. The country's first CIAL was launched in 1994 at Tukma Baja, near Cochabamba, by scientists from IBTA, now known as the

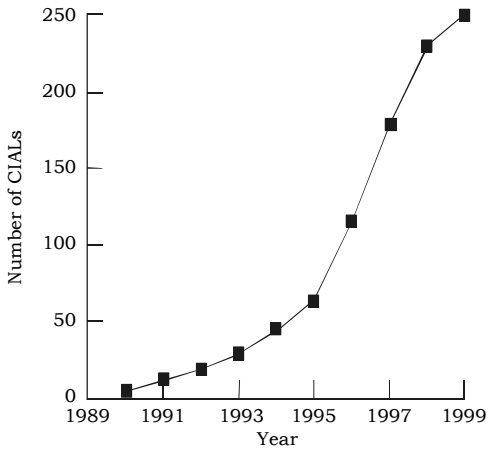


Figure 7. Growth in CIAL numbers.

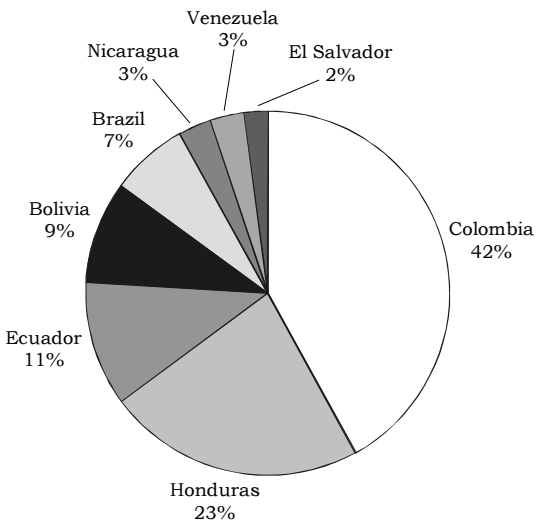


Figure 8. CIALs by host country.

Fundación para la Promoción e Investigación de Productos Andinos (PROINPA). After initial doubts interest quickened when the CIALs evaluated and promoted PROINPA technologies. The Foundation now has 12 CIALs in six of its nine potato pilot areas. These provide useful feedback about integrated pest management (IPM) and other technologies under development. One hosts an experiment that explores the use of participatory approaches to complement conventional plant breeding.

Since PROINPA works mainly on potatoes and other Andean crops, it has encouraged the CIALs to seek support from other institutions in conducting research on other crops and technologies. Several NGOs began their own CIAL programs after a training course in 1996. These include CARE and the Centro de Desarrollo Agropecuario (CEDEAGRO), which now has eight CIALs. Through the Universidad Mayor de San Simón, the methodology has been introduced to students, but the university itself has not formed any CIALs. In 1999 the country had 22 active CIALs, 17 of which sent representatives to the country's first CIAL meeting, held in July 1998.

- *Brazil*. There are now 19 CIALs, known locally as Comités de Pesquisa Agrícola Local (COPALs), in Northeast Brazil, the country's poorest region. Most started with research on cassava, but some have since diversified into vegetable and fruit production. Testing of the CIAL methodology came about originally through the Proyecto Proteção Fitosanitária Sustentável da Mandioca (PROFISMA), a collaborative cassava IPM project involving CIAT and the Centro Nacional de Pesquisa de Mandioca e Fruticultura (CNPMF), a commodity research center of the Empresa Brasileira de Pesquisa Agropecuária (Embrapa). Local extension services played a key part in ensuring successful implementation. Embrapa has since taken up the methodology enthusiastically and now wishes to apply it nationwide.

- *Colombia*. The CIAL program in CIAT's host country goes from strength to strength. Cauca Department now has 46 active CIALs, which have formed their own umbrella organization, the Corporación para el Fomento de los Comités de Investigación Agropecuaria Local (CORFOCIAL). Cundinamarca Department, near Bogotá, and the northeastern departments of Guajira, Magdalena, and Santander are new centers of CIAL activity. The Corporación Colombiana de Investigación Agropecuaria (CORPOICA), the country's national agricultural research institute, has launched a total of 55 CIALs.

A variant of the CIAL has been developed for cassava producers and processors on the country's north coast, and a few CIALs have been started in Valle Department by Colombia's coffee grower's federation. The extension services, together with a few NGOs, have become active partners alongside CIAT-IPRA and CORPOICA. The latter now plans to apply the methodology nationwide through a gradual, progressive approach, whereby expertise gained in one region of the country is tapped to provide training and support to other regions. In 1999, CORPOICA released a video and a multimedia CD to support their internal training efforts.

- *Ecuador*. The main protagonists in Ecuador are the Programa Nacional de Investigación de la Papa (FORTIPAPA), a potato research project of the Instituto Nacional de Investigaciones Agropecuarias (INIAP), and the International Institute of Rural Reconstruction (IIRR), an NGO dedicated to rural development. INIAP has launched an active CIAL program through its extension arm, the Unidades de Validación y Transferencia de Tecnología (UVTTs). Many of these CIALs work with the institute's plant breeders to evaluate and select promising potato clones from crosses made by breeders or by trained farmers.

Used originally in connection with potato, the CIAL approach is now being applied in work on other commodities, including maize, barley, and legumes. Training has been vital for building a national CIAL team, which is now training others. IIRR, following a period of experimentation with the methodology, is currently expanding its activities through collaboration with farmer organizations, the Ministry of Agriculture, and other NGOs. It has provided training for these organizations and for paraprofessionals. A university social science program, the Fundación Latinoamericana de Ciencias Sociales (FLACSO), has provided valuable training on gender

analysis and has promoted the use of the CIAL methodology for research on natural resource management. At the last count, the country had 27 CIALs.

- *El Salvador*. CIAL activities in this country began when an NGO, the Fundación para la Cooperación y el Desarollo Comunal de El Salvador (CORDES), requested information and support from CIAT-IPRA. A course was organized and attended by representatives from CORDES and eight other institutions. Afterwards, CORDES launched five CIALs, several of them in areas devastated by the country's 10-year civil war. A professor from the Universidad de San Salvador became interested, provided some support, and will include the methodology in the course he teaches. The national agricultural research institute, the Centro Nacional de Tecnología Agropecuaria (CENTA), has not yet become fully involved.

- *Honduras*. The country has made rapid progress, with 57 CIALs now established. Activities began in 1993, as a CIAT-IPRA project called Investigación Participativa en Centro-América (IPCA), under the direction of former CIAT staff member Sally Humphries. Since 1995 the project has been coordinated by the University of Guelph, where Humphries now teaches, with funding from Canada's International Development Research Centre (IDRC). The project is being carried out by three Honduran agronomists, two of whom also work at the Centro Universitario Regional del Litoral Atlántico (CURLA), the north-coast campus of the national university. The agronomists support CIALs in three agroecological zones in the north and center of the country. In 1998, IPCA made an agreement among the five organizations working with CIALs in Honduras to form a national CIAL organization. In 1999 regional chapters were set up in the

Yorito and Lago Yojoa area, where most of the IPCA-supported CIALs are located. ASOCIAL has set up a fund to stimulate commercial ventures for the production of maize, beans, pigs, and chickens. From the sale of its produce, the CIAL pays off the loan, plus a small amount of interest, and deposits the rest in its CIAL fund.

IPCA is now seeking independent status as an NGO and hopes to extend its activities to other countries in Central America. In 1996 the UNIR (Una Nueva Iniciativa Rural) Project of the Escuela Agrícola Panamericana (EAP) began its own CIAL program in the south of the country. University staff, together with the national agricultural research institute, a regional bean breeding network, and several NGOs, are forming a partnership with the CIALs for research on common bean and maize. A national NGO, the Fomento Evangélico para el Progreso de Honduras (FEPROH), has also established a CIAL program in the center of the country. Staff from IPCA, EAP, FEPROH, and several other institutions have received training from CIAT-IPRA and have gone on to train others.

- *Nicaragua.* In this country CIAT-IPRA works with a Swiss-funded NGO network, the Proyecto de Agricultura Sostenible para las Laderas Centroamericanas (PASOLAC), which has

extensive links with national institutions. A course was held in 1996 for 18 participants from two universities and nine NGOs selected by PASOLAC, after which eight CIALs were established. The Instituto de Promoción Humana (INPRHU), a rural NGO, launched three of these and is keen to launch more. Several other NGOs have become interested in the CIAL methodology through INPRHU's experience. The Instituto Nicaragüense de Tecnología Agropecuaria (INTA) is responding to increased demand for seed through its links with EAP in Honduras. The Universidad Campesina (UNICAM) is comparing farmer-to-farmer technology transfer with the CIAL methodology, with a view to possibly synthesizing the two. A second-order organization of CIALs in the Río Cálico watershed was formed and held its first meeting of CIALs in 1997. In 1998 a second training course was held for NGOs and for CIAL members who wish to become paraprofessionals.

- *Venezuela*. In 1997 the Fondo Nacional de Investigaciones Agropecuarias (FONAIAP) financed training in the CIAL approach for agricultural professionals from the state of Lara. A course given by CIAT-IPRA drew participants from seven agricultural R&D institutions. Additional courses were given in 1998 and 1999 for FONAIAP researchers and extension specialists. The Fund and its partners have started seven CIALs and plan to start more in 2000. With a view to extending the approach throughout the country, FONAIAP has trained over 100 facilitators through a series of regional workshops. These are generally preceded by a motivational workshop, designed to stimulate interest in participatory research. FONAIAP has also been training students and professors of Venezuela's Central and Lisandro Alvarado West Central universities. A video documenting Venezuela's experience with the CIALs was recently developed to promote the approach.

"The CIAL is like a bridge between the university and the community. Before, they used to tell us what to do; now we decide."

Tomás Barahona, Leader, Lavanderos CIAL, Honduras

Many different kinds of people have had a hand in disseminating the CIAL methodology—farmers, technicians, paraprofessionals, national scientists, research managers, university academics, and NGO workers. What can we learn from their experiences?

Academics get their hands dirty

Agricultural universities in Latin America have long been urged to confront the practical challenges of national development. The CIAL approach is helping them do so.

No one knows this better than Nelson Gamero, who works in the UNIR Project at Honduras' internationally renowned EAP, better known as "Zamorano." The project is responsible for introducing the CIAL concept to an academic community whose wide-ranging regional activities and busy teaching program have in the past kept it somewhat aloof from the farmers in its own backyard, the fertile plains and surrounding hillsides of the Yeguare region. The CIALs work is part of a recent effort to stimulate development in the region.

"We're starting to see changes at Zamorano. Some students are inviting their professors to come here. Their professors are taking more interest in us, in learning from us."

Francisco Roger Figueroa, Member, Silisgualagua CIAL, Honduras

According to Gamero the university's applied research and extension work used to follow a linear process, in which research was conducted on station before recommendations were made to farmers. "We called it participatory," he says, "but it was participatory in name only."

Since 1996 the project has started 10 CIALs, most of which are conducting research on beans and maize. Farmers say they are delighted not only with the new technology introduced but also with the change they have noticed in the university's attitude towards them. They now enjoy increased contact with university staff, who visit their communities more often and invite them, in turn, to visit the university, where they evaluate experimental bean lines on the research station.

Gamero says that experience with the CIAL process has so far had its greatest impact on the university's agronomy program, headed by Juan Carlos Rosas. Beans have been the main focus so far, but there are plans to extend the approach to maize.

The program's scientists were initially skeptical of the methodology. The turning point came when Rosas attended the feedback meeting of the CIAL at Lavanderos, a village in the nearby hill country. There he listened to Yolanda Núñez, the CIAL's secretary, as she presented the results of their trials on beans to the community. He later told Gamero that he had been deeply impressed by her grasp of the principles of research and the soundness of the results she had presented. Questioned closely after her presentation, she had answered him confidently and in a more relaxed way than some of his academic colleagues would have done! As so often happens in participatory research, a personal encounter with farmers convinced, where classroom seminars and discussion groups had not.

Rosas' endorsement of the methodology encouraged others in his program to take an interest in it. Now the program's staff frequently accompany Gamero to the field and regularly attend the diagnostic phase of the process. And the program plans to have its own CIAL activities independently of UNIR.

A little learning...

Older, more established scientists may be skeptical, but the rising generation of would-be scientists—today's students—are embracing the CIAL methodology with enthusiasm. At CURLA in northern Honduras, as at EAP, students are taught the methodology, even though it is not yet officially part of the university curriculum.

"I'm convinced that the CIAL process empowers farmers. In my 10 years of professional experience in working with farmers, I've had the best results using this method."

Nelson Gamero, Agronomist, EAP

"All the students I have anything to do with get introduced to the CIAL process," says Juan Gonzáles, research assistant and lecturer at CURLA. "Some become very interested and stay involved long after we've covered it." Like Gamero, Gonzáles sees his students as a secret weapon—a means of infiltrating university opinion with a view to gaining official acceptance of the methodology in the longer term.

IPCA is providing scholarships to a number of CURLA students for their thesis research. Problems identified by the CIALs that require specialized, in-depth analysis, such as insect-borne plant diseases, have become thesis topics. Students are supervised in the field by IPCA staff but soon learn to look to the farmer for guidance as well. As one student put it, "it is the farmers, most of whom haven't even completed first grade, who are our real teachers. They have a wealth of knowledge and experience to share with us."

There can be no doubt that Honduras' next generation of agronomists will be better versed in the merits of a participatory approach than their predecessors. Those among today's professionals who practice a participatory approach typically came to it relatively late in their careers, when they realized that top-down approaches were not working. Teaching the CIAL and other participatory approaches in universities is vital for raising awareness of the importance of farmer participation in research and for disseminating the skills needed to apply these approaches.

"The students were studying for their theses, not for us. They had too much theory and not enough practice."

Carlos Alfonso Ruiz, Secretary, San Isidro Men's CIAL, Colombia

It can only be beneficial for students to learn about the CIAL process. But using students as cheap labor to support CIALs is not a good idea. In Colombia an NGO that had formed a relationship with a local university employed students doing thesis research to launch and guide the CIAL process. According to farmers the students showed a poor grasp of the CIAL methodology and, upon finishing their 6-month stay in the community, failed to relay information about the CIAL to the next arrival. Moreover, it was difficult for the farmers to accept advice and assistance from younger, less experienced people. They knew better than to follow some of the advice they were given!

Driven by technology

Gonzáles is normally a relaxed, unhurried driver. But not today. Sitting bolt upright and staring straight ahead, he has a vice-like grip

Juan Gonzáles

The management jargon refers to them, inelegantly, as "boundary spanners," and they are often a company's most valuable human resource: people whose interests and knowledge cross disciplinary or sectoral frontiers, placing them at the margins of their own institution but giving them a special ability to forge creative relationships with others. These are the people who take their institutions in new, unexpected directions.

Straddling the frontier between academia and development work, Juan Gonzáles is a typical boundary spanner. He has one foot on the ladder of a promising academic career: A 1992 graduate of the School of Agronomy in Honduras' national university, he has since worked at the university as a research assistant and has recently started giving occasional lectures on participatory research.

The other foot is planted firmly in farmers' fields. Juan became the university's contribution to the IPCA project soon after it was launched. Born in the Atlántida Region, he seemed the ideal person to support the establishment there of Honduras' first two CIALs. Now, as the project's coordinator for Santa Bárbara Province, Juan works tirelessly to nurture the seven CIALs under his care.

Having at first learned about the process solely from manuals, Juan attended a CIAT-IPRA course in 1995. He says that the course gave him renewed confidence in establishing and supporting CIALs. A visit to Colombia's Cauca Department to see advanced CIALs such as El Diviso has inspired him to work even harder to guide his own groups to this stage.

People like Juan give the lie to the conventional image of Latin American universities as remote from the problems of rural development. Their ability to unite the two worlds of the farmer and the academic will benefit both.

on the steering wheel. On the twisty mountain road from Tegucigalpa, he grinds his teeth in frustration each time another heavy truck looms into view, slowing him to a crawl. As the road straightens out on its descent to the plain, he accelerates gratefully. On the final straight into Comayagua he puts his foot right down, weaving through the traffic like a get-away car in a gangster film.

Gonzáles is on his way to the regional research station of the Dirección de Ciencia y Tecnología Agropecuaria (DICTA), Honduras' national agricultural research institute. This year, for the first time, the station's seed production unit has promised him enough improved maize seed to meet the needs of his entire CIAL program. Gonzáles is making sure he is on time to pick up the precious packets before the unit's manager changes his mind and gives them to someone else.

In Honduras, as in most other Central American countries, seed of improved varieties is scarce and competition for it hot. Previously, the IPCA Project has not had priority in the queue for supplies, but last year saw a breakthrough: Invited to the annual CIALs meeting, senior DICTA staff were so impressed with what they heard and saw that they made a commitment there and then to meet the program's demand for maize and bean seed every year.

Gonzáles' race to the research station is a measure of the importance he attaches to new technology in securing and retaining the interest of farmers in the CIAL process. Involving national research institutes is vital, since they hold the key to one of the engines that drives the process economically—the potential for small-scale farmers to multiply and sell improved seed.

National institutes can be involved with the CIAL methodology at different levels. Some institutes, such as DICTA in Honduras, support the CIAL programs of other organizations by supplying seed and other services on request but have not yet started CIALs themselves. Others, such as INIAP in Ecuador, not only provide seed but experiment with the CIAL process, comparing it with other participatory approaches. Colombia is well along in extending the CIAL approach nationwide, and the national agricultural research services of Venezuela and Brazil have announced plans to follow

suit. Meanwhile, in Honduras, Nicaragua, and El Salvador, NGOs rather than national institutes have so far led the diffusion of the CIAL methodology.

"We were asked to do something different, so we did! I truly believe this process is useful, but because it's new for both researchers and farmers it's hard work in the opening stages. Young groups, especially, need a lot of hand-holding; when they're mature, they're more able to access their own resources."

Luis Humberto Fierro, CORPOICA, Colombia

Going national

Luis Humberto Fierro first came across the CIAL methodology while searching through literature references on participatory research in CORPOICA's library. At the time the institute was going through a crisis over its lack of impact, and senior staff were being asked to find new approaches to technology transfer.

After receiving training from CIAT-IPRA, Fierro and his colleagues decided to launch a CIAL program in the Cundinamarca-Boyacá area (Region 1), where agriculture has a strong commercial orientation. With funding from another government agency, they established 32 CIALs, some of which already show great promise.

In 1998, CORPOICA decided to go nationwide with the CIAL methodology. The decision came when Fierro's directors approved a strategic plan developed by the institute's Technology Transfer Program. The plan, which will eventually cover all 10 CORPOICA regions, gives pride of place to participatory approaches, including the CIAL methodology.

Both Fierro and his former director, Santiago Fonseca, agree that the CIAL program has been a success in Region 1, cutting the costs of research while increasing its impact. But they also acknowledge that success has not come easily: The CIALs need a lot of support at first,

"The CIAL program has been very successful for us. The success was reflected in the fact that we got 15 CIAL leaders here for a meeting. I was immensely impressed by the way they presented their projects and knew then that our efforts had paid off. More than doing research, the CIAL process is a way of revitalizing the whole community. If you launch a successful CIAL, there is no doubt that the members will eventually take it over and go further and faster, with less direct support from CORPOICA."

Santiago Fonseca, Former Director (Region 1), CORPOICA, Colombia

and some researchers and staff working in CORPOICA's rural extension units (CRECEDs) find it hard to resist the temptation to dominate the farmers. However, both men are confident that these problems will ease with time.

How does it fit in?

Most of the national institutes testing the CIAL process are also testing other participatory approaches to R&D. An exciting process of cross-fertilization is under way, in which the different methodologies are enriching each other.

Brazil provides a classic example of how introducing the CIAL methodology can alter the formal research agenda, increasing its relevance and potential impact. According to Tony Bellotti, a CIAT entomologist working with PROFISMA, the project had previously been concerned with a narrow range of IPM problems, focusing mainly on biological control of the cassava green spider mite. The open diagnostic approach used in the CIAL process threw up a broader array of farmer concerns, notably declining soil fertility, a different set of pests and diseases, and the shortage of improved cassava varieties. "We realized that these issues were actually more important to the farmers than the topics we were researching," says Bellotti. The CIAL process enabled the project to change direction, focusing more sharply on farmers' priorities and linking with state and national agronomists in the search for solutions.

While PROFISMA is testing the CIAL methodology, another project in CNPMF is applying a participatory plant breeding (PPB) approach to develop and disseminate new cassava varieties. The proximity of the two projects—down the corridor from one another—makes it easier to compare them. PPB channels feedback to plant breeding programs by involving farmers in the evaluation of several hundred or more breeding lines in nurseries on experiment stations or in breeders' regional trials. Farmers then grow some of these lines in their own fields. In contrast, through the CIALs communities decide what kind of research they want to do and then plan, set up, and analyze their own experiments. Participatory breeding tells researchers more about farmers' variety preferences. With the CIALs, in contrast, farmers come to own the research process and its results. "The two projects at CNPMF are rivals and haven't yet realized that the methodologies are complementary," says Carlos Iglesias. "But we expect a synthesis to occur soon."

CIALs that evaluate varieties are using techniques developed for and used worldwide by PPB programs. To create a bridge between the two approaches, CIAT pathologist Luis Alfredo Hernández has developed a tool that enables plant breeders and other scientists to extract more precise information on farmers' selection criteria from participatory research.

At present farmers express opinions about the varieties in their trials through a simple preference-ranking table, in which they place checks in columns headed by either a smiling, "neutral," or glum face. This is much less informative than the detailed data on individual plant traits obtained from farmer interviews carried out during the PPB process. Using a special computer program that he wrote himself, Hernández analyzes the raw data from the CIALs to determine farmers' overall preferences. Data from a large number of CIALs can be combined with PPB surveys and breeder's evaluations to determine overall statistical trends. User-friendly statistical software for analyzing data on farmer's preferences is an important tool for tapping the potential of the CIALs to provide feedback to national research services. The beta version of the software was recently sent out for widespread testing and was an instant hit with users.

"I could have gone on forever doing field experiments, recording data, and analyzing the results. But I became concerned about the impact of my work on poor farmers. How to make an impact gradually became my overriding preoccupation."

Héctor Andrade, Plant Breeder, FORTIPAPA Project, INIAP, Ecuador

Ecuador's national research institute, INIAP, is also testing the CIAL methodology alongside other participatory approaches. These include PPB and an approach developed for women's groups formed to improve cassava processing.

Héctor Andrade, leader of INIAP's FORTIPAPA project, feels that there is a logical progression from conventional to PPB approaches, in which responsibility for defining research priorities gradually passes, by means of the CIALs, from the scientist to the farming community. Andrade became interested in participatory approaches

when he realized that his conventional research was having little impact, especially on poor producers. He found PPB useful for developing new technology, while the CIAL methodology proved more helpful at the adaptation and dissemination stages. Some of the CIALs launched by FORTIPAPA actually evolved from farmers' groups that had evaluated improved potato varieties as part of a PPB project. Being involved in technology generation has increased their ownership of the final product, making these CIALs stronger than those developed independently.

Several Quechua-speaking communities have started CIALs in Ecuador. These people, who speak and read little Spanish, are being introduced to diagnostic techniques used by some of the cassava women's groups. The techniques include participatory map-making, as a means of stimulating discussion of land use and natural resource management issues.

In Ecuador and elsewhere, scientists frequently have two problems with the CIAL methodology. The first is a clash between their specialization in certain commodities or disciplines, on the one hand, and the wide range of issues identified by farmers, on the other. The second is a clash between the scientists' interest in testing new solutions to farmers' problems and the farmers' tendency to stick with what they have already tested and found to be effective.

Experience in Bolivia illustrates these concerns particularly well. Specializing in research on Andean products, PROINPA had developed a wide range of technologies that it wished to test with farmers. The institute initially found the open research agenda of the CIALs to be ill suited for this purpose. It also saw weakness in the CIALs' research on pest and disease management. Members tended to prefer experimenting with pesticides instead of the more sophisticated IPM technologies now available, mainly because pesticides are easier to use and can be tested in relatively simple trials.

These problems underscore the issue of balance of power between the CIAL and the facilitator supporting the process. Scientists, with their specialized knowledge, can easily drift from a participatory approach back to a top-down style, in which they determine the research agenda and impose their own solutions on farmers. This may, in fact, reflect a genuine desire on the part of scientists to benefit poor farmers. After all, farmers would probably not be interested in testing pesticides unless a scientist had first introduced them to this option 20 or 30 years ago.

The CIALs could benefit greatly from training in the principles underlying complex technologies, such as IPM and integrated crop and soil management. One option, for example, would be to borrow from the farmer field school (FFS) approach, which was originally developed in Asia for IPM in rice. The FFS invests heavily in developing and enriching farmers' knowledge, helping them to discover ecological principles as well as encouraging experimentation.

The CIALs do some of their best research when they turn the clash between old and new into an opportunity. In order for this to happen,

though, scientists must allow CIALs to test technologies that are still in the early stages of development. Farmers' should then be able to compare these new options with their current practices in an atmosphere of genuine inquiry that allows both groups to learn from the experience. Scientists must resist the temptation to question farmers' decisions or assume that the new technology is superior to traditional practice.

At Buenavista in Colombia's Cauca Department, a CIAL set out to test two methods for controlling the nematodes that were damaging *lulo* fruit bushes. The first method, based on indigenous knowledge, consisted of pouring hot water around the bushes. The second, proposed by scientists, involved chemical treatment. The hot water treatment proved to be the most economical and effective.

In Honduras a CIAL recently decided to conduct an experiment whose results would support or discredit once and for all the traditional practice of timing crop planting by lunar phase. The group had already experimented extensively with different maize and bean varieties and with the use of organic matter to maintain soil fertility. By submitting traditional practices to systematic scientific inquiry, this CIAL has demonstrated its maturity and its profound belief in objective experimentation. Fortunately, the facilitating organization, IPCA, understood the significance of this experiment and fully supported it.

Such cases raise important questions about the allocation of research resources. Should a national institute spend money to launch CIALs if it thinks farmers' research priorities will not correspond with those of the institute? Programs such as FORTIPAPA and CNPMF, which are responsible for major food crops, can sidestep this issue by creating CIALs in areas where their crop is widely grown. But what happens when communities essentially satisfy their basic food needs and begin to show an interest in diversifying production? The CIALs could simply be referred to other institutions for technical support. Or the research institutes that started the CIALs could adapt their commodity mandates as farmers' needs change. This latter option makes sense for institutes, such as CIAT, that have relatively broad mandates. But more specialized organizations may find it harder to adapt. Instead of launching CIALs, it might make more sense for these organizations to support the CIAL activities of others.

Another issue for formal scientists is how to conduct participatory research on problems that may not be immediately obvious to farmers but limit yields or threaten the quality of resources such as soil or water. This is the case with hidden diseases or pests, such as nematodes. Scientists know that these reduce yields by a steady 15% per year, causing just as much, if not more, damage over the long term than a climatic disaster or epidemic that devastates crops one year in 10. Farmers may not recognize such chronic or hidden problems or may simply accept them as unavoidable. As a result, CIALs seldom put these constraints on their research agenda, which tends to focus rather on problems that are acute and evident.

In this respect the CIAL methodology is little different from other participatory approaches, with the notable exception of the Farmer Field Schools. The facilitator of an FFS helps a farmer study group discover through a participatory learning process the principles underlying complex agroecological issues. Scientists at CIAT are conducting a comparative study of these two approaches, with a view to determining how they can be used together in a complementary fashion.

How should facilitators react to farmers' experiments when they believe that the crop or technology will not perform well, that the problem is too complex for the CIAL members, or that the experimental design is faulty? Ann Braun believes that instead of shutting down the learning process by signaling that something is wrong, facilitators must pose questions that will prompt the farmers to engage in their own critical analysis. The issues raised by these challenging situations will not go away. Indeed, they are likely to grow in complexity, as research itself becomes more complex.

All change!...

Alfonso Truque, leader of a second-order organization of CIALs in Cauca, Colombia, thought he was making a sound investment in future support for the CIALs, when he provided training in the methodology to staff at the local branch of the government extension service in the town of Timbío.

That was in 1997. But in early 1998, local elections resulted in a change of mayor at Timbío. The new mayor brought in his own people, with the result that all local government offices, including the

extension service, now have completely new staff. The new director of extension is sympathetic to the CIAL concept but unfamiliar with it, having yet to see it in action. And his staff need training if they are to continue with the CIAL program started by their predecessors.

Extension services are not the only organizations that suffer from political fall-out. In El Salvador the director of the national research institute became interested in the CIAL methodology and was about to go on a training course in it when he lost his job owing to a change of government. Staff turnover at Bolivia's Universidad Mayor de San Simón delayed acceptance of the methodology there. And NGOs also undergo frequent changes of staff, especially when policies alter.

Daniel Selener, director of IIRR's Regional Program for Latin America, says that up to 70% of the trainees graduated from CIAL courses organized by IIRR were unable to start CIALs after the course owing to a change of job. When staff turnover reaches such high levels, it becomes a serious impediment to dissemination of the CIAL approach.

...but no small change!

Of the six CIALs launched by the extension service at Timbío in Colombia's Cauca Department, only one survives. The high casualty rate has a simple explanation: The CIALs were not provided with their own fund at the outset of the process. Instead they received only the inputs required for their experiments.

Like all government organizations in Colombia, the extension service would be acting illegally if it were to donate cash directly to local communities. This means that the fund, a basic building block in the process and the key to farmer empowerment, cannot be provided when CIALs are launched by such organizations.

CIALs forced to rely on inputs alone are dealt a potentially fatal blow right at the start of the process. Many complain that their inputs

were usually received late, crippling the harvest from their first trial. Since selling the harvest is their only means of raising funds, this endangers the very future of the CIAL process. At San Isidro in Cauca the women's CIAL, originally set up by the extension service, has asked to be transferred to CORFOCIAL as its support organization. The women say they have noticed how the men's group in the same village, which is already supported by CORFOCIAL, gets better service.

Research and development

CIAL members and the community as a whole must always understand that the committee's purpose is to provide a research service. It is not a local extension service organized to promote recommendations made by other entities.

Each CIAL begins the innovation process with research that aims to answer a question or solve a problem to which the community assigns high priority. The committee accomplishes this purpose by systematically comparing different possible solutions with current local practices. Options that do poorly are discarded, while the most promising ones are evaluated at successively larger scales. The CIAL's role in managing a specific innovation ends when other farmers in the community are using the solutions the group has identified or when the CIAL decides that none of the solutions are worth recommending.

CIAL members acquire new skills and develop other roles and functions in the community as a result of the innovation process. They gain experience in teamwork, planning, implementation, problem solving, and monitoring and evaluation. And often they use these skills to develop small businesses and provide training to others. As a result, the CIAL's experience as a research service also gives rise to development.

Sometimes CIAL members leave the committee to exploit the potential of innovations resulting from the group's research. When that happens a new generation of CIAL members may then undertake research on the problem to which the community currently assigns high priority. In other cases the CIAL members become so absorbed in development that they cease to carry out research, until the community sees a need to reactivate the CIAL for investigating some new problem. In still other cases, the CIAL keeps pursuing one innovation after another, as new needs and opportunities arise.

"Adhering to the principle of the CIAL as a research service is probably the most difficult challenge facing the efforts under way to scale up the CIAL concept."

Jacqueline Ashby, Director of Research, Natural Resource Management, CIAT

An extension service demonstrates and promotes proven solutions. The function of a CIAL, in contrast, is to test and compare different options. CIALs that are established solely to transfer and promote technologies already "on the shelf" fail to provide a community service for testing technologies that have not been proven locally. As Jacqueline Ashby says, "CIALs that only promote and validate technologies recommended by outsiders remain highly dependent on outsiders. This is because extension groups need quick, sure-fire successes. CIALs, in contrast, fulfill their function when they tackle uncertainty. It can be just as important for them to discover that local solutions are as good as external ones, as the reverse."

As the experience at Ventanas in Colombia's Cauca Department showed (see page 58), the facilitator plays a crucial role in fostering this understanding. Facilitators who do not see the need for research and are intent on promoting ready-made solutions are not cut out to support the CIAL process. Government extension agents may have particular difficulty when they launch CIALs, since their professional training and career development have made them accustomed to the extension function. Formal researchers may also be tempted to use the CIAL as a vehicle for merely transferring the technologies they themselves have developed. These problems underscore the need to train facilitators thoroughly before they start applying the CIAL methodology independently.

CIALs address rural communities' urgent need to increase their well-being by finding ways to improve farming practices. By the third or fourth season of experimentation, most CIALs have selected or adapted one or more preferred options from an array of external and local alternatives, and they are ready to evaluate these on a larger scale. Technology thus adapted to local conditions by the CIAL is more likely to perform well than technology that has not been developed in this way.

Into the fast lane

NGOs have proved enthusiastic and energetic adopters and promoters of the CIAL methodology in nearly all countries. CIAT-IPRA's records show that some 25 of them were supporting CIALs in 1999, compared with nine government organizations. NGOs accounted for half the total number of active CIALs in 1999 (Figure 9). Another 20% of the committees are supported by consortia of two or more organizations, usually involving an NGO.

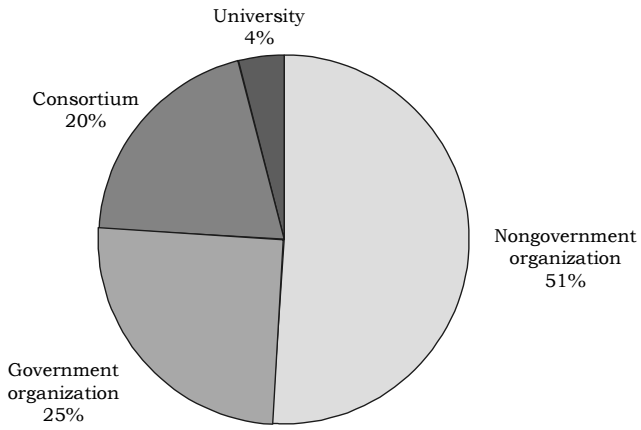


Figure 9. CIALs by facilitating organization.

The NGOs that have moved furthest and fastest with the methodology tend to be those with a positive attitude towards research. Often staffed by professionals with a background in agricultural research and extension, such organizations are keen to improve farmers' access to the products and services of formal research, and they are open to the idea of teaching scientific methods to farmers.

Among the star performers in this category are FEPROH in Honduras, CEDEAGRO in Bolivia, CORDES in El Salvador, and IIRR in Ecuador. FEPROH, for instance, now supports 14 CIALs, has adopted the methodology in all of its programs, and is keen to market the approach to other NGOs in Latin America. Similarly, IIRR has formed 16 CIALs and has offered five training courses to participants from a variety of development organizations, projects, and universities. Actions like these bode well for speedy dissemination of the CIAL methodology in all areas where such NGOs are active.

According to Daniel Selener, NGOs have inherent advantages as promoters of the CIAL methodology. Because they already have grass roots connections with farming communities, the idea of learning from farmers comes to them naturally. They do not have to swallow their professional pride, as formal researchers sometimes must do, when they adopt CIAL approach. Because NGOs tend not to be bureaucratic and specialized, they can respond more flexibly and directly to farmers'

"Trying out the CIAL methodology is a wonderful learning experience. Our key advantages are flexibility and sticking to the farmers' real needs, whereas research institutions tend to have well-defined commodity programs that hinder decision making by farmers. For us this is a long-term initiative, not a time-bound, 3-year project. We adopted this methodology as part of our everyday work, not because the money was there."

Daniel Selener, Regional Director for Latin America, IIRR

"Some idealists think that having a structured, systematic process such as the CIAL doesn't allow genuine participation by farmers. In our experience that's not true."

Daniel Selener

needs than some research organizations, and they take more easily to the CIALs' open diagnostic process. Moreover, their idealism enables them to institutionalize and carry forward a CIAL program on a limited budget, without the short-term project funding typically provided by donors to the formal sector.

A sizable group of NGOs has so far remained aloof from the CIAL methodology. These organizations, often critical of formal research, are reluctant to link rural communities with its products and services. Some NGOs may also dislike the structured and systematic approach of the CIALs to comparing technology options. They tend to regard this feature of the methodology—which was borrowed from the formal system—as being contrary to farmer participation, experimentation, and empowerment. Unless they can be convinced of its benefits, these NGOs are unlikely to test the CIAL methodology. Winning them as allies is perhaps the greatest challenge for speeding the dissemination and widening the impact of this approach.

With the NGO movement fully behind the CIAL methodology, its benefits could quickly be felt by hundreds of thousands of people. And since the NGOs often work with the remotest and poorest communities, their active involvement could ensure that these benefits are distributed equitably.

The farmers' answer

In 1990 a group of farmers in Colombia's Cauca Department suggested forming a second-order organization to protect and promote the interests of the CIALs. The result was CORFOCIAL, an umbrella association grouping the department's 46 CIALs.

Funded from the interest on an endowment provided by an anonymous benefactor, CORFOCIAL has its own Board of Trustees

Bolívar Muñoz

Bolívar Muñoz knows all about life on a farm. He was born on one.

His earliest memories are of helping his parents and three brothers tend the family's crops of coffee and plantain on the smallholding where they lived, near the village of Cabuyal, in one of the poorest areas of Colombia's Cauca Department. It was here that he went to primary school, before going on to complete his secondary education in nearby Pescador.

Bolívar is typical of Colombia's younger generation of farmers—better educated and demanding more out of life than his parents. Keen to improve his own lot as well as that of his community, he became a founding member of the CIAL in Cabuyal in 1991. So impressive was his performance as a CIAL member that he was invited to join CORFOCIAL as a paraprofessional when it was established in 1993.

Today Bolívar is responsible for providing advice and assistance to 18 CIALs near his home village. As a paraprofessional, he has earned new respect from farming families that knew him as a child. His ambition? To gain a better knowledge of research methods and modern farming practices and technologies, so that he can improve the quality of the support he provides still further.

and a staff of three paraprofessionals, who operate from a tiny office in the home of its leader, Alfonso Truque.

Asked how CORFOCIAL benefits the CIALs, Truque immediately cites independence from other organizations. He and his fellow staff have direct experience of how the CIAL process can be subverted when those professing to support it try to control it instead. They see their main challenge as "upholding the basic principles that underpin the CIALs' work."

CORFOCIAL supports the CIAL process by accessing to training, inputs, and services. It also helps formulate funding proposals,

facilitates visits to research institutes or to other CIALs, and promotes the exchange of seeds and other products between CIALs. Last, but not least, it organizes an annual meeting of the CIALs in Cauca Department.

The association has organized training on various topics, including seed selection in tomato, plantain, and onions; soil conservation; and IPM. When the women's group at San Isidro had difficulty in processing its soybean harvest, CORFOCIAL staff tracked down external expertise to help them solve the problem. They then arranged for the San Isidro CIAL to train another group that was also interested in soybean. Now they are helping the group obtain funding for a mechanical thresher.

CORFOCIAL's bird's-eye view of Cauca's CIALs gives it a special role in linking them and thus enabling them to complement one another. One CIAL faced a crisis because it was unable to meet heavy demand for seed after bad weather had destroyed the community's harvest. Bolívar Muñoz, one of the association's paraprofessionals, came to the rescue, borrowing seed from another CIAL that had had a good harvest but was now busy with its coffee crop and did not wish to make a second sowing. The first CIAL not only met demand by distributing the borrowed seed but also sowed another crop of its own, enabling it to repay the loan in time for the start of the second CIAL's next cropping season.

"CORFOCIAL gave us the seed money for our fund. We got the money on time and could buy the inputs we needed for the cropping season."

Carlos Alfonso Ruiz, Secretary, San Isidro Men's CIAL, Colombia

CORFOCIAL enjoys a strong reputation among the CIALs it supports. Several CIALs have rejected the "support" offered by other organizations and have applied to come under the CORFOCIAL umbrella instead. This has placed a growing strain on the association's resources.

To interest from the endowment, CORFOCIAL has added other income, raised mainly from government training programs. "But the annual budget is still far from enough to meet all the demands placed on us," says Truque.

Another problem facing CORFOCIAL is that its paraprofessionals do not have the same breadth of experience as professional agronomists. One CIAL working on *mora* says it was neglected by a paraprofessional, because he had no experience with the crop. Paraprofessionals may also lack the broad range of contacts in the formal research and extension system enjoyed by professional

agronomists. As a result, they tend to experience more difficulty in accessing knowledge and inputs.

At present CORFOCIAL's paraprofessionals do the rounds of the CIALs on motorbikes. Their job as messengers is time-consuming and somewhat hit-and-miss, but an appointment with a CIAL, once made, is kept even if plans have to be changed and the original purpose of the meeting cannot be fulfilled. Like CIAT-IPRA, the paraprofessionals have a policy of never being a "no-show." They understand the importance of keeping their word for the CIALs to remain confident in their support organization.

One day the bikes could be replaced by electronic bulletin boards, says Ann Braun. The use of e-mail has enormous potential in rural areas and could transform the efficiency of the CIAL process by facilitating exchanges among the CIALs and easing their access to external information. But that day is still a long way off: At present only a tiny fraction of households in Cauca have a telephone—and most of those are in towns. Even fewer own a personal computer. Even so, Braun and CIAT communications staff have launched a project to establish rural telecenters, which will connect CORFOCIAL and other local organizations to the Internet on a trial basis.

The CORFOCIAL experience suggests that the answer to the question of external support lies partly with the CIALs themselves. As long as its resources are not spread too thin, the second-order organization can provide effective support, complementing that provided by other types of organizations, both within and outside the government.

"What's the institutional home for this type of process? If it's supported by an institution that has a conflicting agenda, you pull out one of the building blocks. That's why farmer paraprofessionals are so important: They know how the farmer feels."

Jacqueline Ashby, Director of Research, Natural Resource Management, CIAT

Farmers spread the word

Visiting El Paraíso for the day, Eliverio Orellano's brother would not stop talking about his experiences as a researcher. Mainly to keep him quiet and to move the conversation on to other things, Orellano promised him he would come over to his village to see for himself.

Orellano's brother was a member of the CIAL at La Playa, a few kilometers from El Paraíso in Honduras' Santa Bárbara Province. A few weeks later, Orellano fulfilled his promise by attending the CIAL's evaluation meeting, which was held in the committee's experimental plots shortly before harvest. He returned to El Paraíso with a glowing account of what he had seen. "They had an excellent harvest and were using several new bean varieties," he told his friends. Having formed a 20-strong group of interested farmers, Orellano's next step was to contact the IPCA project to ask for support in starting El Paraíso's own CIAL. Today, as the CIAL's leader, he is anxiously awaiting the results of its first experiment, also on bean varieties.

The spontaneous spread of the CIAL process among communities is the strongest possible evidence that the methodology works and is popular with farmers. The steps in the methodology and its basic principles are easy to grasp and hence to pass on to others. Spontaneous transfer has been observed in most countries where CIALs are found.

The establishment of new CIALs by older ones is usually brought about informally by individuals such as Orellano's brother. Some CIAL members not only talk compellingly about the methodology but actively demonstrate it or teach it to other communities. CIAL leaders, such as Adelmo Calambáz at San Bosco and Medardo Carlosama at El Diviso, spend a growing proportion of their time in such activities.

Occasionally, CIALs undertake more formal efforts to disseminate the methodology. They tend to do so in areas where collective action is a strong feature of the local culture.

One CIAL at Tukma Baja in Bolivia went to great lengths to spread the word. When it

invited surrounding communities to visit its experimental plots, at first few people came. The CIAL felt that what it had to show was so important for others that it must find ways of attracting a wider audience. But how?

Then the committee members realized two things: They and all the other young male farmers for miles around had one passion in common, namely football; and second, by a happy coincidence, the CIAL's experimental plots adjoined Tukma Baja's football pitch. They decided to organize a match, challenging a team consisting of the best players drawn from all the surrounding villages. The home team, consisting of CIAL members and their close collaborators, was formed; a day for the match was chosen, timed to coincide with the height of the growing season; and written invitations were sent out.

On the day of the match, the team wore shirts printed with the words "CIAL Tukma Baja." Before the match began, a crowd of spectators assembled along the touch-line. But just as the CIAL had intended, most of them had their backs to the pitch and were admiring the CIAL's healthy looking crops. Kick-off was postponed as CIAL members took the visitors on a tour of the plots, offering to help other groups that wished to set up their own CIAL.

The event was a public-relations triumph. In the weeks that followed, two or three additional CIALs were launched in the area.

Back to basics

Teresa Gracia felt strange wearing a yellow hard hat. And the clouds of dust and incessant banging made it difficult to conduct an interview.

A socioligist with the CIAT-IPRA team, Gracia was visiting a building site in downtown Cali. The purpose of this unusual assignment? To track down a former CIAL member who had given up participating in the CIAL and left his community, migrating to the city to find work as a laborer. Gracia was conducting a study on the reasons why CIALs fail.

The study's results showed that the growing mobility of labor is only one element of the story. Gracia's detective work showed that almost 60% of CIAL failures occur during the first 2 years after establishment and that the reasons for failure are often associated with poor quality of support received during the early stages. Quality varies greatly among different supporting organizations. Those that take control of the

process, overriding farmers' wishes, tend to end up with failed CIALs. Among the most common mistakes made by overbearing supporting organizations are to appoint CIAL members themselves, instead of having them elected by the community, and to withhold the CIAL fund, effectively preventing the CIAL from making its own decisions. By denying farmers the active role that the CIAL demands, these behaviors betray the basic principles of the CIAL process.

Besides guidance in implementing the CIAL process, CIALs in the early stages need good technical support. Such support helps them access new technology and become better managers of their resources. Some particularly perceptive facilitators have pointed to the danger of getting bogged down in the CIAL process at the expense of technical input. A CIAL that is all process and no product will not command the support of the community for long.

"It's replicable, but it's delicate."
Ann Braun, CIAT-IPRA Coordinator

Experiences during the dissemination phase show that the CIAL process is indeed replicable. But to replicate it well, certain basic principles must be observed:

- Relationships between the CIAL, the community, and external actors should be founded on mutual respect and accountability.
- Partners in the research process share the risks of research.
- Research is conducted by systematically comparing alternatives.
- To generate knowledge one must build on experience and learn by doing.
- Research products belong to the community.

The dissemination phase has also revealed the following key lessons for supporting organizations:

- Farmers must retain control of the CIAL process. When facilitators start to dominate, ownership passes to them, and farmers lose interest in the research results.
- The CIAL is a research service, not an extension group. Though farmers may need new technology, facilitators should not assume that their research products will necessarily prove superior to farmers' solutions, and they should respect farmers' decisions on how to manage technology. Moreover, research organizations should not hesitate to provide access to technology that is in the early

stages of development. Testing new ideas, from within or outside the community, is central to the CIAL mandate, and the feedback this provides to formal R&D makes the process more efficient and responsive to local needs.

- The CIAL fund is an essential ingredient, not an optional extra. In almost every case where supporting organizations have attempted to launch CIALs without providing a fund, the result has been failure. It is the fund that guarantees farmer control of the risks inherent in research.

In a word

To sum up:

- Institutions other than CIAT can replicate the CIAL process in countries other than Colombia.
- The quality of support that a CIAL receives during its early stages determines its long-term survival and impact.
- Capable facilitators are essential in the CIAL process, and training them is vital.
- Second-order organizations are a cost-effective means of complementing the support provided to CIALs by other organizations.
- CIALs fail when supporting organizations violate basic principles—when they withhold the CIAL fund, attempt to dominate the research process, or treat the CIAL as if it were an extension group.

Learning to Listen

The CIAL process is a learning experience for all involved—external facilitators as well as participating farmers. The CIAT-IPRA team has developed an intensive training course and training materials to support replication of the methodology.

Seeing is believing

In 1996 Luis Humberto Fierro was one of 10 scientists and technicians from the Corporación Colombiana de Investigación Agropecuaria (CORPOICA), Colombia's national agricultural research institute, who went on a training course in the CIAL methodology organized by CIAT-IPRA.

Four years later Fierro retains two vivid memories of the course. The first was that on the opening day many of his colleagues expressed skepticism and anxiety. What was the point, they wondered, of asking farmers to do research when scientists could do it better? And if farmers could do research, did that mean the scientists would be out of a job?

Fierro's second memory is of how that attitude changed when the course participants visited Cauca and saw the CIALs at work. "We were confronted with farmers who were strongly motivated, confident about what they were doing and keen to try new technology," says Fierro. "Even the most resistant people in our group were converted by what they saw."

An intensive course

Fierro's account testifies to the power of the training provided by CIAT-IPRA to convince and inspire. But the training experience should be more than just a conversion to the cause: It must also be a thorough grounding in the principles and practices of the CIAL methodology that enables those trained to teach it to others. The quality of training determines the integrity of the methodology as it passes out of CIAT's hands into the programs of other institutions.

To respond to the challenge, the CIAT-IPRA team has designed an intensive 2-week course that combines a theoretical introduction to the CIAL methodology with hands-on practice in implementing it.

The course begins with a classroom session on the meaning of participation. According to CIAT-IPRA trainer José Ignacio Roa, participation is a *sine qua non* of the CIAL process, so it is important that participants gain a good understanding of it. "Participation means giving *everyone* in the group a chance to talk, a chance to decide," he says. "It means presenting farmers with a range of options from which to choose." Realizing this can be painful, as many scientists and technicians in the formal system have to unlearn their habit of dominating discussions and imposing solutions. The essence of the CIAL process is that the farmer owns it, not the researcher.

Next, while still in the classroom, the participants are taken step by step through the phases of the CIAL process, from motivation to feedback. Besides describing each phase, these sessions deal with the basic skills needed by the facilitator, such as how to moderate a meeting simply and clearly, how to get quieter group members to contribute, how to ask open questions rather than questions that steer people towards specific answers, and so on. The sessions also deal with issues that commonly arise during each phase, such as the facilitator's role in accessing technological alternatives and assisting with experimental design.

During the second week, course participants take to the field, where they must put the methodology into practice with rural people. This is organized by rotating participants between different communities at different phases of the process. The motivational and diagnostic meetings take place in one community, after which the participants move on to a feedback meeting in a second community—and so on. Courses are held during the cropping season, so that participants can visit CIAL experiments in farmers' fields.

"This part of the course is challenging," says Roa. "But most participants come through the experience well. The presence of farmers who are expressing their real needs acts as a tremendous tonic, bringing out the best in everyone. And there's nothing like exposure to a motivated CIAL group to convince skeptics of the value of the approach."

The end of the course is not the end of the learning experience. Course alumni are asked to spend at least a year trying the methodology out before attempting to teach it to others. During this year, in which each trainee is expected to launch a CIAL from his or her home institution, the former trainees receive follow-up visits from CIAT-IPRA staff to check on their progress and help them solve problems.

Training materials

"What does it mean to experiment? It means trying something new and comparing it with something known."

Thus begins the first in a series of handbooks published by CIAT to help guide the CIALs. Each newly formed CIAL receives a complete set of the handbooks, which now number 13. Besides taking the reader through each phase of the CIAL process, the handbooks cover such topics as experimental design, factors affecting data analysis, and ways to build and maintain the community's trust and support. The facilitator reads the handbook corresponding to the activity under way with the members of the CIAL, who are also encouraged to read and use the handbooks on their own.

The handbooks use simple language—but arriving at that simplicity was no easy matter for the CIAT-IPRA team. To help them present ideas in ways that farmers would find appealing and easy to grasp, the team went back to the source that had inspired the CIAL concept in the first place—the farmers of Cauca.

Around 300 farmers in the communities where the first five CIALs were launched were invited to evaluate the content, language, and drawings of the first drafts. The farmers were divided into three groups, each of which worked with a different CIAT-IPRA team member. Having noted down the farmers' suggestions, the team members collaborated to compare notes and finalize the drafts.

As a result of this exercise, many of the examples included in the handbooks are drawn from real situations that arose in the Cauca laboratory. And the wording and illustrations used are often those suggested by the farmers.

Feedback from users has been positive. Some CIALs in other countries feel a need to adapt the handbooks to their own local circumstances. A modified set has been prepared for Central America. In Nicaragua special materials have been developed for use where literacy rates are low.

Facilitators of the CIAL process need different training materials. Exercises used in the basic 2-week course are available in a set of manuals, which also contain other supporting materials on issues such as gender sensitivity and resolution of conflicts in groups. A basic handbook on participatory approaches to evaluation, two instructional units on farmer evaluation of technology, and a manual and user-friendly software on analysis of data from preference-ranking exercises have also been published. Multimedia learning materials from a second course, for training trainers, and an improved set of tools for monitoring and evaluation are under development.

Supporting replication

Training the trainers was the central element in the CIAT-IPRA team's strategy for disseminating the CIAL approach. The aim was to train at least 250 people from the formal research and development (R&D) sector, together with 80 farmer paraprofessionals and 40 professional trainers.

That aim turned out to be too modest. By 1999, in response to popular demand, the CIAT-IPRA team had organized 12 introductory courses for 285 participants from institutions in Bolivia, Brazil, Colombia, Ecuador, El Salvador, Honduras, Nicaragua, and Venezuela. Many of these participants have gone on to train others, bringing the total number of people trained to around 400.

A condition for attending the course is that each participant should subsequently attempt to start at least one CIAL. Most do so, though inevitably some initiatives fall by the wayside. In Honduras and Bolivia, about 30% of graduates have not yet put their new skills into practice by forming a CIAL.

A successful first CIAL usually attracts the interest of colleagues. Interest then builds to the point at which professionals in other programs request training for themselves. At this point CIAT-IPRA trainers often become involved again, offering training to this larger group. Eventually, the institution may feel sure enough of its capacity in the methodology to share it with other institutions. The ideal, in the longer term, is to build a core national team of experienced CIAL practitioners, allowing sustained progress in spreading the approach independently of CIAT.

Ecuador provides a good example of this process at work. Here the seeds of the CIAL methodology fell on fertile ground, since the Instituto Nacional de Investigaciones Agropecuarias (INIAP), the country's national research institute, had already adopted a participatory approach to research. A series of workshops conducted by CIAT-IPRA staff at the institute's main Santa Catalina research station in 1993-94 persuaded department heads to include the CIAL methodology alongside those already being tested. The program leaders sent their scientists and technicians on an intensive, tailor-made, 5-week course at CIAT and then followed this up with their own in-country training. A nine-strong national group of experts in participatory research was formed and a workshop held to train the group to train others.

Following that first workshop, group members have held six others in different regions of the country, training a further 60 people, including NGO workers as well as staff from the national extension service and regional INIAP offices. First applied solely in conjunction with potato, the CIAL methodology is spreading among researchers working with other commodities, including maize, wheat, barley, and legumes. The group is even becoming a resource for other Andean countries, having recently hosted a course for participants from Peru

and Bolivia, in addition to Ecuador. A training manual on participatory research is being developed, with a chapter on how to form a CIAL.

Most countries participating in the dissemination phase are not as far advanced as Ecuador in their training, but several are heading in the same direction. In Colombia CORPOICA has secured support from a government agency to scale up its training activities and has produced a video and CD-ROM to support the effort. Bolivia's Fundación para la Promoción de Productos Andinos (PROINPA) has released a video and a series of technical bulletins on the CIAL methodology. Venezuela's national agricultural institute, the Fondo Nacional de Investigaciones Agropecuarias (FONAIAP), will hold its first international CIAL course in 2000.

From conviction to action

Like Fierro, most alumni of the courses say that their experience with CIAL groups in the field was decisive in persuading them to try the methodology upon returning to their own institutions. What convinces them is the testimony of the farmers themselves—their self-confidence in their new role as researchers.

The experience of Carlos Amaya, a technology transfer specialist with the Honduran NGO, Fomento Evangélico para el Progreso de Honduras (FEPROH), is typical. Amaya used to conduct conventional on-farm research before going on a CIAT-IPRA course in 1996. During the course he recognized the CIAL process as "something we had long been looking for."

That sense of recognition led Amaya to act decisively on his return home. After discussion with his colleagues, he tried out the CIAL methodology in a village where FEPROH was already working, in the Valle de Cillos area near Tegucigalpa. At the end of the first year's research, the CIAL presented its results not only to the village but to representatives of 13 neighboring communities. The results were so impressive that all 13 expressed the wish to start their own CIAL. The experience was enough to persuade FEPROH to adopt the CIAL methodology throughout its programs.

CORPOICA in Colombia was initially more hesitant. Only one CIAL was launched following the first course attended by Fierro and his colleagues. At the time CORPOICA was going through a profound internal debate about its approach to technology transfer. Most in the

"Before, I used to go looking for plots, not people. I saw farmers as a labor force, who didn't know what was going on. All the technologies tested were selected by us technicians. I thought that agricultural research was something expensive and sophisticated that had to be done on research stations. But the course taught me that anyone can do research, including farmers."

Carlos Amaya, Technology Transfer Specialist, FEPROH, Honduras

institute agreed that the conventional linear approach used in the past did not work with poor farmers. But what should replace it? Having returned to their familiar institutional environment, some participants in the CIAL course fell back into the doubts so successfully banished by their fieldwork in Cauca.

But Fierro remained convinced that the CIAL model was a way forward. Following the success of the first CIAL, he was able to persuade 11 of his colleagues to go to CIAT for a second course. This time the methodology "took": All but one of this second batch of trainees subsequently set up a CIAL.

Experience in Bolivia powerfully illustrates the difference that training can make in the quality of the CIAL process. The country's first generation of CIALs was started in 1994 by people who had not been on the CIAT-IPRA course. Most of these early CIALs failed—except one, established by a group of young researchers who were open to the methodology despite their lack of training. In 1996, CIAT-IPRA staff began providing training and advice to interested scientists and agronomists with PROINPA's national potato research group. Since then the group has successfully established 11 more CIALs.

Several experiences demonstrate the importance of exposing an institution's senior staff to the methodology if the subsequent CIAL program is to flourish. In Colombia's Valle Department, CIALs launched by two agronomists now languish without support. Although the agronomists had been trained, the regional secretariat of the Ministry of Agriculture was unfamiliar with the CIAL concept and did not support the work. Where senior staff are trained, as at INIAP in Ecuador, the institution is much more likely to encourage the CIAL effort and to back it with additional resources.

Several NGOs have scaled up the training effort by running their own courses. The experience of the International Institute of Rural Reconstruction (IIRR) taught it valuable lessons in how to make such training effective. At first the organization provided places on courses free of charge. But a combination of rapid staff turnover and lack of support from bosses meant that few trainees were able to start CIALs on return to their institutions. In addition, because IIRR had no CIALs of its own, its courses lacked a basis in practical experience. After 2 years the organization decided on a radical change of approach. It launched its own CIAL program and offered training only to institutions that were willing to pay for it. According to Daniel Selener, director of IIRR's

Regional Program for Latin America, the result has been a marked improvement in trainee motivation and the subsequent start-up rate of CIALs.

Farmer to farmer

Training paraprofessionals in the CIAL methodology is a vital part of scaling up. Paraprofessionals can make two major contributions to the process.

First, they can serve as a gearing-up mechanism, supporting larger numbers of CIALs than can a formal-sector professional working alone. Based in the rural area, paraprofessionals save time and money for the overstretched technical services of government organizations.

Second, paraprofessionals can sometimes provide more effective support than professionals. They are more easily held accountable by the farming community and are therefore more likely to be conscientious. In addition, farmers are more inclined to trust a fellow farmer than a professional. The corollary, however, is that paraprofessionals may be less familiar with the inputs and services available from the formal research system than are professionals.

This means that the key to achieving impact through paraprofessionals is to ensure that they enjoy good links back to the formal research and extension system, enabling them to draw on its products and services to support the CIALs. The lines of communication may be tenuous at times, especially from the more remote rural areas, but they are vital to success.

Paraprofessionals are probably most effective when they work as a team in a second-order organization. This gives them the ability to tap the expertise of their colleagues, as well as better access to other services. The four members of the CORFOCIAL team in Colombia's Cauca Department work closely together and have been able to attract support from several government organizations to provide training and other inputs. Based on Colombia's experience, several other countries, including Ecuador and Honduras, are keen to start their own second-order organizations.

The impact of training individual paraprofessionals, who subsequently operate in remote rural areas, is less predictable. However, the second-order organization can relay its expertise to such areas at relatively low cost, as CORFOCIAL has already done for several marginalized indigenous communities in the higher lying areas of Cauca. Local NGOs are also well placed to provide training to paraprofessionals. In Ecuador, for example, IIRR has now trained over 20 of them and plans to expand this activity. There, as in Colombia, some outstanding individuals are now at work in remote indigenous communities.

Given the high turnover rate of professional staff in the government services, training paraprofessionals may turn out to be a vital means of ensuring rapid, high-quality replication of the CIAL process. In 1997, through its national partners, CIAT-IPRA began asking CIALs at sites outside Colombia to nominate farmers interested in becoming paraprofessionals. So far, seven from Honduras, two from Nicaragua, and one from Ecuador have been trained.

Farmers notice the difference

Whether support for the CIALs comes from a professional or a paraprofessional, the subtle difference in attitude engendered by

training in participatory techniques is not lost on farmers. At Tontoló in Honduras, the CIAL leader says that agronomists trained in the CIAL methodology propose that "we do something together, learning from each other," rather than seeking to impose technology on farmers, as they did before. "We take this as a mark of respect," he says.

The last word should go to Héctor Andrade of INIAP in Ecuador. He claims that farmers have become more receptive to him since the CIAT-IPRA course taught him not to dominate in group meetings. Andrade epitomizes the factors that make a participatory approach so much more effective for developing and disseminating technology than approaches in which scientists determine the research agenda and impose their own solutions. Effective training ensures farmer empowerment and ownership of the CIAL process and is therefore crucial to impact.

"On the training course, I learned the essential participatory techniques—how to ask open-ended questions and, above all, how to listen more to the answers. Now that I have learned not to dominate, I find that farmers have become more receptive to me."

Héctor Andrade, Plant Breeder, INIAP, Ecuador

In a word

To sum up:

- Good training is essential for conveying the basic principles of the CIAL methodology and hence for ensuring its successful replication.
- Training begins with participants learning the CIAL process and practicing the facilitation skills they will need.
- The CIAT-IPRA course is an effective way to initiate new facilitators, and it can be replicated by other organizations.
- Once a new facilitator has formed a CIAL, training continues for a year in the form of periodic monitoring and evaluation visits from an experienced trainer-facilitator.
- A well-trained core national team can ensure a self-sustaining process of replication.
- Training paraprofessionals and building second-order organizations are important investments in the future of the CIAL process.

Measuring Impact

Two questions must be addressed when assessing the impact of the CIALs. First, do the CIALs provide an effective local research service? And second, how does their research affect development?

Evolution: the big unknown

The CIAL movement is still young. Of the 249 active CIALs in Latin America, around 30% are doing their first or second experiment (Figure 10). Only about 30% have gone through the entire process of conducting a small preliminary experiment, a slightly larger evaluation of the most promising options, and a third production-scale trial and are now designing their fourth or fifth experiment. Only a handful of the committees are seasoned veterans of more than two full research cycles.

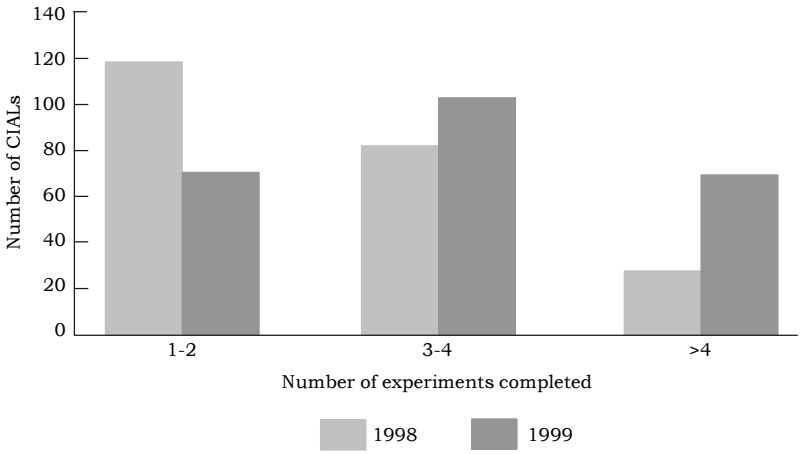


Figure 10. CIALs by maturity level.

Given the youth of the movement, we can only speculate about how the CIALs will evolve. Some committees develop innovations (crop varieties requiring seed multiplication, for example) that need further work to make them broadly available to the community. Other CIALs

continue their research, while at the same time running a business based on the products and services they have already developed. Still others shift their research to a different topic, leaving dissemination and commercialization of their results largely to others. When CIALs develop a marketable product or service, each member must reevaluate his or her personal priorities. Inevitably, some decide to leave the CIAL in order to commercialize its results.

There are various examples of all three cases. At Arbeláez in Colombia, the CIAL intends to go into large-scale seed multiplication of snap bean. Their group's leader doubts that the committee will do research on further questions, unless the community decides to recruit new members. The CIAL at El Diviso, in contrast, already runs a maize seed production and milling business and hopes to repeat its success by extending its research to common bean. Perhaps the most productive CIAL in terms of research results is Tukma Baja in Bolivia. This committee has worked on potato, peppers, snap beans, and common beans—and is still going strong. Tukma Baja funds its research by selling seeds of potato and bean but only on a small scale.

When CIAL members leave the group to focus on business, communities often respond by handing over the group's fund to a newly elected CIAL. The Asopanela CIAL, for example, intends to pass its fund to a new committee that wants to conduct experiments on plantain. This will free the group to market its processing expertise to other sugar cane producers.

Many of the CIALs testing food crop varieties will probably aim to disseminate their results by multiplying and selling seed. There is plenty of scope for the growth of such businesses. In Colombia, for example, improved seed is scarce, owing to the financial difficulties of the larger seed companies, some of which have recently ceased operations. Nevertheless, the market for improved seed will eventually become saturated, so not all CIALs testing varieties can expect to become seed enterprises, especially in the long term.

Establishing a seed enterprise for a major food crop is only one of the possible development paths open to the CIALs. Others include the production and processing of minor crops, such as soybean and fruits (*mora* and *lulo*, for example), or other activities, such as small-scale animal breeding (guinea pig, for example). Some CIALs may attempt to market their expertise in such areas as integrated pest management (IPM). In the long term, tree nurseries or other agroforestry-based businesses might become more common. And eventually the agenda could move beyond agriculture altogether to new areas, such as tourism.

Another unknown is the applicability of the CIAL concept across different farm types, agroecologies, and cultures. As one would expect, some evidence suggests that starting a CIAL is more appealing in communities where farm size is small and the farming systems are heterogeneous than in areas where holdings are larger and the conditions more uniform. The idea has caught on in the Andean hillsides but seems less likely to do so in the plains. Likewise, farmers may be more inclined to experiment where rainfall is high and a wider variety of plant types can be grown than in dry areas, where there are fewer options to explore. Yet CIALs have proved popular in the semiarid zone of Northeast Brazil, so this may be an oversimplification. Finally, though fairly extensively tested in Latin America, the CIAL concept remains untried in Africa and Asia. Rural societies in these regions face problems similar to those of Latin America, but they may come up with different institutional solutions, suited to their different social and economic circumstances. A number of concepts broadly similar to the CIALs have been successfully tested in several countries of these regions.

Given all of these unknowns, none but the most foolhardy would attempt to forecast the overall impact of the CIALs on rural development by extrapolating from individual cases. It is far too early for that. However, it is *not* too early—in fact it is the right time—to ask whether

the CIALs are fulfilling the precondition for impact by providing an effective research service. Only by doing so will they produce usable results that can be widely adopted.

Delivering a research service

What constitutes an effective research service, and how can this be assessed? A process in which the human being is the chief variable does not lend itself to empirical analysis and the easy certainties of laboratory research. The CIAT-IPRA team have met this challenge by devising a special survey. It measures three sets of indicators, marking different stages or milestones along the CIALs' road to success.

The first milestone is a capacity to conduct experiments systematically. This is a prerequisite for producing reliable results that are useful to the community. It is measured by assessing CIAL members' understanding of the research process. Are CIAL members able to explain the objective of their experiment and the research methods they are using? Have they grasped the experimental design, and the reasons why there are controls and replications? And do they appreciate the need to manage risk when testing new ideas?

The second milestone is the CIAL's capacity for self-management. In this case the indicators are designed to assess the ability of the CIAL to run its own affairs independently of external support. This is crucial, because CIALs that become dependent on their facilitator often conduct research that does not match farmers' needs and, as a result, achieves little or no impact. Nor do such CIALs offer any cost savings over conventional on-farm research. The indicators for this milestone include the frequency of visits made by the facilitator, ability to administer the CIAL fund, success in replenishing the fund, ability to seek external support directly (without the assistance of the facilitator), committee members' attendance at CIAL activities, group cohesiveness, and ability to resolve conflicts.

The third milestone consists of strong ties between the CIAL and the community and with formal research and development (R&D) institutions. These relationships, which become important as the CIAL approaches maturity, enable the CIAL to disseminate its results and to express demand for the products and services of formal research and extension. The indicators for this milestone include adoption of CIAL technologies by the community, the amount of experimentation carried out in the community by non-CIAL members, changes in the attitude of

the R&D professionals interacting with the CIAL, and use of the CIAL's research results by R&D organizations.

First developed and applied in Colombia's Cauca Department, the survey is now used in all countries that have CIAL programs. It also forms part of the routine follow-up provided by CIAT-IPRA trainers to course participants who are starting up their own CIALs. So far, the CIAT-IPRA team has analyzed the survey data from Cauca only.

The analysis shows that the CIALs in Cauca learn the rudiments of systematic research quickly (Figure 11). Even during their first trial, over 50% of the CIALs understand the methods they are using. They can give the objective of their research, describe their experimental design clearly, and explain the need for controls and replications. They also understand the need to manage risk when testing new ideas. CIALs

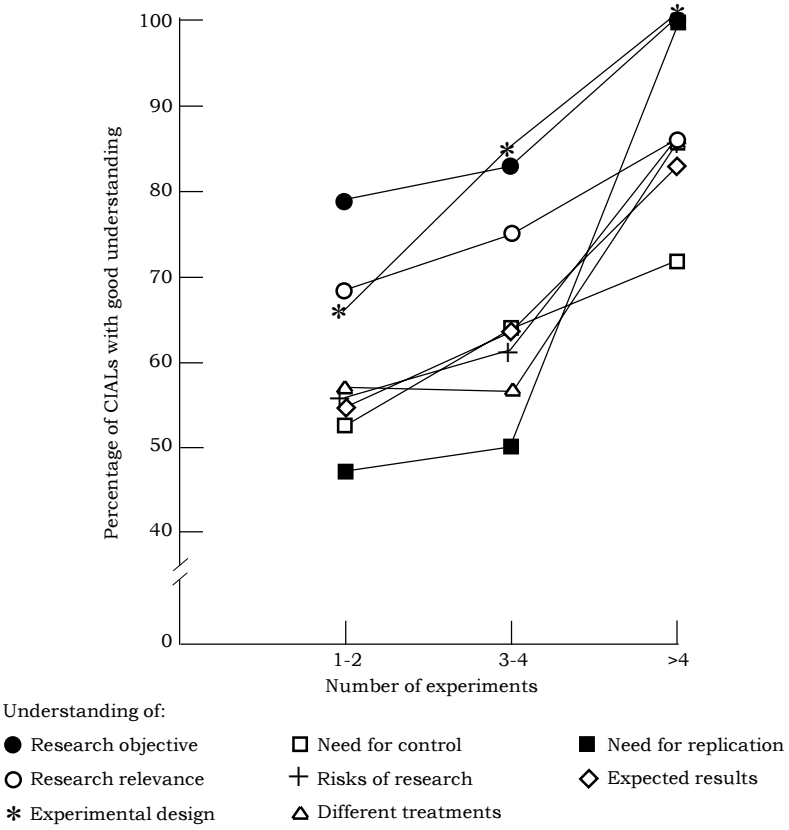


Figure 11. The CIAL learning curve.

take a great leap forward in understanding the research process when they go through the whole process of planning, designing, and conducting exploratory, validation, and production-scale trials. Over 70% of such CIALs in Cauca understand the main principles of research.

The self-management indicators are also generally encouraging (Figure 12). Dependence on external support for conducting the CIAL process declines as the CIAL ages. By the time CIALs have conducted three or four experiments, 50% need only one visit by their facilitator per month. As they mature the CIALs also become more proactive in seeking information: In about 57% of the CIALs, individual members have taken the initiative to contact institutions for advice or assistance without waiting for their facilitator to help. About half of the CIALs have

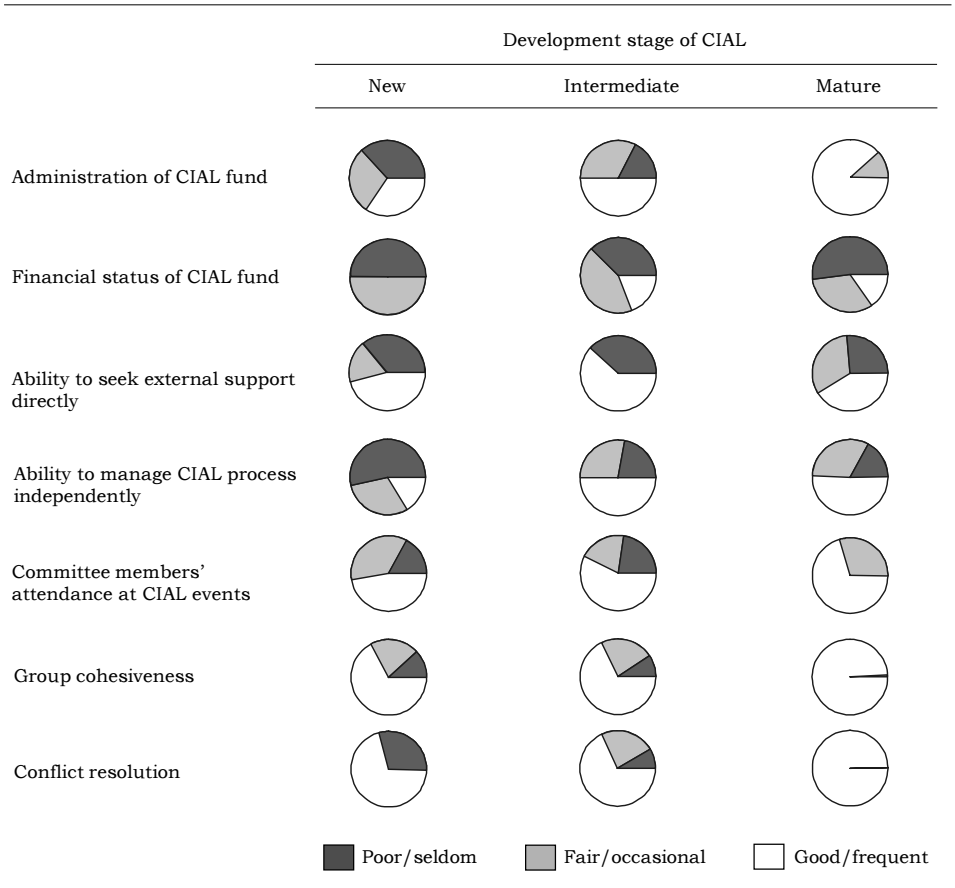


Figure 12. The CIAL's capacity for self-management.

learned to administer their funds competently by the time they have conducted three or four experiments. And the figure rises to 86% in CIALs that have logged more than four experiments.

The learning curve for the research process and the indicators of capacity for self-management point to a gradual maturation process. Novice CIALs that have conducted just one or two experiments grasp some of the simpler research concepts, such as the objective, design, and relevance of the experiment. But they still depend on the facilitator to guide them through the process. By the time a CIAL has completed three or four experiments, it has reached an intermediate stage of maturity. It still struggles with some of the more difficult concepts, such as replication and control, but is moving towards greater autonomy in management. The CIALs' understanding of research concepts gels when they have four or more experiments behind them. These committees can be considered mature.

The most difficult research concept for CIALs to grasp, at least in Cauca, seems to be the need for a control treatment in the trials. And their greatest management challenge is how to replenish the CIAL fund. Only 20% of the committees have managed to increase their funds with proceeds from CIAL activities.

Data on the CIALs' links with the community and with external organizations suggest that these are strong in Cauca. Over half of the CIALs have made recommendations to their communities, based on their own research results. About 83% of CIALs conducting their first trial have held at least one meeting to inform the community of their progress. The more mature CIALs maintain this high level of feedback to the community. Many not only hold a meeting but also make a progress report available. Most important, 80% of the mature CIALs cite major changes in their communities, including widespread testing of their recommendations and greatly increased interest in spontaneous research. These data constitute another nail in the coffin of the allegation that CIALs are elitist.

By the time they reach the production stage, about half of the CIALs report positive changes in the attitudes of R&D professionals interacting with them. These changes include better listening, greater willingness to allow the CIAL to make its own decisions, and more frequent fulfillment of commitments. About half of all mature CIALs report at least one example of the information or products resulting from their research being taken up by R&D organizations.

Implications for development

What can be said about the likely impact of the CIAL process on the three major facets of rural development: economic growth, social equity, and the sustainability of agriculture's natural resource base. Let's take each of these aspects in turn:

Growth. As events at El Diviso demonstrate, the CIAL process can stimulate rapid growth in the rural economy. Where the CIAL conducts research on a major food crop, such as maize, the benefits are likely to be widely felt. Farmers' incomes go up, and in the medium to long term the price of food falls. Both producers and consumers gain.

So far, maize yields at El Diviso have shown only a moderate increase, compared with those achieved by some other CIALs. In El Crucero de Pescador, for example, farmers adopting CIAL technology have seen grain yields rise from about 820 to 1,400 kg/ha for the first harvest of the year and to the spectacular level of 2,000 or even 3,000 kg/ha for the second harvest. Farmers at this location increased their sowing densities and applied much more chicken manure than in El Diviso, partly because it is cheaper there (the community is nearer the city of Cali, where there are large chicken farms). Clearly, factors such as proximity to markets and the relative prices of inputs and outputs will strongly influence the growth effects of CIAL research, as they do in any other kind of research.

When surplus maize is fed to livestock, there is a further positive effect on farmers' incomes and the price of food. Given the rising demand for livestock products, this seems likely to happen whenever and wherever a surplus is created. So far, maize has been fed to chickens and pigs, but it could also be used to feed dairy cows.

The CIALs' research has strong effects on growth when the committees are able to combine increased production with value added through processing. Many of the CIALs conducting research on maize

have achieved this, typically by reinvesting the increased income resulting from yield gains in milling equipment. But combinations of this kind are by no means restricted to major food crops. Many of the CIALs conducting research on new or minor crops, such as soybean or *mora*, are also processing their output for sale in local markets. In these cases the CIALs often enhance the value added through processing by creating products that are new to the local market.

The Asopanela CIAL's research on sugar cane production and processing provides a powerful example. The CIAL identified three crucial steps for ensuring the profitability of small-scale production of *panela*. First, it is testing new sugar cane varieties, which promise higher yields from an earlier maturing plant that can be cut more often, allowing year-round utilization of the processing plant. The cane from these new varieties is softer and easier to press and yields more during processing, adding several other advantages to the productivity gains. Second, the CIAL has increased the efficiency of the ovens used for processing, cutting the consumption of fuel and thus lowering costs. In the past several fuels had to be used, including rubber tires and fuel wood. But now the only fuel needed is bagasse, a byproduct of sugar cane processing. Third, the CIAL has created a new, higher value product—organic *panela*—which it produces under contract. The product is likely to catch on with consumers, since it does not involve the use of a harmful bleaching chemical known to cause headaches and diarrhea. These improvements reinforce one another and together could raise producers' incomes substantially.

Equity. With its emphasis on empowerment, the CIAL process is likely to have highly positive equity effects. In several cases very poor or marginalized groups normally left behind by development have taken up the process enthusiastically. Examples already discussed in this book include landless laborers at San Bosco, indigenous farmers at Flor Naciente, and women at Cinco Días. With the exception of San Bosco, most of these CIALs have begun too recently

for their full impact to be gauged. However, a case study of San Bosco showed pervasive impact on livelihoods throughout the community.

Often, the simplest innovations can bring impressive benefits to marginalized groups. At Santa Isabel, high in the mountains of Colombia's Cauca Department, a group of Totoró farmers learned from another CIAL the practice of using stakes and string to support their snap bean crop. The stakes lift the beans clear of the soil, freeing the crop of the soil-borne fungal diseases that used to devastate harvests. CIAL-to-CIAL dissemination of this kind is increasing among such groups, many of which operated in comparative isolation before the CIAL process helped them to break down barriers and form alliances with others.

Marginalized groups in communities typically conduct research on minor crops or animals that do not interest the majority of farmers. Examples are research on peanuts by women at El Diviso, on soybean by women at San Isidro, and on guinea pigs by a landless group at Portachuelo. This research will not have the broad impact associated with research on major food crops, but the groups doing it are looking for new sources of income that could lift them out of poverty. Their involvement in research, which would probably not have come about under a conventional project-based approach, demonstrates that the CIAL process can contribute uniquely to a more equitable rural society.

Though many groups conducting research on minor crops are successful, some are struggling. Their difficulties may be agroecological. That is, they have chosen a crop that is susceptible to pests and diseases or otherwise difficult to grow under the prevailing soil or climatic conditions. Sometimes the problem results from trying to process an unfamiliar crop without the proper equipment. Where the difficulties are agroecological, research may do little more than demonstrate why the minor crop has remained minor—unless new

technology comes to the rescue. Where processing is the obstacle, the perseverance of some groups and their attempts to obtain new equipment are encouraging signs. But for most it is still too early to say whether or not they will succeed.

If the CIAL process is to realize its potential for contributing to equity, facilitators supporting the CIALs will need to concentrate more on these struggling groups than they do at present. At El Diviso, for example, the successful men's CIAL working on maize has become good at attracting resources and gets most of the attention from visitors—so much so that it almost overshadows the much weaker women's CIAL in the same village. Some CIALs formed by marginalized groups complain that they are more or less neglected by their facilitator, especially if the latter knows little about the crop they are researching.

Sustainability. It is difficult to predict the impact of the CIAL process on the sustainability of production. Since the process puts decision-making power in the hands of farmers, there is no guarantee that they will focus on technology favoring sustainability. Poor farmers must choose options that raise their incomes today, whether or not these help conserve natural resources.

At San Isidro, for example, members of the women's CIAL are funding their activities by growing maize, common bean, and soybean on a steep hillside that is vulnerable to erosion. Meanwhile, the men's CIAL in the same village is concerned about the sustainability of cassava cropping, and this is the focus of their research. They believe farmers must diversify into crops that are profitable enough to justify the use of fertilizer and compost, but they have yet to find a crop that is suitable. When maize and onion trials showed that these crops could not be produced profitably, the group had little choice but to revert to cassava

production. They have considered establishing live barriers in cassava on sloping fields. But they say that livestock would be needed in order for this option to make economic sense, and few farmers at San Isidro have the spare cash to invest in them.

These considerations aside, many CIALs are testing technology that, if widely adopted, will protect natural resources. Often, they do so because of a growing awareness of the environmental damage done by previous generations of farmers—an awareness derived both from personal experience and through public education campaigns. The CIAL at El Paraíso in Honduras is testing the use of live barriers in a large sloping field planted to maize and beans. The CIAL members cleared the field without burning—hard work but worth it for the savings in nutrients, they say. They represent a growing number of farmers in this country who have become conscious of the negative consequences of burning and have renounced the practice as a result. In these situations the CIALs' research and demonstration work can often serve a useful function, establishing the superiority of sustainable practices and promoting their adoption in the community.

Some technologies that intensify production also help to protect the resource base. In Colombia and several other countries, the introduction of new varieties of maize and beans that respond to fertilizer is leading to an increase in the use of chicken manure, which improves soil fertility and structure on steep slopes. In these cases the CIALs' research contributes to sustainability through its effects on growth and equity.

Many CIALs are conducting research on integrated management of pests and diseases. One group, the El Progreso CIAL in Ecuador, has halved the number of fungicide applications to potato from 14 to 7 in a season. In addition to safeguarding the environment and human health, this has saved farmers about US$280 per season. Another group, in Colombia's Valle Department, has developed new technology for combating nematodes that attack *mora.* Their solution is based on indigenous knowledge of medicinal plants. While cleaning their fields, local farmers had noticed that *paico*, a tall aromatic herb known for its medicinal value, was one of the few plants unaffected by nematodes. So

they asked their CIAL to conduct research on it. The group found that a cupful of *paico* extract applied to the soil surface around each *mora* bush banished nematodes after 5 months and that pesticide applications could be discontinued. Findings such as these testify to the CIALs' effectiveness in building on farmers' indigenous knowledge and powers of observation.

CIALs operate mainly at the community level. But to conserve and enhance natural resources often requires that decisions and actions be taken across entire watersheds, cutting across community boundaries. Pilar Guerrero thinks that the CIALs are not ideal for dealing with such issues. "Most CIAL members and farmers still work individually," she points out. "Being profit-oriented, they are not motivated to reach out to resource users beyond the community or to enter the complex negotiations that may be needed to settle difficult resource management issues."

Even so, CIALs in Cauca's Cabuyal watershed are participating in the Consorcio Interinstitutional para Agricultura Sostenible en Laderas (CIPASLA). The consortium negotiates deals, in which communities and individuals undertake socially and ecologically desirable projects (to protect water resources, for example) in exchange for short-term benefits, such as access to credit. Experience so far suggests that the two types of institutions could be highly complementary.

CIAT's impact study

In 1998, CIAT began a study to assess the impact of the CIAL program on local agriculture. The study compares four communities that have no CIAL with four that have one. For the communities with a CIAL, the situation before their foundation is being compared with that 4 to

5 years afterwards. All the communities are in Cauca. CIAT-IPRA used a ranking technique, based on local indicators, to determine the wealth class of each household interviewed. This allows the team to examine how benefits from the CIALs are distributed in the community.

Two caveats surround this study and its findings. The first is that data analysis is still in progress, so only the early results are available. The second is that the level of impact demonstrated so far is conservative, since the study does not cover Cauca's more mature CIALs, whose results are known to be widely disseminated in their communities. To complement the findings from the impact assessment, the CIAT-IPRA team has initiated a series of case studies of mature CIALs.

The study's baseline data were originally collected for a quite different purpose. They were gathered by an undergraduate for thesis research on the relationship between indigenous experimentation and socioeconomic circumstances. When four of the communities chosen for this earlier research subsequently launched CIALs in the early 1990s, CIAT took the opportunity to reanalyze the baseline data and collect further information in both sets of communities, in the hope of shedding light on the CIALs' impact.

One requirement for the study was that the communities be broadly similar in terms of well-being. The wealth ranking showed that similar proportions of people belong to the poorest, intermediate, and not-so-poor groups in all eight communities.

The study reveals important differences between the two sets of communities. In those with CIALs, 57% of the households interviewed reported that innovations developed by their CIAL had led to increases

in agricultural production. The increases were higher among the poorer groups, with 50% to 55% of the households in the two poorest groups reporting productivity gains from CIAL technologies (Figure 13).

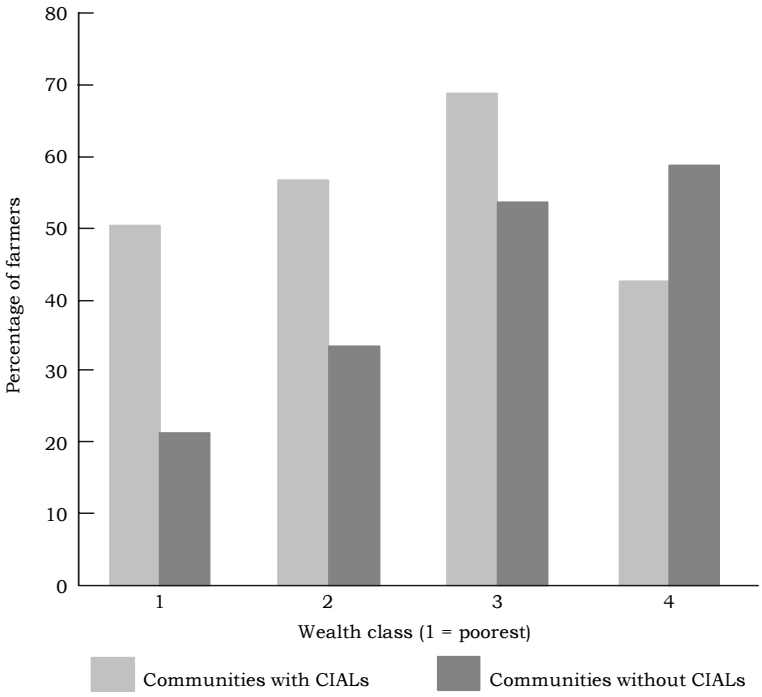


Figure 13. Percent of farmers reporting productivity increases from CIAL innovations in communities with and without CIALs. Cauca, Colombia, 1998.

Many more farmers in CIAL communities cultivate common beans—70% compared with only 48% in non-CIAL communities—and most of these farmers have adopted at least one variety recommended by the CIAL. The data on maize show a similar trend. Farmers in CIAL communities also grow more vegetables, have easier access to credit, and engage in more off-farm activities—all signs of a more dynamic village economy.

Encouragingly, nearly 40% of interviewees in non-CIAL communities also claimed that recommendations developed by nearby CIALs had improved their production. In these communities the better-off

households reported greater production increases than the poorer ones, reflecting perhaps their greater mobility and access to information. Nevertheless, 20% and 30%, respectively, of those interviewed from the two poorest groups reported gains in production, indicating that the results of the CIALs' work had spread considerably among poorer groups in the surrounding areas (Figure 13).

One case in particular shows the powerful effect of CIAL research on adoption both in and beyond the CIAL's immediate community (Figure 14). CIAT researchers supplied seeds of numerous advanced bean lines in Pescador, one of the communities with a CIAL. The committee selected several lines for local seed multiplication, including one that later entered into the Colombian regional bean trials and was eventually selected for official release. This variety was named Caucaya in honor of the farmers who had done the initial screening. The CIAL members first tested the line that was to become Caucaya in the 1990 season. Seeds were not available from other sources, and no other CIAL received them. As shown in the figure, a high percentage of the community's farmers adopted the new variety in Pescador, with adoption taking off rapidly after the CIAL made its recommendation in 1993.

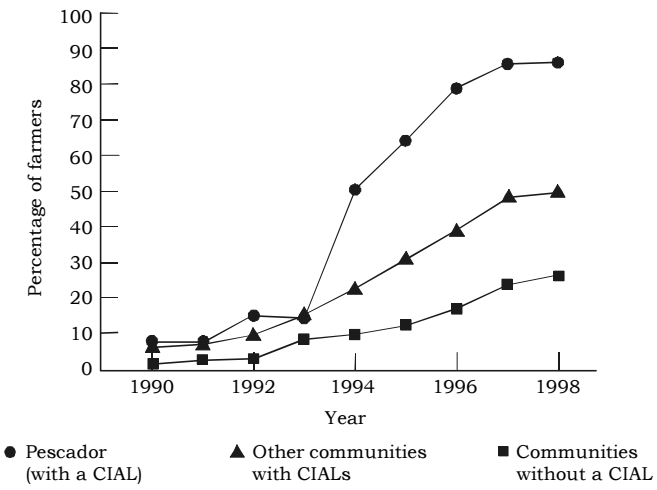


Figure 14. Adoption of improved bean variety *Caucaya* in communities with and without CIALs. Cauca, Colombia, 1998.

But adoption was not limited to Pescador: Farmers in other communities also began testing and adopting *Caucaya*, and the rate of adoption was higher in other communities that had CIALs than in those without. In other words, dissemination took place not only through the normal channels—informal seed exchange—but also through contact between the CIALs. There can be no clearer demonstration of the CIAL's impact, both on farmers' access to new technology and on their speed in adopting innovations recommended by the "home team."

Differences in incomes between the two sets of communities were not very marked, perhaps because the CIALs studied have only recently reached maturity. On average, 36% of interviewees in all communities said that their economic situation was better than 5 years ago. In communities with CIALs, this proportion was slightly higher, at 38%. People in communities with CIALs had a little more disposable income and were more likely to own a refrigerator, a stereo, or a television or to have improved their homes in some way. Although most of these people acknowledged that CIAL technologies had increased their crop production, many felt that the resulting gains in income were being eroded by the rising cost of living.

Most CIALs in Cauca and all those covered in the impact study are seeking ways to improve food security—their number one priority. Each year they face a hungry period between harvests that begins in July and lasts until October. Not surprisingly, in designing the impact study, the CIAT-IPRA team assigned top priority to assessing differences in food security.

The contrast is striking. Far fewer families suffered food shortages during the hungry period in communities with CIALs than in those without (Figure 15). In the CIAL communities, 35%-40% of people from the three poorest groups went hungry during August, the leanest

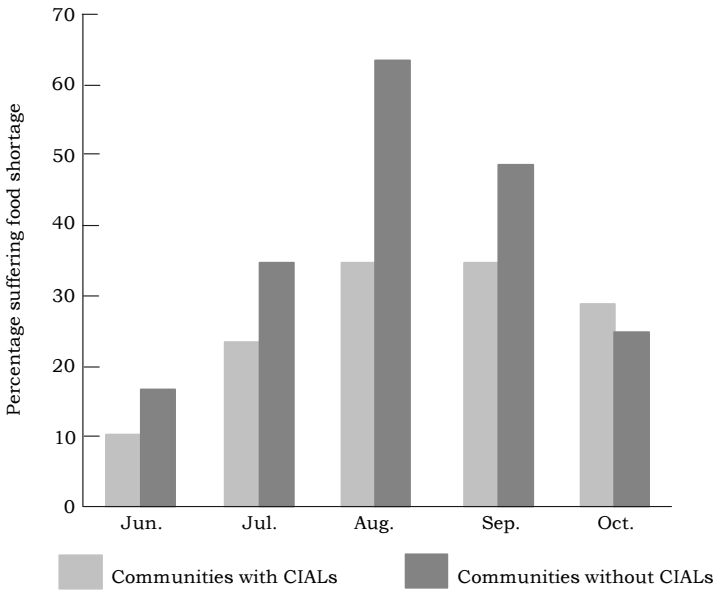


Figure 15. Food security in communities with and without CIALs. Cauca, Colombia, 1998.

"There is a romantic view of indigenous knowledge systems that advocates their isolation and protection from the corrosive effects of modern science and technology. Our study suggests that, on the contrary, the more you introduce the concept of learning to a community, the better it gets at it."

Douglas Pachico, Economist and Director of Strategic Planning, CIAT

month, while 10% of the wealthiest group did. In communities without CIALs, 60%-70% of the people from the three poorest groups and 15% of the wealthiest had empty bellies during August. Despite these impressive results, July to October is still a difficult period for many, and there is still a gap between rich and poor, indicating that agricultural innovation cannot completely solve inequalities of wealth.

Critics of the CIAL methodology sometimes argue that teaching farmers scientific methods will suppress indigenous knowledge and destroy their capacity for spontaneous experimentation. The impact study shows that this fear is unfounded. In communities with CIALs, far more spontaneous experimentation was taking place than in non-CIAL communities. In fact, many farmers who were not members of the CIAL were conducting their own research.

In both sets of villages, experimentation is nearly universal. Only 3% of farmers in communities with CIALs and 5% in those without reported that they had not conducted any experiments of their own. But in communities with CIALs there was more experimentation per farmer, and they experimented on a broader array of topics (Figure 16).

"The CIALs have increased the amount of experimentation in their communities. I have often seen non-CIAL members in CIAL communities conducting small experiments just like those of the CIAL, comparing new varieties with their local control."

Carlos Arturo Quirós, CIAT-IPRA Team Member

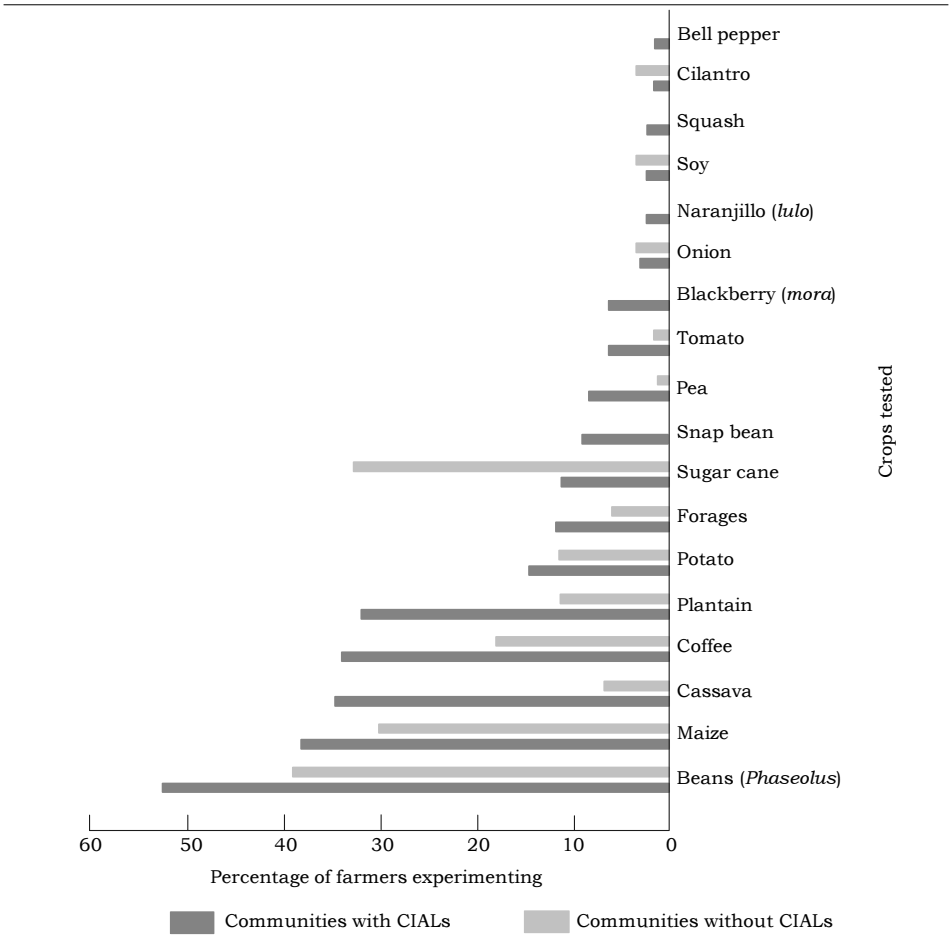


Figure 16. Farmer experimentation on crop varieties in communities with and without a CIAL. Cauca, Colombia, 1998.

Farmers in communities with CIALs frequently experiment with crop varieties, a finding borne out by anecdotal evidence from members of the CIAT-IPRA team. These experiments mimic the small plots with controls and experimental treatments used by CIAL members. Much of this work is made possible by small gifts of seed that committee members make to others in the community before large-scale dissemination takes place.

Thus, in 1998 farmers in CIAL communities reported experimenting with 27 different varieties and 19 new crops, whereas only 14 varieties and 8 new crops were tried in non-CIAL communities. A decade before,

farmers experimenting with varieties in communities that later formed CIALs had focused only on beans, maize, coffee, plantain, forages, and sugar cane. Today the range of crops is much wider, including peanut, soybean, and several new vegetables. The study also picked up big differences in the amount of experimentation on fruit species, such as *lulo* and *mora*. Over 60% of farmers in CIAL communities conducted research on such crops, compared with 23% in non-CIAL communities.

All this is good news for biodiversity. Interestingly, the stresses of production systems in Cauca have not, as one might expect, led to a reduction of diversity in farmers' fields (though this may be occurring in the surrounding forest). Rather, farmers are trying new varieties and crops as a way of maintaining their yields and spreading their risks while raising their incomes. The experimentation inspired by the CIALs is an important part of their search for options and is thus helping increase biodiversity.

Apart from crop varieties, farmers showed considerable interest in experimenting with fertilizers and other means of improving and protecting their soils. This reflects their concern about soil erosion and declining soil fertility, which have become serious problems in Cauca and many other parts of Latin America's hillsides over the last decade. In 1998 more experimentation with fertilizers occurred in CIAL than in non-CIAL communities. And more farmers in CIAL communities tested conservation practices, such as sowing without prior burning, weeding with a machete rather than a hoe (which leaves weed roots in the soil, keeping the soil in place), mulching with weeds, and the use of live barriers in sloping fields (Figure 17). These findings provide further evidence that the CIAL process can have a positive effect on the sustainability of production.

Pest and disease control was another popular area of research. Nearly 80% of respondents in CIAL communities did their own experiments on this topic, compared to only 38% in non-CIAL communities. Over the last decade, pesticide use fell in communities that formed CIALs but remained about the same in those that did not. These findings almost certainly reflect training in IPM offered by CIAT and other institutions in communities with CIALs. Clearly, the training boosted people's confidence in their ability to experiment on this complex topic.

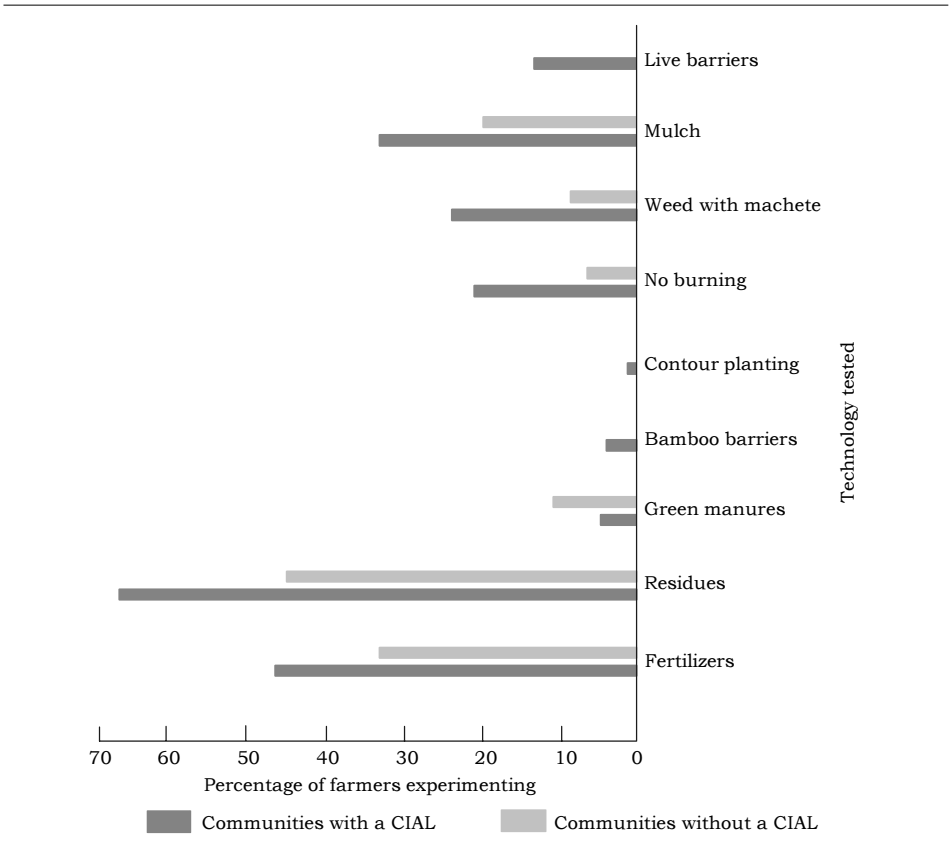


Figure 17. Farmer experimentation on soil improvement practices in communities with and without a CIAL. Cauca, Colombia, 1998.

Return on investment

As the Cauca impact study shows, the effect of the CIALs on their communities and on formal research services transcends dollars and cents. Nevertheless, the CIAT-IPRA team has made a first attempt to estimate the return on the investment made in developing and applying the CIAL approach.

Team members interviewed farmers from the top, high, average and lowest performers among the Cauca CIALs to ask how the costs and benefits of production compared before and after the CIALs made recommendations to their communities. The team analyzed how likely it was for a CIAL to reach a given level of economic impact, the length of time required to get there, and the frequency of CIAL failures. The team

also explored how the costs of establishing and supporting CIALs vary depending on the institutional setting, consulting with CORPOICA, IPCA, PROINPA, and CORFOCIAL in order to capture the full spectrum of organizations working with the CIAL approach.

The interviews revealed that the costs of supporting a CIAL are highest in the first year and decline steadily thereafter. The first year is more costly because of the investment in training facilitators, providing seed money for the CIAL fund and the costs of making two visits per month to each CIAL. In subsequent years the costs depend primarily on the number of CIALs attended by each facilitator and the frequency of visits made. The cost of forming and supporting a CIAL peaks at US$670 in the first year (Figure 18), and averages out to $487 per year over the first 3 years, and to $325 per year over 6 years.

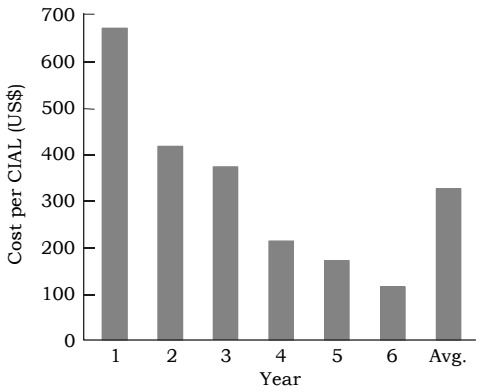


Figure 18. The institutional cost of establishing and supporting CIALs.

Based on the Cauca data, the CIAT-IPRA team extrapolated their analysis to the whole population of CIALs. After subtracting the cost of developing the CIAL approach and the yearly institutional cost of facilitating the CIALs, the team estimated that the net benefits derived from technological recommendations made by CIALs work out to about $1,500 per CIAL per year when a CIAL first reaches maturity (Figure 19), and $5,300 when a CIAL is seven years old. This translates into a return on investment of 78%.

CIAT's assessment of impact from the CIALs' work is far from complete. Watch this space!

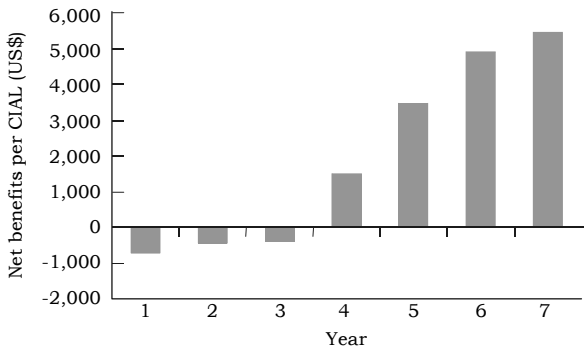


Figure 19. The return on investment in the CIALs.

In a word

To sum up:

- Most CIALs are providing an effective research service in their communities.
- Most CIALs report their results to their communities and cite widespread testing of these by local farmers.
- In some communities where farmers are applying CIAL recommendations, yields of staple crops have almost doubled.
- Food security can be greatly improved in CIAL communities. The poorest groups benefit the most from the increased availability of food during lean times of the year.
- More farmers in CIAL communities are experimenting with soil conservation practices than in communities without CIALs.
- Farmers in communities with CIALs conduct experiments with a much greater diversity of varieties and crops than communities without CIALs.
- Innovations identified by the CIALs reach local farmers more rapidly than others and also spread to other communities both with and without CIALs.
- CIALs report positive changes in the attitudes of the R&D professionals working with them.
- Women and marginal social groups gain social status and respect in their communities as a result of belonging to a CIAL.

Where Do We Go From Here?

CIAT-IPRA has so far focused on building the CIAL process and providing training to support its dissemination. What issues should receive the team's attention in future? And what are the implications of a more widely adopted CIAL process?

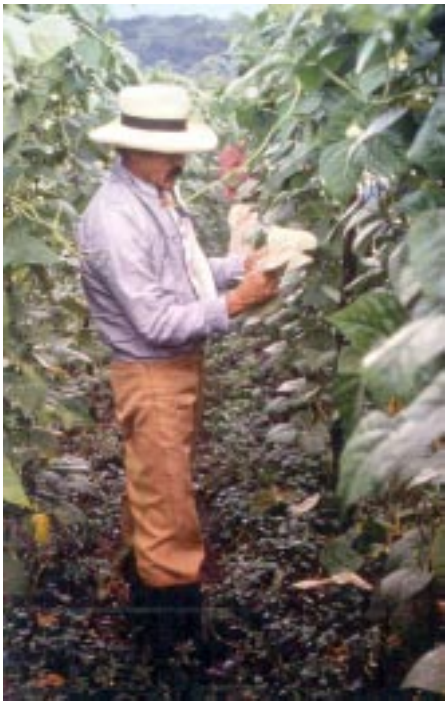
Take-off

The CIAL approach stands poised for mass replication.

The pilot phase, in which the CIAL concept was developed and tested, demonstrated its capacity to empower farmers and improve livelihoods in poor farming communities of Colombia's Cauca Department. A subsequent phase of more widespread dissemination has shown that, as long as certain basic principles are observed, the approach can be successfully applied in other countries and by organizations other than CIAT. A third phase, involving rapid spontaneous adoption, has begun, as national organizations such as the Fondo Nacional de Investigaciones Agropecuarias (FONAIAP) in Venezuela learn about the results obtained elsewhere.

Easy to grasp, the methodology is popular with farmers, who are increasingly disseminating it from community to community independently of any support organization. Nongovernment organizations (NGOs) have also shown enthusiasm, helping to spread the methodology faster than any other type of organization. Several universities teach the CIAL process, and a few have started their own CIAL programs. With few exceptions, the national research institutes that have been introduced to the methodology are either experimenting with it themselves or supporting the CIAL programs of other organizations by providing access to technology, seeds, and diagnostic services. Two regions have formed second-order organizations to protect and promote the CIAL process, and others intend to follow suit.

As the methodology takes off, the CIAT-IPRA project faces new challenges. The first and most important is how to maintain the quality of the CIAL process, while letting go of its implementation. A partial answer to this challenge, as we have seen, is to continue the project's training activities. Despite some successes, the task of building a core team of practitioners in all the countries that currently have an active



CIAL program is not yet complete. The second prong of CIAT-IPRA's strategy for maintaining quality is to respond to major issues and problems identified through monitoring and evaluation of the process of dissemination and expansion.

Outstanding issues

Besides the continuing need for training, the dissemination phase revealed several other issues to which the CIAT-IPRA team will need to give further attention. The main issues are as follows.

Institutional sustainability. Sustaining the CIAL process is a different challenge from replicating it, though the two overlap. Whereas replication tests the robustness of the methodology in different cultural settings and with different forms of external support, sustainability depends on the CIALs' ability to wean themselves from dependency on external support.

Newly formed CIALs can be highly dependent on their facilitator, incurring relatively high start-up costs. As they mature, the committees become more self-sustaining but not wholly self-sufficient. While depending less on external support for mere survival, they may have even greater need of external inputs and services in order to prosper, especially as they become more market-oriented. This is a critical distinction, since the role of a healthy CIAL in actively demanding such inputs and services is quite different from the passive dependence on handouts that characterizes conventional projects and moribund CIALs.

Of the various institutional options for accessing and channeling support, one of the most attractive is a well-endowed second-order organization with strong links to the national research and extension system. The challenge is how to create such organizations.

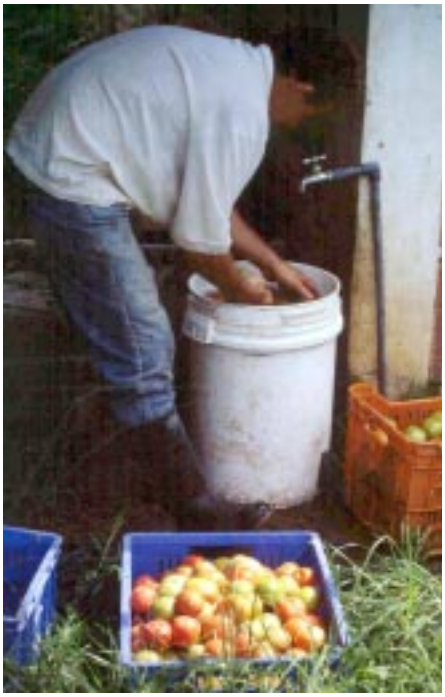
The Corporación para el Fomento de los Comités de Investigación Agropecuaria Local (CORFOCIAL), the second-order organization that supports CIALs in Colombia's Cauca

Department, was established through an endowment, providing it with interest from the capital sum invested. Endowments are one option, but alternatives are needed. It is difficult at present to see what those alternatives could be. The funds to launch a second-order organization must come from somewhere. And if they come from the farming community, the organization begins by taxing the very people it is supposed to benefit. CORFOCIAL's experiences suggest that a second-order organization can raise some additional income through the sale of training activities, but this is not enough to pay more than a small proportion of total operating costs. The basic problem of how to launch such organizations on a sustainable basis remains unsolved.

One imaginative new idea worth pursuing is a private fund-raising scheme. This would appeal to individuals or communities in the developed world, who would be asked to "adopt a CIAL." Village-to-village support or exchanges, of which the CIAL would form a part, could work particularly well. Churches, businesses, professional associations, and even theatrical companies are other possible sources of support. Such institutions respond generously when short-term emergencies occur, and they often express a desire to help find long-term solutions.

Money matters. For the individual CIAL, the major determinant of sustainability is economic viability. Mature CIALs can sustain themselves, provided that their product is marketable. This is the case for CIALs producing seed, although the market for improved seed may eventually become saturated. It is also the case for some knowledge-intensive CIALs, notably those adding value to agricultural products through processing. Others, such as those working with integrated pest management (IPM) and resource conservation technologies, may find it more difficult to sell their expertise.

The options for self-financing are strongest in the more market-oriented farming areas, although difficulties arise even here. In just 2 years, the CIAL at Arbeláez in Colombia's Cundinamarca Department has doubled its fund from US$50 to $100. The CIAL is looking for people to put up money for commercial, large-scale production of snap bean seed. "The trouble is that people suspect some sort of swindle," says extensionist Hernando Malan Jaldenama.



Most CIAL members have bought in, but more money is needed to access extra land.

Microfinancing—the provision of small amounts of credit—is another possibility. CIAT's Rural Agricultural Enterprises Project is studying experiences in microfinancing around the world. "There are plenty of success stories, as well as some revealing failures," says Chris Wheatley, the project's small business development specialist. "Interestingly, the schemes with the lowest interest rates are not necessarily the ones that most appeal to smallholders, as they often require collateral. Poor people either don't have collateral, or if they do they aren't willing to risk it." Nor are schemes requiring that people travel away from their villages to complete a mass of paperwork in some town office likely to appeal, since smallholders have little spare time. The most popular schemes with farmers are those brought to the village center, though they are likely to reflect the high cost of doing this. In short, access rather than interest rates is the key factor determining whether the scheme takes hold.

Linking farmers more closely to markets is another important way forward for the CIALs. Farmers' contacts tend to be limited to buyers or middlemen. They typically expect farmers to provide the best quality produce at the lowest possible price and offer little help or advice in meeting quality standards. The CIALs could reach further up the marketing chain to wholesalers or retailers, extracting information on consumers' demands and passing this information on to farmers. Organizations supporting the CIAL process could point commercially inexperienced CIALs and farmers in the right direction. CORFOCIAL is making a start by contacting a supermarket chain that is opening a new store in Popayán, the capital of Cauca Department. The store could constitute a promising new outlet for nearby CIALs. The three telecenters to be established in Cauca in 2000, with seed money from a project financed by the International Development Research Centre (IDRC), will also provide a mechanism for linking CIALs with markets in Cali and beyond.

Buyers representing organic market niches and ethical trading schemes are more likely to provide support and advice to farmers, and they are more likely to reward them with a fair price than are conventional buyers. As far as the CIAT-IPRA team is aware, no CIALs are yet linked to such schemes. This is an area well worth further exploration, possibly through the telecenter project.

CORFOCIAL obtained a small grant from CHORLAVI, a fund established by the NGO consortium, Asociación Latinoamericana de Organizaciones de Promoción (ALOP). The objective of the CHORLAVI-financed project is to systematize the experiences of the 12 Cauca CIALs that have launched small enterprises and to develop a business vision for them as well as for CORFOCIAL.

Ann Braun believes that the CIALs need to develop an aptitude for spotting opportunities, in addition to solving problems. "CIALs may have trouble in marketing their knowledge," she says, "but as they continue on the road to empowerment, they figure out where their unique commercial opportunities lie and so bring economic progress to their communities in new ways." This could mean going beyond agriculture to link with new actors in rural development. For example, in addition to serving as a training center for Quechua-speaking farmers, the *hacienda* of Flor Naciente in Ecuador could perhaps double as a lodge for tourists intent on climbing Mount Chimborazo.

Enrichment. Another important challenge facing the CIAT-IPRA team is how best to enrich the CIAL process with knowledge, practices, and materials from the formal research sector.

Most CIAL research is still restricted to relatively simple tasks, such as the evaluation of crop varieties. But in time the CIALs must grow more sophisticated in their approach. Farmers conducting research on IPM or soil fertility management, for instance, need to understand ecological principles and processes, including the life cycles of pests and their natural enemies and the role of microorganisms in soils. Farmers can discover these principles for themselves through nonformal education approaches, such as those used by the Farmer Field Schools (FFS). But it takes intensive interaction between trained facilitators and the farming community to get these processes going. How can this interaction be organized? And how can scientists' knowledge on such subjects be introduced without undermining the principle of an open diagnostic process, which is one of the CIALs' major strengths?

These questions are particularly pressing with regard to soil and water conservation in hillside areas. It is vital that the CIALs do not repeat the mistakes of formal-sector researchers. In general, they have single-mindedly pursued short-term increases in food production at the

expense of the long-term productivity of natural resources. It would be a sad irony if, in their desire to place decision making in the hands of farmers, the organizations supporting the CIAL process were to turn a blind eye to this danger. Will the steeply sloping plot of the San Isidro women's group still be there to cultivate 5 years from now? Or will it have been swept downhill in a freak storm, carrying with it the hopes of Zuly and her friends?

Enrichment of the CIAL process should enhance its appeal to the formal research sector. Introducing simple techniques to extract more information of use to plant breeders will help these professionals increase the relevance of their research. In addition, the use of simple cost-benefit analysis would improve the quality of technology evaluation. As pointed out by researchers at the Fundación para la Promoción e Investigación de Productos Andinos (PROINPA) in Bolivia, the evaluation methods used at present are helpful to farmers but not to researchers: A smiling face for benefits may or may not offset a glum face for costs.

One advantage of the CIAL methodology is the cost savings to formal-sector research. Enrichment of the process would require that more external research expertise be applied per CIAL, thus raising costs. Thus, a final question is who would pay for enrichment. There are no easy answers.

Adaptation. The CIALs have served admirably well for conducting adaptive research on agriculture within single communities. And the communities hosting CIALs have shown that within certain limits the CIAL can be adapted to local circumstances. But more radical adaptations of both the structure and process may be needed if the CIALs are to cope with a broader, more complex research agenda in the future.

For example, addressing natural resource management issues frequently requires planning and action at the watershed rather than

community level. Where networks or consortia operating at this level already exist, the CIALs can be linked to them (as in Colombia's Cabuyal watershed). But what if such organizations do not exist? Could a multicommunity or watershed-level CIAL be established? If so, could it manage the complex negotiations that are often required to resolve issues in natural resource management?

Topics such as the selection and management of tree species require longer term research than is envisaged in the current process, which was developed for work on annual crops. Arguably, a CIAL should not have to report back to its community, when all it has to say is that the trees it planted grew by 2 cm in diameter and 8 cm in height. But without regular feedback meetings, how would the community's interest and support be sustained over long periods? And how would the CIAL's accountability be guaranteed?

As the CIALs' agenda moves beyond agriculture, their field research will have to be complemented by other activities, such as lobbying policy makers or contacting potential sales outlets. These activities imply a need for new functions within the committee—for example, a sales representative.

One can imagine two approaches for research on adapting the CIAL process and structure. First, some situations will require that the CIAT-IPRA team or other facilitators solve specific problems as they arise in the community. And second, other situations will call for a *laissez-aller* approach, in which communities solve problems without outside intervention. In these cases CIAT-IPRA could still observe the outcome and derive lessons from it.

Access to information. If the CIALs are to increase their links with markets, broaden their horizons beyond agriculture, and enrich their research with specialized knowledge, they will need more efficient ways of obtaining and sharing information.

Rural telecenters, with access to the Internet, are a powerful means of linking isolated communities to each other and to the wider world. CIAT has just initiated a project that will provide CORFOCIAL and other local organizations in Colombia's Cauca Department with access to the Internet. If successful the project could be extended to other regions and countries.

"This is not some manicured poodle."

Jacqueline Ashby, Director of Research, Natural Resource Management, CIAT

Group conflicts. In a survey of CIALs in Colombia's Cundinamarca Department, Ann Braun noticed that several CIALs had failed, or were about to, because of clashes within the group. These usually arise when particular members feel they are doing more than their fair share of the work, when the priorities of members diverge, or when they disagree over the use of resources.

The CIAT-IPRA team has developed and introduced in a few places a method that enables groups to assess their feelings about each other and about their performance as a team. Some CIALs have welcomed the method, while others consider it risky. One option for the CIAT-IPRA team is to expand the use of this method and further explore its potential for resolving group conflicts.

Impact. A final issue requiring continued study by the CIAT-IPRA team is impact assessment. As we have seen, there is an urgent need to conduct more case studies of mature CIALs and of CIALs that have broken ground in research on complex topics, such as IPM, soil fertility management, and small livestock production. In the long term, it should be possible to use more sophisticated techniques to assess impact at the macroeconomic level.

In Colombia the plans of the Corporación Colombiana de Investigación Agropecuaria (CORPOICA) to spread the CIAL methodology through a nationwide program provides a golden opportunity to conduct more "before and after" studies in specific communities. CIAT-IPRA and CORPOICA are planning a collaborative project to do just that. Under this project data will be collected on the costs of CIAL research to both the community and the supporting institution. These data will provide a basis for deepening the analysis of costs and benefits initiated with CIAT-IPRA's study of impact in Cauca.

Why bother?

In essence, the CIAL process represents an opportunity to devolve adaptive research and development (R&D) from government services to the farming community. But why bother? Are not scientists better at conducting research than farmers? What benefits would a widely adopted CIAL process deliver that a conventional project-based approach cannot?

Experience with the CIAL methodology has shown that farmers can conduct adaptive research at a fraction of the costs incurred by public

institutions. They can also deliver locally adapted solutions to large numbers of people—something that the formal sector, by virtue of its structure and its modes of operation, simply cannot do.

The impact of the CIAL process in poor farming communities is pervasive and far-reaching. The process strengthens food security and delivers other direct gains, such as improved availability of new crop varieties and milling services. It also brings development benefits, such as easier access to sources of microcredit, additional land, and a better-stocked village shop. Finally, the approach achieves less measurable but no less real advances, such as fairer sharing of domestic chores in the family, greater confidence in local capacity to experiment, and better access to information and training opportunities.

The central goal of the CIAL process is to empower farmers by enabling them to organize and participate in a locally accountable research service. Seed money is used to get the service off the ground, and the freedom to decide how to spend it is vital to the success of the venture. The money protects farmers from the risks of research, while giving them control of the research process. The result is profound and lasting change in the life of the whole community.

If widely applied, the CIAL process would fundamentally alter the division of labor between farmers and researchers. Farmers could take far more responsibility for adaptive research than they are normally allowed to. They would enjoy a more active and equal partnership with researchers and technicians—something conventional approaches deny them.

Researchers would be empowered too. Their research would have greater impact, because better-targeted technologies would reach more farmers. Their work would also be more relevant, since a more articulate farming community would be better able to express its needs and demands. Finally, the CIAL process would free researchers to devote more of their time and resources to new and more basic research challenges.

"Let's not put resource-poor farmers on a baby bottle."

Jacqueline Ashby

In a word

To sum up:

- The CIAL methodology is likely to be widely adopted.
- The CIAL methodology enhances the efficiency of public-sector R&D services.
- In addition to training, the CIAT-IPRA team needs to address the issues of CIAL sustainability, links to markets, process enrichment, adaptability, access to information, group conflicts, and impact assessment.
- The creation of second-order associations is a vital next step for ensuring the sustainability of the CIALs as community-based research services.

Fun at the Fair

Each year the CIALs in Colombia's Cauca Department get together for a meeting. Half scientific conference, half agricultural fair, the encuentro de los CIALs *is a unique experience that combines business and pleasure as only country people know how to.*

Show business

Hung between two telephone poles on either side of the main street in Rosas is a large, brightly colored banner: "Encuentro Departamental de CIAL: 17, 18, 19 julio 96."

Asked what would become of the CIAL idea when they hatched it nearly a decade ago, few members of the CIAT-IPRA team would have predicted this. Yet a more fitting outcome of a project to promote participatory research could hardly be imagined. For the banner does more than merely announce a meeting: It proclaims ownership. Replete with civic pride, this small country town in southern Cauca is laying claim to the CIAL process, welcoming it, for a few days at least, as its very own.

To prove the point, the town has lent its handsome theater as a venue. Soon the mayor, accompanied by other local dignitaries, will arrive to give his welcome address. By the end of the day, over 70 representatives from the CIALs will have flocked into town from the four corners of Cauca, bringing a welcome boost to trade for the town's guest houses and shops. At various times during the 3-day event, their numbers will be swollen by additional family members tagging along for the occasion, representatives of supporting organizations, and as festivities get into

"A town's offer to host the *encuentro* is a recognition of the CIALs' work, a way of saying, 'We welcome you'. "

Alfonso Truque, CORFOCIAL Coordinator

full swing, local townspeople who have no connection with the CIALs but are attracted by the prospect of a rollicking good night out.

As people arrive, the theater gradually fills with a buzz of conversation. In the queue for registration, old friends meet and start to talk animatedly, inquiring about each other's fortunes during the past year. Once past the registration desk, people gravitate towards the stalls erected on-stage by the CIALs, where they examine the wares on display this year. El Diviso's maize seed, renowned across Cauca for its high quality, excites the most curiosity, but you can also sample soy milk from San Isidro, *mora* juice from Cinco Días, maize bran from San Bosco, or *panela* products from Portachuelo. Suddenly a threshing machine from Santa Bárbara leaps noisily into life, drowning conversation but demonstrating its efficacy to a group of fascinated onlookers.

Then a man starts trying to call the meeting to order. For a moment it seems as if his attempt might be in vain, but eventually the threshing machine is abruptly switched off, and the hum of conversation subsides. Everyone is asked to sit down, the rows of seats fill up, and the business of the meeting, conducted from a table set up on the stage, gets under way.

Instant tradition

When in 1991 the CIALs of Cauca first got together to exchange their experiences, no one knew they were starting a local tradition. So successful was that first meeting that the organizers decided to repeat it annually. It has since become a popular event, which the region's villages and towns vie with each other to host.

The *encuentro* is orchestrated by CORFOCIAL (a second-order organization supporting the CIALs), which each year circulates a proposed agenda to all of the committees in Cauca, together with a confirmation of dates and place, well in advance of the meeting. Each CIAL nominates two of its members to come, funding their journey and accommodation for the 2- or 3-day event. In 1998 representatives from the CIALs of Cauca were joined by a group selected from Cundinamarca's CIALs. And a few guests from other countries are occasionally sponsored by CIAT.

Held at a different location each year, the meetings celebrate the diversity of Cauca's rural cultures. In 1994 and 1999, the host was

Timbío, a small town in the valley near Popayán, whose 250-year-old baroque church of San Antonio de Padua provided an unusually beautiful setting. The 1997 meeting, in contrast, was hosted in the remote mountain community of Totoró by the *cabildo indígena*—the local council—which put on a display of traditional woolen clothing and other locally made products.

Unique hybrid

Just as the CIAL concept fuses the traditional and the modern, so the *encuentro* is a unique hybrid between an agricultural fair and a scientific conference.

Like any traditional rural show, one of the *encuentro's* main functions is to mix people who otherwise do not get much of a chance to meet. Those living in isolated rural communities like nothing better than a get-together to exchange gossip, admire each others' produce, barter or buy goods and services, compete with one another, and celebrate their common heritage and values. These are time-honored rural pursuits worldwide—a factor that helps to explain why the *encuentro* found such immediate popular acceptance.

But the meeting also serves more serious purposes. First, it is the CIALs' opportunity to hold CORFOCIAL and its paraprofessionals to account. An early item on the agenda is the CIALs' evaluation of the support they receive. Are the paraprofessionals dividing their attention fairly, or do CIALs in the more distant communities feel neglected? Do the paraprofessionals know enough about the commodities under research by each CIAL? And do they come to meetings on time? These and other questions are answered on a previously circulated questionnaire, the results of which are discussed at the meeting and

"The *encuentro* is a very important time for us, as we are evaluated by the CIALs. We collect ideas from them on how we can improve our performance. It's also a time to offer friendship, to extend a helping hand to those CIALs that need it."

Alfonso Truque, CORFOCIAL Coordinator

published in the minutes. Each year CORFOCIAL must also present accounts for the past year and its spending plans for the next.

Second, the *encuentro* provides a forum at which the CIALs present and exchange their research results, just as formal-sector scientists do at their meetings. All the CIALs attending the meeting are expected to bring a set of posters describing their work, together with samples of their products and services. Every year, six or so are invited to present their work in detail. Turn by turn, a member of each—usually its leader—takes to the rostrum to explain how their research topic was chosen, why it is important to the local community, what results they have achieved, and how they are being disseminated. Each presentation is followed by questions.

This trial by a wider jury than their local communities is an important test for the CIALs. "We get to see what they're doing, how well they've grasped the process, and where the weak points lie," says CORFOCIAL's coordinator Alfonso Truque. "That enables us to encourage the CIALs that are having difficulties and point out how they can improve their performance."

More important still, the presentations are an opportunity for the CIALs to demonstrate their progress and advertise their wares. The CIALs selected to present are usually at a relatively advanced stage, at which their results are potentially of interest to other groups.

Inspiration...

José Ignacio Roa remembers the first *encuentro*, at which the El Diviso CIAL presented its results. For the first time, a CIAL was able to display packets of seed it had begun selling to the community's farmers.

"It was an inspiration for the others," says Roa. "New CIALs, especially, that were unsure of themselves suddenly saw what they could do in the future." According to Roa each year since then has seen an increase in the number of CIALs that have established small businesses. The effect is growing confidence among all of the department's CIALs, even those that are struggling, and a heightened competitiveness between the stronger CIALs, as they seek to outdo each other from one year to the next.

The *encuentro* is a powerful vehicle for the exchange of knowledge, ideas, and products from CIAL to CIAL. Many CIALs now bring seed and sell it at the meeting; some also display their threshing machines; and all are free to swap notes on the support available from different institutions or to arrange visits to each other. It was at the *encuentro* that Adelmo Calambáz, leader of the San Bosco CIAL, first met the El Diviso group that had successfully applied for additional land from the government land reform agency. They inspired him to prepare his own application and explained the procedure, saving him considerable time and effort. Similarly, María Gutiérrez, secretary of the 11 de Noviembre CIAL in Ecuador, first saw a mechanical thresher at work when she was invited to attend the *encuentro*. The experience helped her persuade her fellow CIAL members to acquire one too.

The *encuentro* also fulfils other, more deeply felt needs. The shared experience of CIAL membership helps to form ties between the separate and sometimes mutually hostile ethnic groups of Cauca, repairing the torn fabric of rural society. When members of the CIAL of Santa Isabel, a Totoró community high in the mountains, came to their first *encuentro*, they heard a presentation by the CIAL of Betania, a lower-lying *mestizo* community in the Cabuyal watershed. This CIAL had experimented with new varieties of snap beans, tied to stakes with string. The use of stakes and string was a revelation for Santa Isabel, where the crop had always been grown without any support. The innovation has since been widely adopted by Santa Isabel's farmers, who say their yields have increased greatly. But this isolated indigenous community learned more than a new technique for growing beans: Its shy, mistrustful people discovered that they could gain through their contact with another ethnic group.

The success of the *encuentro* is attracting increasing attention from senior policy makers, research managers, and other government officials whose support is vital to the national CIAL program. Two directors of

the Servicio Nacional de Aprendizaje (SENA) attended the 1998 *encuentro,* together with a director of the Corporación Colombiana de Investigación Agropecuaria (CORPOICA). For SENA, the CIALs represent a new opportunity to reach the poorest rural communities with training and technology to raise incomes and living standards. SENA has already provided training to several CIALs directly. Recently, it also decided to fund a course for CORPOICA staff as well as the expansion of the institute's activities through a nationwide program.

In 1997, CORPOICA launched an annual *encuentro* for the CIALs of Cundinamarca. The first meeting drew 15 of the region's 21 CIALs to the institute's headquarters, where it was hosted. For Santiago Fonseca, then CORPOICA's director for the region, the meeting was tangible evidence of the success of the institute's CIAL program. "Many of the CIALs present had done research on potato. The discussions on that crop were particularly valuable, both for them and for us," he says.

CORPOICA has recently suggested organizing an international CIAL meeting for all of the Latin American countries with an active CIAL program.

And the idea of the *encuentro* shows every sign of spreading still further afield. Among the countries participating in the dissemination phase, Honduras was first off the mark, organizing its first national *encuentro* at Yojoa Lake in 1997. Other countries may soon follow suit.

...and fiesta

After the formalities of the meeting, it is time to unwind. No agricultural fair is complete without that archetypal expression of rural culture, folk music.

Strongly assertive of regional and ethnic identity, the folk song and dance of Colombia are as varied as the peoples who make them. Thus, as darkness falls at Rosas, an intimate band of cornets, flutes, guitars, and tambours strikes up, and a group of singers delights the crowd with the closely harmonized Spanish-language ballads of the valleys. At Totoró, in contrast, the keening sound of the *quena*, a flute-like instrument of the high Andes, evoked the yearnings of a people in search of a lost identity. And when the *encuentro* was held at Piendamó, a village influenced by the nearby urban culture of Popayán, a larger, more raucous band played *salsa,* and there was dancing on the village square.

Music makes a fitting end, both to the *encuentro* and to our exploration of the CIAL experience. For the CIAL movement has much to celebrate. Appropriated by rural people and absorbed into the mainstream of rural life, it has come of age, developing its own set of behavioral norms and the mechanisms for sustaining itself independently of CIAT's support. The movement's gathering strength derives from the trust placed in it by people whose previous experience of research and development has been one of alienation and powerlessness. This time it is different: *They* are in control. No longer passive listeners to an unfamiliar tune orchestrated by others, they are giving *their* music to the band. Take it away, *campesinos!*

The CIALs in 1999

CIAL	Location	Research topic	Supporting institution	Date established
Bolivia				
Monte Grande	Monte Grande	Resistance to potato late blight	CARE	7/97
El Tapial	Belisario	Resistance to tomato late blight	CARE	10/97
Polígono	Callejas Alta	Control of onion pinkroot	CEDEAGRO	3/97
Buena Vista	Mizque	Evaluation of maize varieties	CEDEAGRO	7/97
Th'olapampa	Mizque	Evaluation of oat varieties	CEDEAGRO	9/97
Tin Tin	Tin Tin	Control of garlic pinkroot	CEDEAGRO	1/98
Incahuasi	Mizque	Control of onion diseases	CEDEAGRO	1/98
Mizquepampa	Mizque	Multiplication of potato seed	CEDEAGRO	2/98
Huañuma	Tin Tin	Evaluation of cereal varieties	CEDEAGRO	5/98
Pozuelos	Pozuelos	Resistance to bean angular leaf spot	CIAT-Sta. Cruz	9/96
Kollana	Tarakollo	IPM of Andean potato weevil	PROINPA	8/96
Boqueron Alto	Tiraque	Resistance to frost in potato	PROINPA	9/96
Parte Libre	Ayopaya	Evaluation of potato varieties	PROINPA	7/97
Wallata	Ayopaya	Resistance to potato late blight	PROINPA	7/97
Piusilla	Ayopaya	Evaluation of potato varieties	PROINPA	9/97
Cebada Jichana	Cebada Jichana	IPM of Andean potato weevil	PROINPA	10/97
Leuquepampa	Chuquisaca	Resistance to potato late blight	PROINPA	10/97
Quewiña Pampa*	Carrasco	Resistance to potato nematodes	PROINPA	3/98
Candelaria	Colomi	Evaluation of potato varieties	PROINPA	9/99
Chacala	Potosí	Evaluation of quinoa varieties	PROINPA	10/99
Jalsuri	Potosí	Evaluation of quinoa varieties	PROINPA	10/99
Tukma Baja	Mizque	IPM for potato CEDEAGRO	PROINPA/	2/94
Brazil				
Bahía				
Roberto Santos	Inhambupe	Resistance to cassava green mite	EBDA	3/93
Buril	Alagoinhas	Resistance to cassava green mite	EBDA	3/94

* Women's CIAL.

(Continued)

CIAL	Location	Research topic	Supporting institution	Date established
Brazil				
Bahía (continued)				
Chapada	Aporá Alagoinhas	Resistance to cassava root rot	EBDA	3/94
Cadeté	Cruz das Almas	Fertilization systems for cassava	EBDA	3/94
Caldeirao	Piritibá	Production of good quality cassava planting material	EBDA	6/94
Umbuzeiro	Feira de Santana	Effect of green manure on cassava production	EBDA	6/94
Sumaré	Piritibá	Production of good quality cassava planting material	EBDA	4/95
Alagoinhas	Barra São Miguel das Matas	Resistance to cassava whiteflies	EBDA	7/95
Ceará				
Nova Veneza	Ubajará	Resistance to cassava witches' broom	EMATER	10/94
Vila Moura	Acarau	Effect of green manure and compost on cassava production	EMATER	2/95
Lagoa Grande	Acarau	Evaluation of cassava varieties	EMATER	2/95
Valparaiso	Tianguá	Effect of green manure and compost on cassava production	EMATER	3/95
Paraíba				
Souza	Salgado de São Felix	Resistance to cassava root rot	EMATER	10/94
Quiteria	Alagoa Grande	Resistance to cassava root rot	EMATER	10/94
Gameleira	Alagoa Nova	Resistance to cassava root rot	EMATER	7/95
Pernambuco				
Boa Vista	Araripina	Effect of green manure on cassava production	EMATER	10/94
Tatu	São Bento do Una	Fertilization systems for cassava	EMATER	10/94
Gameleira	Gloria de Goitá	Resistance to cassava root rot	EMATER	10/94
Campina Nova	Vitoria de Santo Antao	Resistance to cassava root rot	EMATER	11/94
Colombia				
Cauca				
Los Quingos	Los Quingos	Evaluation of maize varieties	CORFOCIAL	1/90
San Isidro	San Isidro	Evaluation of maize varieties	CORFOCIAL	1/91
San Bosco*	Santander	Evaluation of green manures	CORFOCIAL	2/91
San Bosco	San Bosco	Evaluation of maize varieties	CORFOCIAL	2/91
Santa Bárbara	Santa Bárbara	Evaluation of maize varieties	CORFOCIAL	2/91
Betania	Betania	Evaluation of bean varieties	CORFOCIAL	6/91
Cabuyal	Cabuyal	Evaluation of green manures	CORFOCIAL	9/91

* Women's CIAL.

(Continued)

CIAL	Location	Research topic	Supporting institution	Date established
Colombia				
Cauca (continued)				
El Diviso	El Diviso	Evaluation of plantain varieties	CORFOCIAL	9/91
La Paz	Cajibío	Evaluation of maize varieties	CORFOCIAL	2/92
Campo Alegre	Campo Alegre	Evaluation of maize varieties	CORFOCIAL	2/92
Cinco Días*	Cinco Días	Evaluation of *mora* varieties	CORFOCIAL	3/92
Asopanela	Asopanela	Evaluation of sugar cane varieties	CORFOCIAL	4/92
Santa María	Santa María	Propagation of *granadilla*	CORFOCIAL	9/92
La Esperanza	El Moral	Evaluation of sugar cane varieties	CORFOCIAL	2/93
Buenavista	Buenavista	Organic fertilizers for beans	CORFOCIAL	6/93
La Paz	La Paz	Evaluation of papaya varieties	CORFOCIAL	6/93
Pan de Azúcar	Pan de Azúcar	Evaluation of cassava varieties	CORFOCIAL	8/93
El Jardín Cerro Alto	El Jardín Cerro Alto	Evaluation of bean varieties	CORFOCIAL	9/93
El Moral	El Moral	Evaluation of sugar cane varieties	CORFOCIAL	9/93
Nuevo Amanecer	El Porvenir	Commercialization of beans	CORFOCIAL	10/93
Crucero del Rosario	Crucero del Rosario	Evaluation of plantain varieties	CORFOCIAL	8/94
El Carmen	Piendamó	Evaluation of bean varieties	CORFOCIAL	9/94
La Palma	Pueblo Nuevo	Control of lulo diseases	CORFOCIAL	5/95
Andalucía	Andalucía	Evaluation of bean varieties	CORFOCIAL	7/95
San Antonio	San Antonio	Evaluation of maize varieties	CORFOCIAL	8/95
Portachuelo Alto	Portachuelo Alto	Evaluation of diets for guinea pigs	CORFOCIAL	8/95
Carpintero	Carpintero	Evaluation of bean varieties	CORFOCIAL	10/95
Michinchal	Cajibío	Evaluation of bean varieties	CORFOCIAL	1/96
La Independencia	Cajibío	Evaluation of bean varieties	CORFOCIAL	1/96
Pioyá	Pioyá	Evaluation of onion varieties	CORFOCIAL	4/96
La María	La María	Evaluation of maize varieties	CORFOCIAL	8/96
Chambimbe	Chambimbe	Evaluation of cassava, beans, and maize intercropping	CORFOCIAL	9/96
San Isidro	San Isidro	Evaluation of cassava varieties	CORFOCIAL	9/96
Betania	Totoró	Evaluation of wheat varieties	CORFOCIAL	10/96
San Isidro*	San Isidro	Evaluation of soybean varieties	CORFOCIAL	10/96
La Aurora	El Tengo	Evaluation of maize varieties	CORFOCIAL	2/97
Bellavista	Bellavista	Evaluation of bean varieties	CORFOCIAL	3/97
Pescador	Pescador	Evaluation of bean and cassava varieties	CORFOCIAL	10/98
La Floresta	Silvia	Evaluation of bean varieties	CORFOCIAL	10/98
Quebrada Azul	Quebrada Azul	Evaluation of snap bean varieties	CORFOCIAL/ FUNCOP	1/90

* Women's CIAL.

(Continued)

CIAL	Location	Research topic	Supporting institution	Date established
Colombia				
Cauca (continued)				
Frontino	Frontino	Evaluation of bean varieties	CORFOCIAL/ FUNCOP	3/93
El Placer	El Placer	Evaluation of maize varieties	CORFOCIAL/ FUNCOP	8/96
Altamira	Totoró	Fertilization for peas	CORFOCIAL/ Cabildo Totoró	12/95
Santa Isabel	Santa Isabel	Staking of peas	CORFOCIAL/ Cabildo Totoró	10/97
El Turco	El Turco	Evaluation of forages	CORFOCIAL/ UMATA	9/94
La Cabaña	La Cabaña	Fertilization of *mora*	UMATA Timbío	5/96
Boyacá				
San Pedro	Macanal	IPM of potato tuber moth	CORPOICA-CRECED	6/96
San Pedro de Muceño	Macanal	IPM for *lulo*	CORPOICA-CRECED	7/96
San Luis	Belén	IPM of potato tuber moth	CORPOICA-CRECED	6/97
Mata de Mora	Saboyá	IPM for potato	CORPOICA-CRECED	6/97
El Hato	Tibasosa	IPM for potato	CORPOICA-CRECED	9/98
Siativa	Tinjacá	Fertilization of *lulo* to control fruit drop	CORPOICA/ UMATA	7/96
María Auxiliadora	Mongui	Evaluation of *azucena* varieties	CORPOICA/ SENA	10/98
Turmeque Abajo	Turmeque	Production of sunflower oil	CORPOICA/ SENA	10/98
Cundinamarca				
Pilacá Bajo	Sasaima	Control of ants on cassava and oranges	CORPOICA	5/98
Rodeo	Las Peñas	Evaluation of sugar cane varieties	CORPOICA	1/97
Viena	Fusagasugá	Evaluation of papaya varieties	CORPOICA	5/98
Turtur	Utica	Control of stem borer in sugar cane	CORPOICA	6/98
Cumba	Chipaque	IPM of potato bacterial wilt	CORPOICA-CRECED	7/95
Nemogá	Fúquene	Evaluation of pea varieties and staking	CORPOICA-CRECED	5/96
Salitre	Une	IPM of potato late blight	CORPOICA-CRECED	5/96
El Cucubo	Duitama	Evaluation of alfalfa varieties	CORPOICA-CRECED	5/96

(Continued)

CIAL	Location	Research topic	Supporting institution	Date established
Colombia				
Cundinamarca (continued)				
Ojo de agua	La Mesa	Control of spittlebug in sugar cane	CORPOICA-CRECED	6/96
Cabuyal	La Peñas	Evaluation of sugar cane varieties	CORPOICA-CRECED	1/97
Usatama	Fusagasugá	Potable water	CORPOICA-CRECED	3/97
Pan de Azúcar	Pacho	Evaluation of poultry diets	CORPOICA-CRECED	5/97
Santa Bárbara	Arbeláez	Evaluation of snap bean varieties	CORPOICA-CRECED	5/97
Mesitas	Fusagasugá	Evaluation of forages	CORPOICA-CRECED	5/97
Bocas de Monte	Pasca	IPM of potato tuber moth	CORPOICA-CRECED	5/97
Pacho	Pacho	Evaluation of poultry diets	CORPOICA-CRECED	6/97
Pantanos	Apulo	Evaluation of poultry diets	CORPOICA-CRECED	7/97
Volsalice	Fusagasugá	Rational use of water resources	CORPOICA-CRECED	9/97
El Espino	La Mesa	Control of fruit drop in tomato	CORPOICA-CRECED	6/98
Rincón Santo	Zipacón	IPM for potato	CORPOICA-CRECED	6/98
Bojacá	Chía	Evaluation of guinea pig diets CRECED/UMATA	CORPOICA-	5/96
Potrero Grande	Choachí	Control of onion diseases CRECED/UMATA	CORPOICA-	6/96
Paeces Abajo	Jenesamo	Evaluation of poultry diets	CORPOICA/ SENA	8/98
San Luis	Quipile	Evaluation of cultivation practices for *mora*	CORPOICA/ SENA	3/99
Magdalena				
El Trébol	El Banco	Control of cassava stem borer	CORPOICA-CRECED	9/98
El Bajo	El Plato	IPM for cassava	CORPOICA-CRECED	9/98
Zacama	El Retén	IPM for chili pepper	CORPOICA-CRECED	9/98
Rosa María	Remolino	Pest resistance in melon	CORPOICA/ SENA	4/98

(Continued)

CIAL	Location	Research topic	Supporting institution	Date established
Colombia				
Magdalena (continued)				
La Rivera	Pailitas	Evaluation of rice varieties	CORPOICA/ SENA	8/98
Vuelta a la Mica	El Plato	IPM of tobacco pests	CORPOICA/ SENA	8/98
La Peña	Curití	Evaluation of bean varieties	CORPOICA/ SENA	9/98
Guajira				
Cañaverales	San Juan del Cesar	Evaluation of tomato varieties	CORPOICA-CRECED	9/98
Mundo Nuevo	Puente Bomba	Evaluation of papaya varieties	CORPOICA-CRECED	9/98
Guaracaca	Riohacha	Control of fruit deformation in papaya	CORPOICA/ SENA	9/98
Meta				
San Antonio	El Calvario	Control of fruit drop in *lulo*	CORPOICA	6/97
El Carmen	San Juanito	Evaluation of pea varieties	CORPOICA-CRECED	7/97
Santander				
Morario	Confines	IPM for plantain	CORPOICA-CRECED	9/98
Gambitá	Gambitá	Evaluation of maize varieties	CORPOICA-CRECED	9/98
San Benito	San Benito	Evaluation of plantain varieties	CORPOICA-CRECED	9/98
La Meseta	Floridablanca	IPM for soursop	CORPOICA/ SENA	8/98
Aguaclara	Cúcuta	Control of sigatoga disease in plantain	CORPOICA/ SENA	9/98
Bolarqui	Bucaramanga	Evaluation of kidney bean varieties	CORPOICA/ SENA	10/98
Hatillo	Ocaña	Fertilization of onion	CORPOICA/ SENA	10/98
San Lorenzo	San Benito	Evaluation of planting density in plantain	CORPOICA/ SENA	10/98
Valle de Ritoque	Floridablanca	Evaluation of pig diets	CORPOICA/ SENA	10/98
El Cúcano	Pamplonita	Evaluation of tomato varieties for resistance to flower drop	CORPOICA/ SENA	2/99
La Judia	Floridablanca	Control of pseudostem disease in plantain	CORPOICA/ SENA	11/99

(Continued)

CIAL	Location	Research topic	Supporting institution	Date established
Colombia				
Santander (continued)				
San Antonio	Portachuelo	Evaluation of fertilization levels for *mora*	SENA	9/98
Valle				
El Salado	Caicedonia	Evaluation of bean varieties	Comité de Cafeteros/UMATA	7/99
Monte Grande	Caicedonia	Evaluation of maize varieties	Comité de Cafeteros/UMATA	7/99
Ecuador				
San Pablo Urco	San Pablo Urco	Evaluation of pea and limabean varieties	APAE/DFC/ U. Loja	1/99
Santo Domingo	Santo Domingo	Evaluation of potato varieties	APAE/DFC/ U. Loja	1/99
UNOPAC	Ayora	Fertilization of potato	APAE/DFC/ U. Loja	1/99
Mayurco	Mayurco	Evaluation of organic fertilizers	APAE/DFC/ U. Loja	1/99
El Aliso	El Angel	Evaluation of *mora* varieties	CARCHI/IIRR	7/97
Tamboguacha	San Juan	Economic evaluation of agroforestry systems	DFC/APAE	1/99
Las Palmas	Las Palmas	Milk and meat production in cattle	FUNAN/MAG/ IIRR	6/97
Nuevo Amanecer	San Agustín	Evaluation of guinea pig breeds	IIRR	3/96
San Esteban*	San Esteban	Control of diseases in tree tomato	IIRR/DFC	9/97
Achig Vaqueria	Macag Grande	IPM for potato	IIRR/DIPEIB	1/99
El Cóndor	San Alfonso	Evaluation of guinea pig breeds	IIRR/FUNAN	5/96
Nuevo Amanecer	Baeza Napo	Evaluation of fruit varieties	IIRR/FUNAN	6/97
Futuro Mejor	San José de las Minas	Evaluation of organic fertilizers	IIRR/MAG	5/96
Las Orquideas	Las Orquideas	Evaluation of *mora* varieties	IIRR/MAG	6/97
Flor Naciente	Guabug	Evaluation of potato varieties	INIAP	8/97
Chanchalo	Chanchalo	Evaluation of potato varieties	INIAP	8/97
Chaupi	Cotopaxi	Evaluation of potato and forage varieties	INIAP	8/97
El Progreso	Pichincha	Evaluation of carrot varieties	INIAP	9/97
11 de Noviembre	Pusnia	IPM of potato	INIAP-FORTIPAPA/IIRR	4/96
Rumiñahui	Chambo	Resistance to potato late blight	INIAP-FORTIPAPA/ IIRR	5/96
El Progreso	Llucud	Resistance to potato late blight	INIAP-FORTIPAPA/ IIRR	5/96

* Women's CIAL.

(Continued)

CIAL	Location	Research topic	Supporting institution	Date established
Ecuador (continued)				
Progreso a la vida	Guanujo	Resistance to pests and diseases in peas and potatoes	INIAP/IIRR	1/99
Nueva Esperanza	Causanchi	Resistance to pests and diseases in potatoes	INIAP/IIRR	1/99
Shingashina	Aloguincho	Resistance to potato late blight	MAG	4/96
La Victoria	La Playa	Evaluation of potato varieties	MAG/IIRR	5/96
Las Playas de Pulpaná	San Francisco	Evaluation of fruit varieties	UNOCANC/IIRR	6/97
Yanajaca	Imbabura	Control of late blight in potato	Visión Mundial/ APAE/DFC	1/99
El Salvador				
Santa Marta	Los Laureles	Evaluation of tomato varieties	CORDES	1/97
La Libertad	La Libertad	Chickens for egg production	CORDES	5/97
San Carlos Lempa	Tecaña	Evaluation of tomato varieties	CORDES	5/97
El Chaparral	El Chaparral	Chickens for egg production	CORDES	6/97
Papaturro	Papaturro	Evaluation of maize varieties	CORDES	7/97
Honduras				
Nuevo Paraíso	Tabla Grande	Evaluation of bean, maize, and cassava varieties	EAP	3/96
Nuevos Horizontes	Lavanderos	Evaluation of bean and maize varieties	EAP	3/96
Silisgualagua	Silisgualagua	Evaluation of bean varieties	EAP	9/97
Los Limones	Los Limones	Evaluation of bean varieties	EAP	9/97
La Lima	La Lima	Chemical control of thrips in onion	EAP	9/97
Sagrado Corazón de Jesús	El Ocotal	Evaluation of bean and maize varieties	EAP	9/97
Unión del Llano	Llano Ocotal	Evaluation of bean and maize varieties	EAP	9/97
Chaguite Grande	Chaguite Grande	Evaluation of bean and maize varieties	EAP	9/97
El Llano	El Llano	Evaluation of bean varieties	EAP	4/98
Hoya Grande	Hoya Grande	Evaluation of bean varieties	EAP	8/99
San José de Mora	San José de Mora	Evaluation of bean varieties	FEPROH	4/96
El Encinal	El Encinal	Resistance to bean pests and diseases	FEPROH	2/97
Vallecillos	Vallecillos	Evaluation of bean varieties	FEPROH	4/97
La Unión	La Unión	Evaluation of bean varieties	FEPROH	4/97
Río La Puerta	Río la Puerta	Evaluation of bean varieties	FEPROH	4/97
Jutiapa	Jutiapa	Evaluation of bean varieties	FEPROH	4/97
San Isidro	Vallecillos	Evaluation of bean varieties	FEPROH	4/97
Los Pinos	Los Pinos	Evaluation of bean varieties	FEPROH	4/97
Agua Blanca	Agua Blanca	Evaluation of bean varieties	FEPROH	4/97

(Continued)

CIAL	Location	Research topic	Supporting institution	Date established
Honduras (continued)				
Netapa	Netapa	Evaluation of bean varieties	FEPROH	4/97
Quebradas	Quebradas	Evaluation of bean varieties	FEPROH	4/97
El Esfuerzo de Tuliapita	Vallecillos	Evaluation of bean varieties	FEPROH	9/97
Sinovizapa	Sinovizapa	Evaluation of maize varieties	FEPROH	3/98
San Cristóbal	San Cristóbal	Evaluation of maize varieties	FEPROH	3/98
El Zapote	Jesús of Otoro	Evaluation of maize varieties	IHDER	3/96
Vallecillos	Vallecillos	Evaluation of maize varieties	IPCA	1/96
Luquigue	Luquigue	Evaluation of bean varieties	IPCA	2/96
4 de Marzo	California	Evaluation of bean varieties	IPCA	3/96
La Playa	Concepción del Sur	Evaluation of bean varieties	IPCA	3/96
El Pital	La Ceiba	Evaluation of bean varieties	IPCA	3/96
Río Arriba	Sulaco	Organic fertilization of maize	IPCA	3/96
Palmichal	Taulabé	Organic fertilization of maize	IPCA	3/96
Mujeres en Acción*	San Antonio	Evaluation of cassava varieties	IPCA	7/96
Guaco	Yorito	Evaluation of maize varieties	IPCA	11/97
Jalapa	Yorito	Evaluation of onion varieties	IPCA	11/97
Cafetales	Victoria	Evaluation of bean varieties	IPCA	2/98
Sabana de San Pedro	Yorito	Evaluation of bean varieties	IPCA	2/98
El Paraíso	Concepción del Sur	Live barriers for soil conservation	IPCA	3/98
Santa Cruz	Yorito	Evaluation of maize varieties	IPCA	3/98
Turin	Yorito	Evaluation of maize varieties	IPCA	3/98
Divino Paraíso*	Yorito	Evaluation of bean varieties	IPCA	3/98
Guachipilin	Victoria	Control of bean weevil	IPCA	4/98
El Ensinal	Las Vegas	Evaluation of maize varieties	IPCA	5/98
El Paraíso*	Concepción del Sur	Fertilization of carrot	IPCA	8/98
Patastera	La Patastera	Chemical fertilization of chili pepper	IPCA	12/98
Turin	Yorito	IPM for cabbage	IPCA	12/98
Santa Marta*	Yorito	Evaluation of pea varieties	IPCA	12/98
Portillo	Yorito	Evaluation of bean varieties	IPCA	12/98
Quebrada Vieja	Yorito	Control of maize borer	IPCA	12/98
Río de la Puerta	Vallecillo	Evaluation of bean varieties	IPCA	2/99
El Plantel	Victoria	Evaluation of maize varieties and fertilization	IPCA	2/99
Diviso	El Diviso San José	Evaluation of fertilizers for beans	IPCA	3/99
Monte de Dios	Siguatepeque	Evaluation of maize varieties	IPCA	3/99
Pueblo Viejo*	Yorito	Evaluation of bean varieties	IPCA	3/99

* Women's CIAL.

(Continued)

CIAL	Location	Research topic	Supporting institution	Date established
Honduras (continued)				
Río Bonito	Río Bonito	Evaluation of maize varieties	PRR	3/98
Brisas de Bacadia	Brisas de Bacadia	Evaluation of maize varieties	PRR	3/99
Nueva Esperanza*	Nueva Esperanza	Home gardening	PRR	11/99
Nicaragua				
Piedras Largas	Matagalpa	Evaluation of bean varieties	CIAT	8/97
El Jícaro	Matagalpa	Evaluation of green manures for maize	CIAT	9/97
Wibuse	Matagalpa	Evaluation of bean varieties	CIAT	9/97
El Jícaro*	San Dionisio	Evaluation of soybean varieties	CIAT	2/98
El Coyolito	San Dionisio	Evaluation of bean and maize varieties	CIEETS	9/96
Guaylo	San Lucas	Evaluation of bean varieties	INPRHU	6/96
Nuevo Pensamiento	Cuyas	Evaluation of bean varieties	INPRHU	8/96
Las Mesas	San Dionisio	Evaluation of maize varieties	INPRHU	8/96
Venezuela				
Ovejera	Pampán	Evaluation of coffee varieties	FONAIAP	2/98
Estibandá	Urdaneta	IPM for tomato	FONAIAP	10/99
Marajabú	Urdaneta	Evaluation of potato varieties	FONAIAP	10/99
San José de los Ranchos	Torres del Estado Lara	Evaluation of melon varieties	FONAIAP	10/99
Curari	Camacaro	Evaluation of bean varieties	FONAIAP/ICAP-PROSALAFA/ MARN	2/98
El Solitario	Uramaco	Evaluation of bell pepper varieties	ICAP-PROSALAFA	2/98
El Alto	Guarico	Organic fertilization of coffee	MARN	2/98

* Women's CIAL.

The CIAT-IPRA Team

Jacqueline A. Ashby

When I was doing my doctoral dissertation research in Nepal on Green Revolution rice, an elderly farmer whom we always visited in the village after a tiring day doing questionnaires squatted on his porch and asked me why I was so interested in how people grew rice.

"You don't realize that we aren't as worried about growing more rice as we are about storing the rice we already grow. If only we had a way to store the surplus for a few months until the prices go up, we'd be much better off! If you really want to help people in this village, you'll help us to find a way to build a community storehouse."

At the time my reaction to this unusually frank criticism was one of paralysis: How could I drop my busy schedule of completing questionnaires and get involved in a development crusade? How could I get my Cornell University committee to let me change my dissertation topic? And so on. But I felt there was something wrong.

A couple of years later, while I was doing fieldwork in Colombia, the same frustration grew. Despite all their affectionate tolerance of our questionnaires, farmers were not really speaking to us about their priorities. The research institutes we worked for seemed as gripped by paralysis as I had been in Nepal. Something had to change.

For me, as for many of the others involved, the process of change began in earnest during the early 1980s, when the IPRA team branched out into participatory plant breeding. During this period we evaluated thousands of varieties with farmers and began to listen instead of mainly asking questions. Our challenge became to develop a systematic process that would build on farmer's own capacity for research and would allow real working relationships between farmers and scientific "centers of excellence," such as CIAT. This was the crucible of the CIAL concept.

Although I have a PhD from Cornell and have gone from being one of the first social scientists in the CGIAR system (as IPRA project coordinator and CIAT Hillsides Program leader) to become a director of research at CIAT, when I think about my career, I consider my relationships with farmers and scientists to be the most important professional experiences of my life—far more important than degrees, publications, promotions, and other honors. Long may this continue to be the case!

Ann R. Braun

I worked for CIAT from 1983 to 1993 on very narrowly focused disciplinary research—studying the biology and ecology of natural enemies of pests and selecting species for biological control. In 1992 I had a professional crisis. I had focused my attention on a pest that had invaded Africa in the 1970s. Now, 20 years later we were still trying to solve this problem, and I began to question the approach we had taken to setting our priorities. I felt so frustrated that I was considering leaving the IPM field and ending my career as a scientist altogether. Susan Poats, a close friend and colleague, advised that this would be wasteful and negative. She suggested it would be more constructive to change the way I worked. She suggested I contact the Escuela Agrícola Panamericana (EAP) in Zamorano, Honduras, where anthropologist Jeff Bentley was developing a course for farmers and extensionists on a participatory approach to biological control and sustainable agriculture.

Skeptically, I contacted Bentley and arranged to attend the course. After 2 weeks of daily work with farmers and the mentoring of Gonzalo Rodríguez, a talented EAP student who was facilitating the course, I left a changed person. I realized that in my decade of research I had never bothered to consider the role that farmers could play in identifying problems and in conducting research to solve them. I had never considered how they might view the technologies that I had been developing. These revelations prompted me to accept an offer to join the regional office of the Centro Internacional de la Papa (CIP) in Bogor, Indonesia, where I worked for nearly 5 years on ways to strengthen farmer research in Farmer Field Schools (FFS). It was in Indonesia and Vietnam that I "earned my wings" as a participatory researcher. I returned to CIAT in January 1998 as the coordinator of the CIAT-IPRA project.

Teresa Gracia Camargo

Since I was a girl, I have always asked questions. I think one should never be afraid to ask questions, of oneself and of others. I always try to look behind the facts, to understand *why* things are so.

Born in Cali, I did my BA degree in social sciences at the Universidad Javeriana in Bogotá. Then I went to the University of Michigan in the USA, where I did an MA. I also have a diploma in rural sociology from the Sorbonne in Paris. Before joining CIAT I first worked in a research center for rural development attached to the Universidad del Valle, then in a United Nations project in Spanish-speaking Africa, and finally with a rural development program run by Colombia's Coffee Board in Valle Department.

I have worked with the CIAT-IPRA team for 10 years. When I joined in 1988, I became responsible for training technicians and developing training materials. Lately, I have undertaken other activities as well, including follow-up of CIALs and a study on the reasons why CIALs fail.

María del Pilar Guerrero Arango

I was born in Cali but educated in the USA and Bogotá before going to university in Puerto Rico, where I studied sociology. After graduating I spent quite some time wondering what sociology was useful for (besides earning one a reputation for being a socialist, that is). After a while my father, who was getting fed up with having an anti-imperialist, pseudosocialist, part-time teacher under his roof, forced me to drop in on CIAT. I was first introduced to Jacqui Ashby—the only sociologist at CIAT at that time. She was excited at the prospect of having a colleague on staff but said she could not afford to recruit me just then. I was then sent to see Douglas Pachico, who needed enumerators for a consumer survey being carried out by the Bean Program. I worked under a 2-month contract, after which I left.

Two years later, in 1984, I dropped by CIAT again to say hello. It so happened that some agronomists in the Bean Program had made a mess of interviewing farmers, so Dr. Pachico very wisely decided to recruit me to do it instead. As a single woman sociologist with little or no interest in high heels and nail varnish, I was considered the ideal person to send 500 miles out into the Andes, near Colombia's frontier with Ecuador. It was during my 4 years there that I learned what Colombian farmers looked like and how they behaved with us—taciturn, passive, never saying "no," bowing before the great God technology—suffering, in short, from paternalism.

These first experiences with CIAT taught me that it was not just through giving farmers our time, technology, or sympathy that we could alleviate their poverty. A new, revolutionary approach was needed.

In the summer of 1989, I joined the CIAT-IPRA team, starting work in Cauca Department. I spent the first 2 years getting to know the farmers and setting up bean, cassava, and maize trials. I asked the farmers to rank the varieties, taking hours and hours of their time. We used to turn it into a game, a beauty contest, which they enjoyed. Many of the farmers became my friends. One of our best women farmers asked me to be godmother to one of her daughters. I am part of their family now.

In 1990 I facilitated the motivation meetings for the first five CIALs in Cauca. I also participated in their first diagnostic, evaluation, and feedback meetings. Since then I have lost count of the CIAL activities I have attended! I have also made many follow-up visits to assess the progress of the CIALs and written (with difficulty!) some training materials. And I was involved in the formation of the first-ever all-women's CIAL, at Cinco Días.

Luis Alfredo Hernández Romero

I am the most recent member of the CIAT-IPRA team, which I joined in 1998. However, I have long been involved in a participatory approach to research.

By profession I am a plant pathologist. I started my work with CIAT in Cauca Department, where we evaluated new cassava varieties with farmers. Based on this experience, I was able to develop a glossary of farmers' varietal selection criteria, including desirable agronomic and postharvest characteristics. I then worked in the cassava-growing area of Colombia's north coast, where we set up a large network of trials at representative sites, involving 25 other professionals and around 1,000 farmers. During this period I was involved in the development and testing of a participatory plant breeding method now used elsewhere in Latin America, including Ecuador and Brazil.

Carlos Arturo Quirós Torres

I am an agronomist and did an MS in plant protection and integrated pest management (IPM). When I joined CIAT in 1981, I worked with Jacqui Ashby, collecting socioeconomic data in Cauca Department. My involvement in the development of participatory research methods really began in 1983, when we started finding out why farmers were not adopting fertilizer recommendations. Our next step was to involve farmers in the design of experiments. By 1985 we had realized that farmers had to be involved as decision makers in all stages of the research process and that we needed to develop a

methodology for this. We began developing the methodology during on-farm trials of new bean and cassava varieties and then applied it to other topics.

When the CIAT-IPRA team was formed in 1987, a more intensive phase of further methodology development and dissemination began. I worked in participatory research on IPM in a project with CIAT's Bean Program and a national research group in Cundinamarca. And in 1990 I became involved in the development of the CIAL concept and the establishment of the first CIALs in Cauca Department.

In 1991 I went to Costa Rica to do my MS at the Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), working on an IPM project. I returned to CIAT in 1993 as coordinator of the Consorcio Interinstitucional para Agricultura Sostenible en Laderas (CIPASLA), the CIAT-sponsored consortium working on sustainable watershed development in Cauca. When the dissemination phase of the Kellogg project began in 1995, I rejoined the CIAT-IPRA team as a trainer, responsible for spreading the CIAL methodology in participating countries. I also follow up CIALs and evaluate their progress.

José Ignacio Roa Velasco

I was born in Cali, but my earliest memories are of the countryside. My father had a *finca* in the hillsides, where we went for holidays and at weekends. We played football to keep warm and went fishing with the sons of the laborer who lived there, who was Indian. Afterwards he would give us *arepas* to eat, washed down with large cupfuls of steaming hot chocolate.

I went to the Jesuit school in Cali. There I learned to have compassion for the poor. Every Friday we had to bring something to eat, or some small change, to put in a large hamper outside the door of the classroom. The hampers were distributed in La Isla, a poor district of the city. I was also impressed by my great aunt, Eufemia, who used to feed children from poor families in her home. She founded the Christmas Club, now well known in Cali for its work with poor children.

After finishing school I studied agronomy at the Faculty of Agriculture in Palmira. I did my thesis in CIAT's Biotechnology Unit, under William Roca. I remember my impressions of CIAT at that time: It seemed a place where no farmers ever came, and I wondered, "Why don't they, if we're working for them?" I then went to Carimagua, where I worked with CIAT's Pastures Program for 4 years. It was a wonderful experience, and I learned a lot about managing experiments and working in a team.

In 1987 the guerrilla took Carimagua, an event that triggered my return to Cali. I learned that CIAT was starting a new participatory research project under Jacqui Ashby but was warned that she was difficult to work for. "I've got nothing to lose," I thought, and applied for a job as her research assistant. The interview lasted 2 hours, at the end of which I was offered the job. I was overjoyed, as the idea of participatory research seemed so relevant. Because I had grown up in a farm environment, I took to it like a duck to water. My work for the CIAT-IPRA team at present involves training and follow-up of newly formed CIALs.

The IPCA Project

Juan Gonzáles

Getting out of the experiment station at the university to work with farmers in their fields has really opened my eyes. Before the IPCA project, I never had this opportunity. The university has not encouraged outreach work with local farmers, and most students never get the chance to learn beyond the campus setting. We were fortunate to get some scholarship money for student research from IDRC and from the Bromley Foundation in England. Being able to provide this support to a few students who really demonstrated a willingness to learn with farmers has been a very positive experience—both for the students and for IPCA. As I see it, working with farmers is an educational process that helps us to better understand our humanity.

Sally Humphries

We launched the Investigación Participativa en Centro-América (IPCA) project in 1994 as the Central American arm of CIAT-IPRA. At the time I was working in Honduras as a member of CIAT's Hillside Program.

Things had got off to a slow start. Shortly after I began working in Honduras in 1992, a car accident put me out of action for over a year. It was not an auspicious beginning. After I returned to Honduras, we set up the country's first CIAL and began to organize the IPCA team. A year later I returned to Canada to a teaching position at the University of Guelph. Since then IPCA has been funded by the International Development Research Centre (IDRC) of Canada through the University of Guelph. It has been a collaborative effort between the IPCA agronomists—Juan Gonzáles,

José Jiménez, and Fredy Sierra—CIAT, and myself. The advent of e-mail has made coordinating activities between Honduras, Colombia, and Canada relatively easy.

The project's research and development (R&D) work with farmers provides me with a constant supply of material for the teaching I do in the field of international development. The real-life stories of farmer empowerment and participation in research provide an important counterweight to the generally negative impression of formal R&D that Canadian students tend to get from their studies. It is important for students to know that positive change is possible.

José Jiménez

I remember the first time I went to see a CIAL experiment. It was one of two pilot CIALs set up in the hillsides of northern Honduras. Sally Humphries claimed it was just a short climb. But my research background with the Honduran national bean program had not prepared me for working with farmers on such steep slopes and in such inaccessible places. That first climb nearly killed me. In reality it took me more than a few months to become accustomed to working under these conditions. Now I cannot imagine returning to the old style of on-farm research. Working with the CIALs produces results that are meaningful to people; that did not always happen in the past.

Fredy Sierra

I was trained in the CIAL methodology by IPRA in 1996. At that time I was working at the experiment station of the Centro Universitario Regional del Litoral Atlántico (CURLA) in La Ceiba, Honduras. A year later I joined the IPCA team as the project's socioeconomist. In this position I collaborate with CIAT in supporting the Tascalapa watershed committee in Yorito, in particular, helping to integrate the 20 CIALs there into this organization. I am also coordinator of the Asociación de los Comités de Investigación Agrícola Local (ASOCIAL). This is the umbrella association of Honduran CIALs and their support institutions. We are currently in the process of facilitating the organization of four regional chapters of the ASOCIAL in different parts of the country. I see this federation as the best way to assure the future of the CIALs in Honduras.

Training Materials

Videos

The IPRA Method

This video, with an accompanying study guide, presents the evaluation of agricultural technology in the overall context of participatory research with farmers.

21:00 min. VHS and Beta (NTSC-PAL-SECAM).

IPRA Didactic Video

This three-part video for trainers interested in participatory research methods covers the following topics:

- Essential skills for participatory research with farmers
- Planning agricultural research with rural communities through CIALs
- Strengthening farmer experimentation through CIALs

A trainers guide accompanies the video.

43:20 min. VHS and Beta (NTSC-PAL-SECAM).

CD-ROMs

Método CIAL: Guía de Capacitación, Vols. 1 and 2

IPRA. 2000.
CD-ROM.

This two-volume, comprehensive manual in Spanish offers resources for training of trainers in the CIAL methodolgy. An English version (*The CIAL Method: A Guide for Trainers*) will be available in 2001.

Handbooks and Manuals

IPRA Handbooks

In 1990 farmers in Cauca, Colombia, took agricultural research into their own hands, forming, with the help of IPRA researchers, their own CIALs. Now the pioneering farmers of six CIALs share their knowledge through a set of 13 handbooks.

Each handbook introduces a step in the process of forming or operating a CIAL and describes the research done at that stage. The books are designed for use by farmers, extension workers, and researchers interested in participatory research.

English versions of the handbooks will be available in 2000.

The handbooks are:

In Spanish	***In English***
El Ensayo	The Experiment
Los Comités de Investigación Agrícola Local	Local Agricultural Research Committees
El Diagnóstico	The Diagnosis
El Objetivo del Ensayo	The Experimental Objective
La Planeación del Ensayo	Planning the Experiment
La Evaluación del Ensayo	Evaluating the Experiment
Cosas que Pueden Pasar	Things That Can Go Wrong
Compartimos los Resultados de Nuestro Ensayo	Sharing the Results of Our Experiment
Un Caso Real	A Real Case
Las Experiencias también Cuentan	Experience Counts
Las Cuentas Claras	Keeping Track of Our Accounts
Es Bueno Saber a Tiempo si Vamos Bien	Checking on How We Are Doing
Guías para Conocer Nuestro Camino	Guidelines to Help Us Along the Way

Evaluating Technology with Farmers: A Handbook

Manual para la Evaluación de Tecnología con Productores

Manual para a Avaliação de Tecnologia com Agricultores

Evaluer des Technologies Avec les Paysans: Un Manuel

Ashby JA. 1990.

This handbook presents the general principles of a participatory approach to evaluating technology with farmers. Examples of techniques are given.

Farmer Evaluations of Technology: Methodology for Open-ended Evaluation. Instructional Unit No. 1

Evaluaciones de Tecnología con Productores: Metodología para la Evaluación Abierta. Unidad de Instrucción No. 1

Quirós CA; Gracia T; Ashby JA. 1991.

This instructional unit is for practicing and teaching the skills required for farmer evaluation of technology.

Farmer Evaluations of Technology: Preference Ranking. Instructional Unit No. 2

Evaluación de Tecnología con Productores: Ordenamiento de Preferencias. Unidad Instruccional No. 2

Avaliação de Tecnologia com Agricultores: Classificação de Preferências. Unidade de Instrução No. 2

Guerrero MP; Ashby JA; Gracia T. 1993.

This unit can help agricultural researchers concerned with generating technology for small farmers. Preference ranking makes it possible to identify the concepts or criteria farmers use to assess the usefulness and acceptability of new technology. Practical exercises are included.

Gender Analysis in Agricultural Research

Análisis de Género en la Investigación Agrícola

Herpen D van; Ashby JA, eds. 1991.

Includes materials for training in gender analysis: case studies, exercises, background readings, study questions, and instructor notes. These materials are designed to promote awareness of gender issues in agriculture.

Methodology for the Participation of Small Farmers in the Design of On-Farm Trials

Ashby JA. 1986.

Evaluates and describes three methodologies for farmer participation in the design of on-farm fertilizer trials. (A reprint from *Agricultural Administration* published by Elsevier Applied Science Publishers, England.)

Decision Making for Sustainable Natural Resource Management: Nine Tools That Help

Nueve Instrumentos de Apoyo a la Toma de Decisiones para el Manejo Sostenible de los Recursos Naturales

CIAT. 1999.

A set of decision-support tools in English and Spanish for natural resource management in hillsides.

In English	*In Spanish*	*Authors*
Local Soil Quality Indicators	Indicadores de Calidad de Suelo	Turcios WR; Trejo MT; Barrios E; Bareto HJ
Land Use Tendencies by Photo Analysis	Tendencias en el Uso del Suelo	López E; Trejo MT
Participatory Mapping	Mapeo Participativo	Vernooy R; Espinoza N; Lamy F

In English	*In Spanish*	*Authors*
Analyzing Interest Groups	Análisis de Grupos de Interés	Ravnborg HM; Guerrero MP; Westermann O
Identifying Well-Being Levels	Identificación de Niveles de Vida	Baltodano ME; Méndez MA
Making an Atlas	Elaboración de un Atlas	Bareto H; Jiménez P; Lamy F
Identifying Market Opportunities	Identificación de Oportunidades de Mercado	Ostertag CF
Using Simulation Models	Uso de Modelos de Simulación	Estrada RD; Chaparro O; Rivera B
Developing Organizational Processes	Desarrollo de Procesos Organizativos	Beltrán Tijerino D; Vernooy R

Developing Regional Poverty Profiles Based on Local Perceptions

Desarrollo de Perfiles Regionales de Pobreza Basados en Percepciones Locales

Ravnborg HM. 1999.

This manual shows how to develop indicators of well-being, and create and use a regional poverty profile.

Statistical Applications

Logistical Preference Ranking Analysis: An Application for EXCEL v.7.0 for Windows 95. Instruction Manual

Regresión Logística en Análisis de Preferencia: Una Aplicación para EXCEL v.7.0 para Windows 95. Manual de Instrucciones

Hernández LA. 1998.
Beta version.

A user-friendly statistical application for analyzing farmer-preference ranking data.

Acronyms

ALOP	Asociación Latinoamericana de Organizaciones de Promoción
APAE	Asociación de Promotores Agroforestales (Ecuador)
ASOCIAL	Asociación de los Comités de Investigación Agrícola Local (Honduras)
CARCHI	Consorcio CARCHI (Ecuador)
CARE	Cooperative for American Relief Everywhere (Bolivia)
CATIE	Centro Agronómico Tropical de Investigación y Enseñanza (Costa Rica)
CEDEAGRO	Centro de Desarrollo Agropecuario (Bolivia)
CENTA	Centro Nacional de Tecnología Agropecuaria (El Salvador)
CHORLAVI	Small grants fund established by ALOP
CIAL	Comité de Investigación Agrícola Local (Colombia)
CIAT	Centro de Investigación Agrícola Tropical (Bolivia)
CIAT	Centro Internacional de Agricultura Tropical (Colombia)
CIEETS	Centro Intereclesial de Estudios Tecnólogicos y Sociales (Nicaragua)
CIMMYT	Centro Internacional de Mejoramiento de Maíz y Trigo (Mexico)
CIP	Centro Internacional de la Papa (Peru)
CIPASLA	Consorcio Interinstitucional para Agricultura Sostenible en Laderas (Cauca, Colombia)
CNPMF	Centro Nacional de Pesquisa de Mandioca e Fruticultura (Brazil)
COPAL	Comités de Pesquisa Agrícola Local (Brazil)
CORDES	Fundación para la Cooperación y el Desarrollo Comunal de El Salvador
CORFOCIAL	Corporación para el Fomento de los Comités de Investigación Agropecuaria Local (Cauca, Colombia)
CORPOICA	Corporación Colombiana de Investigación Agropecuaria (Colombia)
CORPOTUNIA	Corporación para el Desarrollo de Tunía (Cauca, Colombia)
CRECED	Centro Regional de Estudios de Capacitación, Educación y Desarrollo (Colombia)
CURLA	Centro Universitario Regional del Litoral Atlántico (Honduras)
DFC	Desarrollo Federal Campesino (Ecuador)
DICTA	Dirección de Ciencia y Tecnología Agropecuaria (Honduras)
DIPEIB	Dirección Provincial de Educación Intercultural Bilingüe (Ecuador)
EAP	Escuela Agrícola Panamericana (Honduras)
EBDA	Empresa Baiana de Desenvolvimento Agrícola (Brazil)
EMATER	Empresa de Assistência Técnica e Extensão Rural (Brazil)
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuária (Brazil)

FEPROH	Fomento Evangélico para el Progreso de Honduras
FFS	Farmer Field School
FLACSO	Fundación Latinoamericana de Ciencias Sociales (Ecuador)
FONAIAP	Fondo Nacional de Investigaciones Agropecuarias (Venezuela)
FORTIPAPA	Programa Nacional de Investigación de la Papa (INIAP, Ecuador)
FUNAN	Fundación Antisana (Ecuador)
FUNCOP	Fundación para Comunicación Popular (Colombia)
IBTA	Instituto Boliviano de Tecnología Agropecuaria
ICAP	Instituto de Crédito Agropecuario (Venezuela)
IDRC	International Development Research Centre (Canada)
IFDC	International Fertilizer Development Center
IHDER	Institución Hondureña de Desarrollo Rural
IIRR	International Institute of Rural Reconstruction (Ecuador)
INCORA	Instituto Colombiano de Reforma Agraria
INIAP	Instituto Nacional de Investigaciones Agropecuarias (Ecuador)
INPRHU	Instituto de Promoción Humana (Nicaragua)
INTA	Instituto Nicaragüense de Tecnología Agropecuaria
IPCA	Investigación Participativa en Centro-América
IPM	Integrated pest management
IPRA	Investigación Participativa con Agricultores
MAG	Ministerio de Agricultura y Ganadería (Ecuador)
MARN	Ministerio del Ambiente y de los Recursos Naturales (Venezuela)
NGO	Nongovernment organization
PASOLAC	Proyecto de Agricultura Sostenible para las Laderas Centroamericanas (Nicaragua)
PPB	Participatory plant breeding
PROFISMA	Proyecto Proteção Fitosanitária Sustentável da Mandioca (Brazil)
Fundación PROINPA	Fundación para la Promoción e Investigación de Productos Andinos (Bolivia)
PROSALAFA	Proyecto de Apoyo a Pequeños Productores y Pescadores Artesanales de la Zona Semiárida de Lara y Falcón (Venezuela)
PRR	Programa de Reconstrucción Rural (Honduras)
R&D	Research and development
SENA	Servicio Nacional de Aprendizaje (Colombia)
UMATA	Unidad Municipal de Asistencia Técnica Agropecuaria (Colombia)
UNICAM	Universidad Campesina (Nicaragua)
UNIR	Una Nueva Iniciativa Rural (project of the W.K. Kellogg Foundation)
UNOCANC	Unión de Organizaciones Campesinas del Norte de Cotopaxi (Ecuador)
UVTT	Unidades de Validación y Transferencia de Tecnología (Ecuador)

Contacting IPRA

If you would like to learn more about the CIALs, about training materials, and courses or if you would like to support the CIALs in any way, please contact IPRA or IPCA, or visit the CIAL website [http://www.ciat.cgiar.org/CIALs].

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IPCA	Proyecto IPCA Apartado Postal 561 La Ceiba, Honduras	504-400720	504-430700	ipca@laceiba.hn

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Design:
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Analysis, tables, and figures:
Ann R. Braun, James García, and Jorge Luis Cabrera

Map:
Rosalba López and Jorge Luis Cabrera

Printing:
Feriva S.A.
Cali, Colombia