Bibliography of participatory research in CIP

Bibliografía de investigación participativa en el CIP

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[1] Papa Andina Project

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Overview

This annotated bibliography was prepared for a review of participatory research in CIP. Participatory research was defined for this review as actively involving final users of the technology in planning, implementing or evaluating a research activity. Whilst this definition is a broad one, in practice most of the bibliographic entries relate to farmer participatory research, with a major concentration on varietal selection. The bibliography covers the period from the foundation of CIP to the present. It is mostly restricted to published material except for a few local reports and theses of particular relevance.

The bibliography began as a literature search provided by the CIP library, whose staff were especially helpful in providing documents. Other references were supplied by CIP staff. Abstracts are of variable size and nature. Some came from the library, others were written by authors and some were prepared by Elske van de Fliert, Dindo Campilan and myself. Many documents have no abstract at all. Despite these inconsistencies, and other errors and omissions, I hope the bibliography is useful. All material cited should be available in the CIP library in Lima. Some material may be obtained through the contacts listed on the back cover The document is also available as an Endnote file.

Contexto

Se preparó esta bibliografia anotada para una evaluación de investigación particpativa en el CIP. Se definió investigación participativa como aquella donde se involucra activamente a los usuarios finales de la tecnologia en la planificación, implementación o evaluación de una actividad de investigación. Mientras que la definición es amplia en la práctica la mayoria de las entradas refieren a investigación con la participación de agricultores, con una concentración en selección de variedades. La bibliografia cubre el

periodo desde la fundación del CIP hasta el presente. Es principalmente restringido a material publicado con la excepción de unos pocos informes locales y tesis de relevancia especial.

Este trabajo empezó como una búsqueda bibliográfica en la biblioteca del CIP. El personal de la biblioteca nos apoyó eficientemente al proporcionarnos los documentos solicitados. Los resumenes son de diferentes tamaños y tipos. Algunos vinieron de la biblioteca, otros fueron escritos por los autores y otros fueron preparados por Elske van de Fliert, Dindo Campilan y por mi persona. A pesar de estas inconsistencias, y otros errores y omisiones, espero que la bibliografia sea útil. Todo el material citado debería estar en la biblioteca del CIP. Algo de este material también puede obtenerse de los contactos indicados al reverso de la caráturla del presente documento. El documento está disponible también como un archivo de Endnote.

Graham Thiele

Achata Paiva, A. V. (1989). [CIP's experience in on-farm research in Peru]. Algunas experiencias del Centro Internacional de la Papa (CIP) en investigación con agricultores en el Perú. VIII Seminario métodos y experiencias de investigación agrícola en campos de agricultores. Chiclayo (Perú). 22-26 Ago 1988. B. Ramakrishna, IICA. BID. PROCIANDINO**:** 65-98.

Los objetivos y enfoques de la investigación agrícola han evolucionado rápidamente adecuándose a las exigencias del nuevo contexto económico, social y científico. En esta evolución, el rol de la tecnología agrícola mantiene su preponderancia y la presión por resultados rápidos y efectivos es la oportunidad para aprovechar las ventajas de la investigación con los agricultores. Este tipo de investigación debe jugar un rol cada vez más útil acelerando la generación de tecnología, revalorando la tecnología nativa, identificando alternativas de solución en el corto y largo plazo y sugiriendo líneas de investigación económica y social con una tasa mayor de retorno. En este proceso, es de primera importancia la búsqueda de mecanismos que propicien una participación más efectiva de los agricultores. El CIP tiene una importante experiencia en investigación con agricultores y ha logrado nuevos conocimientos sobre el particular, aplicando diferentes metodologías y enfoques para hacerla más eficiente, especialmente en papa y recientemente en camote. Lo aprendido de ellas es muy valioso para el entendimiento del cambio tecnológico, la identificación de los factores claves de la producción, el diseño más apropiado de nueva tecnología y la expansión de un cultivo. Con esto, se logra generar, en menor tiempo, tecnología de investigación más apropiada para los programas nacionales de los países en desarrollo. A pesar de sus diferentes objetivos y metodologías, la investigación en la estación experimental y la investigación en campos de agricultores son fuertemente complementarias y de creciente interacción en el futuro. Pero una eficiente investigación con agricultores sólo puede desarrollarse si refuerza su autonomía, fortalece sus métodos, enfoques y organización institucional. Por lo tanto, el reto más importante en el futuro es lograr cada vez mayor reconocimiento, apoyo y respaldo financiero e institucional de la comunidad científica agrícola internacional.

Aganon, C. and A. Bautista-Tulin (1998). Participatory approaches to integrated nutrient management in the Philippines. Sustainable livelihood for rural households: contributions from rootcrop agriculture. Los Baños, UPWARD**:** 116-136.

A multilocation project in the Philippines sought to enhance farmer practice for sweetpotato integrated nutrient management. Participatory methods were used to assess local knowledge on crop health and nutrition. Researchers and farmers developed field-level tools for diagnosing nutrient deficiencies. Participatory trials compared farmer practice with researcher recommendation on integrated crop management.

Aguirre, G., J. Calderón, D. Buitrago, V. Iriarte, J. Ramos, J. Blajos, G. Thiele and A. Devaux (1999). Rustic seedbeds, a potential bridge between formal and traditional potato seed systems in Bolivia. Impact on a changing world: CIP Program Report 1997-98. Lima, CIP**:** 195-203.

A seedbed system was tested and validated in collaboration with farmers' communities and NGOs. More than 95% of farmers interviewed accepted the technology. Replacement of the substrate was a concern for 70% of farmers. Some farmers had found cheaper alternatives to the plastic covers for the beds.

Alcalá de Marcano, D., M. Morros and L. Salazar (1995). [Experiences in the participatory evaluation of advanced potato materials]. Experiencias de evaluación

participativa de materiales avanzados de papa. Memorias: XVII Reunión de la Asociación Latinoamericana de Papa (ALAP). Mérida (Venezuela). 9-15 Jul 1995. Mérida (Venezuela), Fondo Nacional de Investigaciones Agropecuarias (FONAIAP): 53-54.

Considerando la importancia de la participación de los agricultores en la evaluación y selección de nuevas tecnologías, el Proyecto de Investigación Integral para el Desarrollo de Zonas Altas de Lara del FONAIAP, realizó experiencias de investigación participativa en la selección de clones avanzados de papa introducidos del Centro Internacional de la Papa y que poseen resistencia a P. infestans. Dichas experiencias fueron realizadas en las localidades de Monte Carmelo y La Triguera (Sanare) y Páramo Abajo (Cubiro), estado Lara. El objetivo fue seleccionar clones promisorios e identificar algunos criterios de aceptación o rechazo utilizados por los productores. En las dos primeras localidades se seleccionaron grupos organizados, mientras que en la tercera se trabajó con productores individuales, todos con una participación activa durante la investigación. La técnica utilizada fue la evaluación abierta, absoluta, con priorización de criterios de acuerdo a su frecuencia. Las evaluaciones se realizaron en las fases de floración y cosecha. Según los criterios de selección conjunta de agricultores y técnicos, se lograron seleccionar 12 clones en La Triguera, 10 en Monte Carmelo y 1 en El Páramo. En este último caso, el clon seleccionado, 383112-9, pasó a ser multiplicado en forma artesanal por el productor, lo que evidencia que el uso de esta metodología facilita la adopción de la innovación tecnológica (clon) y reduce el tiempo necesario para lograrlo.

Alcázar, J., F. Cisneros, O. Ortiz, W. Catalán and V. Cerna (1994). [Implementation of an integrated pest management programme of Andean weevil in Peru]. Implementación de un programa de control integrado del gorgojo de los Andes en el Perú. Resúmenes. Congreso Internacional de Manejo Integrado de Plagas. San José (Costa Rica). 18-22 Jul 1994. P. L. Chavarría. San José, CATIE: 15.

El gorgojo de los Andes (Premnotrypes spp.) constituye una de las plagas de mayor importancia del cultivo de papa en el Perú y en otros países del área andina. El Centro Internacional de la Papa (CIP), en colaboración con el Instituto Nacional de Investigación Agropecuaria (INIA), ha logrado diseñar y ejecutar un Programa de Control Integrado del gorgojo de los Andes en la comunidad de Huatata, Chincheros, Cusco. Después de conocer la biología de la plaga, identificar las fuentes de infestación, comprobar las tecnologías disponibles y desarrollar otras en el mismo lugar, se diseñó una estrategia para reducir la población del gorgojo de una manera armónica, secuencial y práctica mediante métodos de control biológico, mecánico, físico, cultural y químico. El Programa ofrece un repertorio de 15 prácticas de control para que sean adoptadas o adaptadas por los agricultores del área piloto en Cusco y en otras comunidades, de acuerdo a las condiciones agroecológicas y socioeconómicas de cada lugar. Los resultados del Programa, en tres años de ejecución, con participación de los agricultores, muestra una reducción sucesiva del porcentaje de tubérculos dañados en la cosecha de 31%, 15% y 11% para 1991, 92 y 93 respectivamente. En términos económicos, esto representa la disminución de las pérdidas en $256, $124 y $98 dolares US por hectárea para cada año, respectivamente. El Programa está difundiendo la tecnología a las comunidades vecinas y a otras localidades del Perú. Se han identificado nuevas áreas piloto en Cajamarca, Huancayo y Puno, donde, conjuntamente con el INIA, se está coordinando su implementación con participación activa de los agricultores. La evaluación socioeconómica de los centros piloto ha generado información importante sobre las razones de los agricultores para adoptar o rechazar ciertas prácticas de control. El Programa está difundiendo la tecnología de dos maneras: 1) directamente a los agricultores y técnicos, mediante días de campo, cursos y charlas y 2) indirectamente, a través de

convenios o proyectos de cooperación con otras instituciones estatales y Organizaciones No Gubernamentales que tienen estrecha relación con agricultores y a los cuales se entrena previamente y se les proporciona el material adecuado para su labor de difusión.

Alvarez, P., V. Escarramán, E. Gómez, A. Villar, R. Jiménez, O. Ortiz, J. Alcázar and M. Palacios (1996). Economic impact of managing sweetpotato weevil (Cylas formicarius) with sex pheromones in the Dominican Republic. Case studies of the economic impact of CIP-related technology. T. Walker and C. Crissman. Lima, CIP**:** 83-94.

Farmer participants evaluated a range of IPM control practices and adapted the technology to their conditions. Farmer views about the benefits of IPM were also provided for impact evaluation.

Anabella, T., V. Asio, J. Pardales Jr. and D. Campilan (1999). Establishing nutrient deficiency symptoms in sweetpotato. UPWARD Fieldnotes **8**(1): 9-11.

An initial on-station experiment established visible indicators of nutrient deficiency symptoms in sweetpotato. These symptoms were field-validated by eliciting and comparing with farmers' own knowledge on nutrient deficiencies. Results indicate that symptoms identified by researchers and farmers were comparable. However, among farmers, the women were more precise and detailed in their characterization of nutrient deficiency symptoms. Through focus group discussion, practical diagnostic guides and tools were developed for subsequent field testing.

Andrade, H., X. Cuesta, N. Lara, E. Carrera and E. Alarcón (1995). [Advanced potato clones selected by means of participative research for field adaptation and consumers acceptance of fresh and processed potato]. Subproyecto 1.2.5: Clones avanzados de papa seleccionados de manera participativa por su adaptación en campo y su aceptación por consumidores de papa fresca y procesada. Quito, FORTIPAPA.

Andrade, H., M. Sola., J. Moreno, E. Alarcón and N. Borja (1995). [Third cycle of participatory evaluation of potato clones with resistance to Phytophthora infestans in the fields of small farmers]. Tercer ciclo de selección participativa de clones de papa con resistencia a Phytophthora infestans en campos de pequeños productores. Memorias: XVII Reunión de la Asociación Latinoamericana de Papa (ALAP). Mérida (Venezuela). 9-15 Jul 1995. Mérida (Venezuela), Fondo Nacional de Investigaciones Agropecuarias (FONAIAP)**:** 44-45.

El Programa Nacional de Raíces y Tubérculos rubro Papa, por tercer ciclo consecutivo, está usando la metodología de investigación participativa con productores, con el objeto de evaluar y acelerar la adopción de nuevos cultivares mejorados de papa. Dentro de la oferta tecnológica consideramos la participación de productores, técnicos, comerciantes y consumidores en el proceso de obtención de cultivares para, de esta forma, mejorar el conocimiento por parte de los técnicos de las exigencias de estos elementos de la demanda. El presente trabajo se desarrolló en cuatro provincias de la sierra ecuatoriana, donde el cultivo de papa es prioritario. Se realizaron reuniones preparatorias de motivación y explicación de la metodología, objetivos, metas y expectativas en las comunidades que fueron escogidas por el grado de organización y capacidad de autogestión. En estas reuniones, de común acuerdo con los grupos comunales, fueron elegidos entre seis y diez agricultores evaluadores por localidad, que cumplieron con los requisitos preestablecidos. El germoplasma evaluado provino del CIP, con resistencia vertical a P. infestans. Estos clones fueron

confrontados con cultivares testigos nativos y mejorados de mayor aceptación en cada localidad, como parámetros referenciales. Usamos las técnicas de evaluación absoluta, abierta y matriz de ordenamiento, según criterios. Las dos primeras durante el primer y segundo ciclo; y la tercera, en los dos últimos ciclos. Se realizaron dos reuniones de calificación, en la floración y cosecha. Además, realizamos pruebas de calidad culinaria de consumo en fresco. En el segundo ciclo de selección, se obtuvo un grupo de seis clones: 388790.24 (C-399), 388749.3 (C-388), 382119.20B (C-126), 382119.2 (C-45), 387121.4 (C-119), GV 872267 (0-19), que fueron escogidos en dos, tres y cuatro localidades. Adicionalmente, se obtuvo una amplia información cualitativa que permitió establecer las diferencias y aproximaciones de criterio entre los evaluadores. Los criterios de selección que más aportaron a la variabilidad fueron rendimiento, color de pulpa, color de piel, forma, tamaño, calidad y semilla. La información del tercer ciclo reconfirmó la predilección de los productores por los clones 388790.24 (C-399), 388749.3 (C-388) y 382119.20 (C-26), que se integrarán a la multiplicación rápida de semilla.

Andrade, H. J. and X. Cuesta (1997). The role of the user in selecting and releasing potato varieties in Ecuador. New frontiers in participatory research and gender analysis. Proceedings of the International Seminar on Participatory Research and Gender Analysis for Technology Development. September 9-14, 1996. Cali (Colombia), CIAT. Participatory Research and Gender Analysis Program (PR/GA); International Maize and Wheat Improvement Center (CIMMYT); International Rice Research Institute (IRRI)**:** 181-187.

Farmers participate in the early stages of the breeding process when they provide broad criteria (through open-ended evaluation) with 30 clones, in the middle stages when they use absolute evaluations to specify user requirements with 10 clones, and in the final stages, when they give directed opinions (ranking matrix) with 6 clones. The scheme is supplemented by culinary tests with rural and urban consumers. Participatory research complements the scientific method. The potato program has obtained four new varieties using this methodology. Once farmers understand the selection process and recognize they are addressing a real problem, they are able to keep their own records and obtain results. They disseminate successful new varieties within their communities.

Asmunati, R. (1999). Participatory monitoring and evaluation of sweetpotato ICM farmer field schools in Indonesia. UPWARD Fieldnotes **8**(1): 14-17.

A participatory monitoring and evaluation methodology for farmer field schools was developed and piloted by involving farmers and facilitators in its planning, implementation, and analysis. An indicators development workshop was conducted to identify ways to systematically assess changes in farmer behavior, farm productivity, and broader and longer-term impact on livelihood and environment. Farmer-cooperators regularly collected field data that were shared and validated with other farmers through end-of-season workshops.

Asmunati, R., Wiyanto and E. Van de Fliert (1999). Integrating sweetpotato ICM and FFS approaches in government and NGO initiatives in Indonesia. Enhancing sustainable livelihood with root crops; potentials of local R&D. Los Baños, UPWARD.

Integrated Crop Management (ICM) Farmer Field Schools (FFS) for sweetpotato were promoted through the National IPM Program and 30 local NGOs in Indonesia. These FFS were subject to a two-year (1998-99) participatory monitoring and evaluation project conducted by Mitra Tani, a local NGO, and

supported by UPWARD and CIP. Methodology and tentative results are discussed. Process and impact evaluation of the FFSs demonstrated increased yields, reduced production cost, and enhanced farmers' problem-solving capacity. The basic principles of the FFS and ICM approaches, implying the need for guidelines to be adjusted to local conditions at the farm level, had left the trained groups with adequate skills to experiment and adapt locally.

Bagalanon, C. L. P. (1997). Negotiating initiatives in soil fertility management among agencies in Dolores, Quezon, Philippines. Local R & D: institutionalizing innovations in rootcrop agriculture. Los Baños, UPWARD**:** 85-93.

An interagency team was formed to coordinate efforts to support a project on soil resource management. This came out of farmers' assessment that soil-related problems involved not only a single crop or the soil itself, but also land tenure, infrastructure, and marketing. The interagency collaboration enabled farmers' cooperatives to gain easier access to necessary research, extension, and other support services.

Baral, D. R., N. Timisina, D. Timsina and P. Bhandari (1997). Integrating farmer indigenous practices with improved technologies in managing late blight of potato. Local R & D: institutionalizing innovations in rootcrop agriculture. Los Baños, UPWARD**:** 51-61.

Late blight caused by Phytophthora infestans is one of the most serious diseases and a major constraint to successful potato cultivation in the Eastern Terai Region of Nepal. A disease management effort has been made in the Dhaijan Village Development Committee of Eastern Terai using an integrated approach that included participation of cooperators. Researchers frequently visited the area and interacted informally with the farmers to obtain the required information. Several participatory action trials were conducted to enrich or verify the hypotheses on how late blight is best managed in farmers' fields to produce a healthy potato crop. Achievements to date show that integrated practices have been successful in controlling the disease. Among the practices are early (September-October) or late planting (December-January), cultivation of less disease-susceptible varieties (Kufri Jyoti and Desiree), chemical spray (1-3sprays of Dithane M-45 0.5 percent) combined with other cultural modifications, such as restricted irrigation during the peak disease infestation period, judicious application of chemical fertilizers, ridge planting, hilling up, mulching, and smudging around the field.

Bardhan Roy, S. K., A. K. Chakravorty and A. K. Roy (1996). Farmers' participatory on-farm trials with TPS seedling tubers in the rice-based cropping system of West Bengal. Production and utilization of true potato seed in Asia: Proceedings. Inter-Regional Workshop. 21-30 Jan 1995. Modipuram (India). M. D. H. Upadhya, B.; Gaur, P.C.; Ilangantileke, S.G. Lima (Perú), Centro Internacional de la Papa (CIP); Indian Council of Agricultural Research (ICAR)**:** 187-189.

On-station experiments showed a 33% yield increase in seedling tuber over Kufri Jyoti. Based on this result, 76 on-farm trials were conducted in 1993-94. About 14kg of seedling tubers were provided for each trial conducted under farmers' management practices. Farmers assessed the advantages and disadvantages of growing TPS. TPS seedling tubers showed more blight tolerance, plants were more vigorous, and taste was reasonably good. Disadvantages were small-sized tubers, plants remaining green for a longer period, and lower market price for tubers.

Bentley, J. and G. Thiele (1999). Bibliography: farmer knowledge and

management of crop disease. Agriculture and Human Values **16**: 75-81.

Nearly all contemporary people subsist on cultivated plants, most of which are vulnerable to diseases. Yet, there have been few studies of what traditional people know - and do not know - about crop disease. Agricultural scientists, in general, are becoming aware of the potential contribution of social scientists and farmers in developing integrated management of crop diseases. The International Potato Center (CIP) has focused on stimulating farmer-scientist collaboration in developing management of late blight, a major fungal disease of potato and other plants. Understanding farmers' knowledge of this and other plant diseases is an important element in furthering such collaboration. Although not all agricultural scientists recognize the value of social science, this literature search shows that some agricultural scientists now actively collaborate with farmers, in ways that cross the boundary into social science research. During this search, much of the work we found was written by plant pathologists and entomologists. We found over 50 publications on farmer knowledge of crop disease, and we have annotated the material considered most relevant to farmer-scientist collaboration for research of crop diseases, especially late blight.

Casi todos los pueblos contemporáneos se alimentan de plantas cultivadas, la mayoría de las cuales son vulnerables a enfermedades. Sin embargo, existen pocos estudios de lo que los pueblos tradicionales saben -y no saben- sobre las enfermedades de los cultivos. Los científicos agrícolas, en general, están tomando interés en la contribución potencial de los científicos sociales y de los agricultores para desarrollar un manejo integrado de enfermedades de los cultivos. El enfoque del Centro Internacional de la Papa (CIP) estimula la colaboración científico-agricultor para mejorar el manejo del tizón tardío, la enfermedad más importante de la papa y de otras plantas. EI conocimiento y la información que se brinda a los agricultores sobre ésta y otras enfermedades de las plantas, es un elemento importante para una más amplia colaboración. Aunque no todos los científicos agrícolas reconocen el valor de la ciencia social, esta literatura busca demostrar que algunos científicos agrícolas están colaborando actualmente con los agricultores, cruzando, en cierta forma, el límite de la investigación científica social. La mayor parte de los trabajos hallados durante nuestra búsqueda han sido escritos por entomólogos y patólogos. Encontramos más de 50 publicaciones acerca del conocimiento del agricultor sobre enfermedades de los cultivos. Hemos seleccionado el material que consideramos más relevante para la colaboración científico-agricultor en la investigación de enfermedades del cultivo, especialmente del tizón tardío.

Boncodin, R. and B. Betty Gayao (1998). Homegardening for sustainable rootcrop research and development: case projects from the Philippines. Sustainable livelihood for rural households: contributions from rootcrop agriculture. Los Baños, UPWARD**:** 149-161.

Researchers and women homegardeners conducted an assessment of the potential of homegardens for sustainable agricultural livelihood. In the urban homegarden project, crop management technologies were evaluated through participatory trials and learning workshops. In the rural homegarden project, the contribution of homegardens to family nutrition and biodiversity was assessed through participatory garden mapping, and joint evaluation of introduced crops and cultural management practices.

Boncodin, R. and B. Vega (1999). Local views on genetic resources conservation. UPWARD Fieldnotes **8**(1): 12-13.

A workshop brought together "local conservationists" to discuss experiences and issues in conserving sweetpotato genetic resources, and to identify needs and opportunities they felt should be addressed by

researchers. Among the key questions raised were: What are local views and concepts on genetic resources conservation, What crops do people conserve, How do people conserve and Who are the" local conservationists"? Workshop results included the development of project proposals on user-driven sweetpotato conservation.

Booth, R. and R. Rhoades (1989). An attempt to improve the storage of consumer potatoes on small farms in Peru. Tropical Science **29**: 1-8.

On-farm storage trials compared simple, home-made pallet boxes and a chemical sprout suppressant with farmer's technology of piling tubers in a corner of a dark room in an existing building. Contact with farmers suggested that specialized free-standing structure was unlikely to be accepted. Trials in 1983 were managed by CIP scientists. Trials in 1984 and 1985 were managed by farmer cooperators. The improved technology helped reduce monthly losses of consumer potato of more than 2%. Farmers were not observed to adapt or adopt the technology. Farmer comments and decisions about when to terminate storage suggest their preference to sell after a short period when prices are high.

Braun, A., G. Thiele and M. Fernández (1999). [The Farmer Field School for IPM and the Local Committee for Agricultural Research: complementary platforms to promote integral decision making for sustainable farming]. La Escuela de Campo para MIP y el Comité de Investigación Agrícola Local: plataformas complementarias para fomentar decisiones integrales en la agricultura sostenible. Manejo Integrado de Plagas (Costa Rica)(53): 1-23.

La Escuela de Campo (EC) para Manejo Integrado de Plagas y los Comités de Investigación Agrícola Local (CIAL) son plataformas participativas para fomentar la toma de decisiones integrales y la innovación en la agricultura sostenible. La EC ofrece educación no formal sobre principios agroecológicos a través de un proceso de aprendizaje participativo que dura todo el ciclo de un cultivo. En cada EC participan 25 agricultores de una comunidad. El CIAL es un servicio de investigación permanente compuesto de un equipo voluntario de cuatro o más agricultores. Cada CIAL pertenece a una comunidad y crea un vínculo entre la investigación local y la formal. Las EC y los CIAL fueron iniciados por razones diferentes y tienen objetivos distintos, pero comparten varios principios y procesos. Ambos aportan soluciones concretas a problemas locales, pero aplican diferentes estilos de experimentación y análisis para el desarrollo de las mismas. Ambos incrementan la capacidad de individuos y grupos comunitarios para el análisis crítico y en la toma de decisiones. Ambos estimulan la innovación local y enfatizan principios y procesos en lugar de recetas o paquetes tecnológicos. La fortaleza del CIAL está en la evaluación sistemática de alternativas tecnológicas, y en su rol como un canal que permite que las comunidades de escasos recursos económicos influyan en las agendas de los sistemas formales de investigación y extensión. Además, algunos CIAL contribuyen al fomento de microempresas rurales. La EC llena lagunas locales en conocimiento y aumenta la conciencia sobre fenómenos que no son obvios o fácilmente observables. Su fortaleza está en preparar a los agricultores en el manejo de procesos agroecológicos. Dependiendo del problema o la oportunidad a enfrentar, una u otra plataforma podrían ser el punto de partida más apropiada. Un reto para el futuro es integrar sus elementos complementarios y/o emplearlos conjuntamente como una estrategia para expandir la capacidad creativa de los agricultores para resolver problemas y aprovechar oportunidades.

The Farmer Field School (FFS) for Integrated Pest Management and the Local Agricultural Research Committee (CIAL) are participatory platforms that foment improved decision-making capacity and stimulate local innovation

for sustainable agriculture. FFS offers non-formal education related to agroecological principles through a participatory learning process that lasts an entire crop cycle. Twenty-five farmers from a single community participate in each FFS. The CIAL is a permanent agricultural research service staffed by a voluntary team of 4 or more farmers. Each CIAL belongs to a community and creates a link between local and formal research. FFS and CIALs were initiated for different reasons and have different objectives, but they share various principles and processes. Both result in concrete solutions for local problems, but they apply different styles of experimentation and analysis for developing these. Both increase the capacity of individuals and local groups for critical analysis and decision-making. Both stimulate local innovation and emphasize principles and processes rather than recipes or technology packages. The strength of the CIALs is in the systematic evaluation of technological alternatives, and their ability to influence the research agendas of formal research and extension systems on behalf of economically disadvantaged communities. In addition, some CIALs stimulate the development of small rural enterprises. FFS fills the gaps in local knowledge and increases awareness and understanding of not obvious or easily observable phenomena. Their strength lies in increasing farmers' skills as managers of agroecological processes. Depending on the problem or opportunity to be address, one or the other may be a more appropriate entry point. Integrating the complementary elements of the FFS and CIALs and/or employing them in parallel in order to expand the creative capacity of farmers to resolve problems and seize opportunities are future challenges.

Braun, A. R. and E. Van de Fliert (1997). The farmer field school approach to IPM and ICM in Indonesia: user participation. Local R & D: Institutionalizing innovations in rootcrop agriculture. Los Baños, UPWARD**:** 62-84.

Assessment of integrated pest management (IPM) needs in sweetpotato-growing areas of Indonesia in 1994 confirmed that the sweetpotato weevil was the most damaging pest. However, its impact varied between locations and seasons, and was not the major concern of farmers. A more detailed, participatory study concluded that improved overall crop management was the most promising means to increase income from the crop. To respond to this need, a pilot integrated crop management (ICM) program was developed, with emphasis on farmer experimentation and training for the development of appropriate crop management skills and technology. User participation was fostered by training farmers to conduct research on topics of their choice, supporting them in the process, and involving them in FFS development and piloting. Capacity of farmer researchers (FRs) to set the agenda and conduct the research autonomously increased as they gained more experience and confidence over the course of several seasons. Resource persons from NARS and an NGO have introduced new ideas and information, and gradually have increased the scope of activities conducted by the FRs.

Braun, A. R., E. Priatna, R. Asmunati, Wiyanto, Y. Widodo and E. van de Fliert (1997). Farmer field schools for sweetpotato in Indonesia. International Potato Center. Program Report 1995-96. Lima (Perú), CIP**:** 198-204.

The process of developing an adapted Farmer Field School (FFS) model for sweetpotato crop management in Indonesia is described. The sweetpotato enterprise was analyzed through participatory needs assessment, based on which the farmers' field research agenda was set. Technologies were field-tested and adapted. The FFS model was piloted, and a curriculum was developed for sweetpotato integrated crop management. A mechanism for scaling-up FFS through national programs was designed.

Calderón, R., R. Esprella and L. Crespo (1997). Training Bolivian farmers in IPM. ILEIA Newsletter **13**(4): 31.

The project began by providing farmers with information about the Andean potato weevil. Farmers did not know that the larva and adult are different stages in its life cycle. Control measures, such as manual collection, ditches around fields and harvesting potato on woollen bags, were discussed. Farmers first analyzed the control measures before deciding which to try out.

Callueng, M., E. Sana, E. Valdez, H. Reboroso, A. de la Cruz and E. Chujoy (1993). Farmers' participatory evaluation of lowland potato clones. SAPPRAD on the second year of phase III: Research papers and progress reports on development activities July 1992 - June 1993. E. T. Rasco Jr., P. J. S. Lopez and F. B. Aromin. Manila (Philippines), SAPPRAD. **1: potato:** 157-167.

Fourteen lowland potato clones selected on-station for good adaptation, high yield, and excellent storability were jointly evaluated by farmers and researchers at Sto. Niño, Cagayan (Philippines) from 1990 to 1993. Most clones were evaluated without replication; a few were replicated across farms. This was undertaken to assess the performance of these clones under farmers' management. Mean yield of all the clones for three years was 395 g/plant or 19.8 t/ha (range: 257 to 524 g/plant). It was possible to store seeds between planting seasons (8-9 months) in diffuse light storage under ambient conditions. Storage loss over this period was 33% on the average and as low as 10% in one clone (APC 107). Of the 14 clones, 10 were considered acceptable alternatives to standard cultivars by farmer-cooperators. Encouraged by results, other farmers in Sto. Niño also signified their interest to test the new clones. The farmers were convinced that the use of lowland clones can lower production cost and sustain potato production in their environment.

Campilan, D. (1995). Enhancing the user-oriented diagnostic framework through knowledge systems thinking. Taking root: Proceedings of the third UPWARD review and planning workshop. Cavite (Philippines). 2-5 Apr 1994. Manila (Philippines), UPWARD**:** 131-145.

UPWARD's transition to a new program phase is characterized by the shifting emphasis from users' perspectives to participation. This paper proposed that the change in program focus be complemented by an amplification of the user-oriented diagnostic framework through the integration of knowledge systems thinking. Specifically, the following points were suggested: 1) expanding the focus to include other actors or key players in a system, besides users; 2) describing fully the problem situation; 3) adopting a soft systems perspective; 4) recognizing multiple perspectives; and 5) viewing indigenous knowledge in its holistic form. An enhanced diagnostic framework, through the incorporation of the above, would further help UPWARD move upward by being able to better respond to newly emerging issues and concerns in agriculture and rural development.

Campilan, D. and G. Prain (in press). Self-evaluation as an approach to assessing participatory research: an Asian experience. Assessing the Impact of Participatory Research. Quito, CIAT-SWI-PRGA.

A self-evaluation approach was applied to help researchers and project participants assess experiences in participatory research. Seven case projects from five Asian countries were self-evaluated to examine the influence of participatory research on project processes, outcomes, and impacts. The self-evaluation process involved 1) ongoing participatory project monitoring and evaluation; 2) development of project case study; 3) a workshop to present and discuss findings; 4)

further refinement of case study; and 5) program-level synthesis and strategic planning.

Campilan, D., G. Prain and C. L. Bagalanon (1998). Evaluation from the inside: participatory evaluation of agricultural research in the Philippines. Journal of Knowledge, Technology and Policy **11**(4): 114-131.

Participatory evaluation methods enabled project participants to conduct a self-assessment of research processes and results. Includes three case projects from the Philippines -- urban homegardening, rural homegardening and soil resource management. Participatory methods used included PRA, community validation meetings, learning workshops, mapping and diagramming, field days and cookfests, and games and group dynamics. Results of monitoring and evaluation served as input in subsequent participatory research planning.

Campilan, D. M. and G. D. Prain (1996). Integrated pest management, the view from below: The role of users' perspectives and participation in agricultural R & D. Integrated management of bacterial wilt of potato: Lessons from the hills of Nepal, proceedings. National Workshop. Pokhara (Nepal). 4-5 Nov 1996. P. M. Pradhanang and J. G. Elphinstone. Pokhara (Nepal), Lumle Agricultural Research Centre (LARC); Users' Perspectives with Agricultural Research and Development (UPWARD); Winrock International (WI)**:** 87-100.

The paper explores the social dimension of pest management and argues that understanding users' perspectives and facilitating user participation can contribute to more effective pest management R&D. Pest problems involve not only technical but also social issues since the field impact of pest management innovations is highly dependent on local communities' social structure, collective representation, and meaningful social action. Users' perspectives and participation are particularly critical when the characteristics of insect pests or diseases are such that collective decision and actions are essential for successful management. The paper focuses on rootcrop agriculture to illustrate the application of user participatory approaches to pest management R&D. Empirical cases drawn from UPWARD projects in various Asian countries describe how researchers work with users in undertaking problem diagnosis, action research, and local R&D management. The paper ends by summarizing key lessons learned and how these would compare with the experience of the community-based bacterial wilt management project in Nepal.

Cárdenas, F. M., B. H. Andrade, S. X. Cuesta and E. Carrera (1998). [Participatory evaluation of culinary quality and the acceptability of promising potato clones of Solanum tuberosum L. in the provinces of Chimborazo, Cotopaxi and Carchi in Ecuador]. Evaluaciones participativas de calidad culinaria y aceptabilidad de clones promisorios de papa Solanum tuberosum L. en las provincias de Chimborazo, Cotopaxi y Carchi del Ecuador. INIAP Revista Informativa (Ecuador) **10**: 25-27.

El PNRT-Papa desarrolla un esquema de mejoramiento genético, con enfoque en investigación participativa. Considera que son importantes las evaluaciones poscosecha de calidad culinaria en la etapa avanzada (IPC3) , con la participación de los productores-consumidores rurales, donde las mujeres campesinas tienen un rol destacado. Los resultados mostraron la preferencia por papas de pulpa amarilla o crema intenso, con sabor a papa fresca (recién cosechada, no guardada), algo dulce, consistencia suave y un tiempo de cocción menor a 45 minutos. En base a estas características fueron seleccionados 11 clones promisorios en las tres zonas, entre los que sobresalieron los clones O-10 y O-5. Los criterios de rechazo fueron: pulpa de color blanco o crema pálido, sabor amargo, agrio o

picante, consistencia dura y tiempos de cocción superiores a los 45 minutos. De los 11 clones seleccionados por los consumidores rurales, cinco fueron probados por los consumidores urbanos de Quito, cuyas preferencias fueron parecidas a las del usuario rural.

Carrasco, E., A. Devaux, W. García and R. Esprella (1997). Frost-tolerant potato varieties for the Andean highlands. Program Report 1995-1996. Lima (Perú), CIP**:** 227-232.

Farmers evaluated the most advanced clones during three seasons. One of the techniques used was matrix scoring. After each harvest, new cultivars were placed in piles at the end of the rows where they had been grown. Farmers examined the new cultivars closely, identified criteria and then scored all clones one criterion at a time using grains of maize. Culinary characteristics of boiled potato were evaluated using the same method.

Castillo, G. and D. Campilan (1999). Nurturing a network: lessons in the evolution of the UPWARD program. Households in an interdisciplinary perspective. A. Niehof and P. Terpstra. Wageningen, Wageningen Agricultural University**:** 37-46.

An analysis of UPWARD's emerging "user participatory approach" that draws on empirical examples from various field projects to illustrate its operationalization. Through an iterative process of action and reflection, elements of the approach have been identified as follows: sensitivity to users' perspectives, focus on the household, food systems framework, integration of scientific and local knowledge, interdisciplinary approach, multi-agency teamwork, problem-based agenda, and secondary crop orientation.

Chilver, A. and R. Suherman (1994). "Patterns, processes and impacts of technology diffusion: the case of true potato seed (TPS) in Indonesia." Journal of the Asian Farming Systems Association **2**(2): 285-302.

Chilver, A. (1994). Exploring TPS: applicability through farmer participation. CIP Circular **20**(1): 9-11.

A research team took TPS to 15 farmers in Cibodas who had once grown potatoes. Farmers received the latest information on TPS and were asked to use their creativity to develop production techniques. They established successful methods for producing seedling tubers. Early in the process farmers began distributing tubers to nearby families and peer groups. Medium sized farmers with little or no extension contact diffused tubers most. More recent evidence from Indonesia indicates that TPS farmers still face challenges with seedling tuber degeneration, late bulking, and low yields.

Chilver, A. (1997). Innovation paths in developing country agriculture: true potato seed in India, Egypt and Indonesia. Norwich (UK), University of East Anglia**:** 289.

The role of farmers in technology generation and diffusion has long been identified as a key dimension in publicly funded international agricultural research. This thesis uses a case study approach to document actual research and diffusion practices and their outcomes, and from these it draws conclusions for research policy. The thesis compares the effects of new technology, the research processes that generated it, and the diffusion processes that promoted and disseminated it, in three countries. Particular attention is given to farmer participation and related issues deemed critical to effective research and diffusion. The

technology in question is true potato seed, a radical alternative means for potato propagation to tuber seed, researched and promoted by the International Potato Center in collaboration with national research institutes since 1978. The case study countries are India, Egypt, and Indonesia. Extensive quantitative and qualitative farmer surveys provide the first detailed assessment of TPS benefits, their distribution, and likely TPS adoption. Secondary data, documentation, and in-depth interviews with key actors permit an analysis of significant activities, decisions, and players that shaped TPS research and diffusion processes. The farmer survey evidence indicates that TPS outcomes are problematic in each country. It also reveals cases of inadequately justified TPS research and promotion largely due to poor awareness by scientists and research managers of farmers' conditions. This thesis demonstrates that a powerful countervailing force to the pursuit of unproductive research lies in the early and effective involvement of farmers in the research process. This allows for critical weaknesses to come to light during experimentation by farmers under their own conditions of production. The inevitable geographical and institutional decentralization that this entails fosters a greater level of research responsiveness and an environment in which alternatives to formal extension, including farmer dissemination networks, may be stimulated and encouraged where appropriate. However, regardless of the rhetoric regarding farmer participatory approaches at an organizational level, the extent to which these are borne out in practice depends largely upon the philosophies of key individuals who shape and direct research and promotion processes.

Early and extensive farmer involvement in experimenting with TPS in Indonesia contrasts with late farmer involvement as recipients of finished technology in Egypt and India. Early farmer involvement in Indonesia and the use of informal channels led initially to adaptation of the technology to fit farmers' needs and faster diffusion, and, subsequently, to a realization that the technology was not viable. A lack of farmer involvement in testing in India meant that the technology was promoted outside of the agroecologies where its use was economic. Key farmer characteristics, such as their preference for direct transplanting rather than production of tuber seedlings, where incorporated into the technology at a later stage. In Egypt and India, there was a substantial gap between the theory of CIP's participatory research and its use of conventional researcher-led activities at the regional level.

Cisneros, F., J. Alcázar, M. Palacios and O. Ortiz (1995). A strategy for developing and implementing integrated pest management. CIP Circular **21**(3): 2-7.

A strategy for IPM development and implementation is proposed. In this strategy, farmers' participation is a key component to achieve agro-ecological and socio-economic integration of control practices within pilot sites.

Cisneros, F. and P. Gregory (1994). Potato pest management. Aspects of Applied Biology **39**: 113-124.

CIP has devised a strategy to develop and implement integrated pest management (IPM) to overcome some constraints that prevent farmers in CIP's area of influence from adopting IPM practice. IPM development is divided into five distinct phases: pest problem assessment, development of management components, integration of key components, implementation in pilot areas, and large-scale implementation. During implementation phase, selected components are tested in farmers' fields and their reactions to each component are also evaluated. Farmers must understand the rationale behind each control measure and are encouraged to express their thoughts. Monitoring by farmers of insect populations and action thresholds may be important components. Only when farmers accept the practical value of the IPM program in pilot areas is it time to proceed to large-scale implementation. This

occurs through NGOs and other agencies. CIP's role at this stage is to train personnel who will train farmers in IPM and methodologies for training farmers, making IPM diffusion materials available and providing technical backstopping to the NGOs. The experience in developing IPM programs for potato tuber moth, the Andean potato weevil, and the leaf miner fly as key pests confirms the validity of the strategy.

Conghua, X., D. Campilan, E. Chujoy and Y. Wang (1999). Assessing Farmer Management of Potato Diseases in Southwest China. UPWARD Fieldnotes **8**(1): 12-14.

A needs assessment study collected field information on potato production systems, disease problems, and systems of seed management by farming communities in southwest China. An interdisciplinary team undertook the study for each of the five provinces covered using the following methods: PRA, key informant interview, community meeting, collection of secondary data, and field observation. Results were discussed among researchers and farmers to plan for the implementation of integrated disease management activities.

Cortbaoui, R. (1981). On farm research to optimize potato productivity in developing countries. Social science research at the International Potato Center: report of the second social science planning conference. Lima, CIP**:** 81-90.

Dhital, B. K., P. M. Pradhanang, S. R. Ghimire and T. B. Gurung (1996). Management of bacterial wilt of potato through community participatory approach in the western hills of Nepal. Integrated management of bacterial wilt of potato: Lessons from the hills of Nepal, proceedings. National Workshop. Pokhara (Nepal). 4-5 Nov 1996. P. M. E. Pradhanang, J.G. Pokhara (Nepal), Lumle Agricultural Research Centre (LARC); Users' Perspectives with Agricultural Research and Development (UPWARD); Winrock International (WI)**:** 60-69.

Bacterial wilt (Pseudomonas solanacearum) is one of the most destructive diseases of potato in the high hills. This disease is difficult to manage due to lack of resistant varieties and the conducive environment in the high hills for long-term survival of the pathogen in soil. Lack of awareness of the disease and its management among the farmers has further complicated the problem. A disease management effort has been made by the Lumle Agricultural Research Centre in the traditional upland potato-growing area of the Western hills with community participatory approach. Key components consisted of elimination of infected planting material from the villages, seed multiplication in isolated disease-free areas, adoption of three-year rotation with non-host crops, eradication of volunteer potato plants, and farmers' education on crop hygiene and disease management. These were implemented through farmer committees. Experience shows that the approach adopted was technically feasible to manage the disease if the regulations envisaged were followed by all community members. As the reintroduction of the disease caused by to inter-village exchange of potato is the biggest threat to the program, a strong and effective bacterial wilt awareness campaign in a wider area is urgently needed. Alternative income-generating activities, such as off-season vegetable production and upland rice cultivation encouraged community cooperation on the program. Some problems encountered in implementing the program, potential solutions, and areas for further investigation are also discussed.

Equise, R. H. and C. D. Ortega (1998). [Validation of the strategy for the chemical control of late blight (Phytophthora infestans)

with farmers in Chuquisaca, Bolivia]. Validación de la estrategia de control químico del tizón (Phytophthora infestans) a nivel de agricultor en Chuquisaca, Bolivia. XVIII Reunión de la ALAP: Compendio de exposiciones. Cochabamba (Bolivia). 9-13 Feb 1998, Ministerio de Agricultura. Proyecto Nacional de Semilla de Papa (PROSEMPA): 85-86.

Entre los años 1995-1997 se validó a nivel de agricultor una estrategia de control químico del tizón para cultivares susceptibles, en comunidades de la Cordillera de El Rosal, con la finalidad de evaluar los criterios de los agricultores e identificar los caminos más adecuados de adopción y difusión de la nueva estrategia. La validación participativa se efectuó con 19 agricultores. La evaluación se realizó mediante encuestas, testimonios, charlas individuales, visitas a parcelas y días de campo. Los resultados indican que el nivel de conocimiento de los agricultores respecto a los componentes de la estrategia aumenta después del proceso de validación. Se determinó que el 94% de los agricultores conocen y aplican la estrategia de control químico del tizón en todas sus parcelas. Asimismo, se observó que este grupo de agricultores difunden la estrategia a otros agricultores.

Espinola, N., H. Creed-Kanashiro, M. E. M.E. Ugaz and M. van Hal (1998). [Development of a complementary feed with sweetpotato for children from 6 months to 3 years]. Desarrollo de un alimento complementario con camote para niños de 6 meses a 3 años. Lima, CIP and Instituto de Investigación Nutricional (IIN).

Espinola, N., H. Creed-Kanashiro, M. E. Ugaz, M. van Hal and S. G. (1999). Development of a sweetpotato-based instant weaning food for poorly nourished children six months to three years old. Impact on a changing world. Program Report 1997-98. Lima, CIP: 295-302.

A trial of a weaning food was conducted with mothers and infants in Lima, Peru. An acceptability score was assigned based on the mother's perception of her child's acceptance of different formulas. Almost all mothers found the formulations beneficial.

Evangelio, F. A., B. A. Vega and C. D. V. Godoy (1997). Linking scientists' and farmers' knowledge of soil fertility management. Local R & D: institutionalizing innovations in rootcrop agriculture. Los Baños, UPWARD: 39-49.

Quantitative and qualitative research techniques were employed to gather data at three sites: Dulag, Leyte; Baloi, Lanao del Norte; and Dolores, Quezon. Results showed that the sites represent three different pedo-ecological zones causing some aspects of sweetpotato farming systems to vary. Dulag has a warm lowland environment and type II climate. Soil is derived from alluvial deposit and is silty clay to sandy loam. Farmers classified this as gabhok. In this area's sweetpotato-corn-sweetpotato system, very few farmers fertilize sweetpotato as it benefits from the residuals from corn. Farmers practice fallowing, crop rotation, and green manuring. Yield is 8-12 t of sweetpotato roots per hectare (ha). In Baloi, about 1,800 ha is planted to sweetpotato in the warm-cool upland with type V climate. Farms are on undulating and upper terraces with silty clay soil. With this soil, locally known as lonokon, farmers have adopted two cropping patterns: sweetpotato-corn-sweetpotato and sweetpotato-corn-peanut-sweetpotato. Farmers practice green manuring and proper timing of planting to maintain soil fertility. Farmers get a yield of 11-15 t sweetpotato/ha. Dolores represents the cool, upland sweetpotato-growing environment with type II climate. Production areas are situated on a piedmont slope of Mt. Banahaw with clay loam soil locally known as malagkit, mapulapula, and buhaghag. Most farmers in the area practice monocropping because of proximity to the market. Others have adopted relay cropping and crop rotation. Because soil is low in organic matter, most farmers apply manure or compost and commercial fertilizer to

maintain soil fertility and productivity. Some farmers practice green manuring. All hillside farmers have contour hedgerows as a soil and water conservation measure. Farmers' indigenous knowledge of soil fertility management was compared with scientists' approach so as to develop interventions for optimum sweetpotato yield. This approach is complementary and participatory in nature: both farmers and scientists mutually agree on particular interventions for soil fertility management. Results in Dulag show that sweepotato yield was higher in plots using introduced knowledge or intervention compared with that in plots using existing practices. Since the trials, indigenous practices can be improved to further increase sweetpotato yield by 50-100 percent.

Ewell, P. (1988). Farmer-oriented research and development of integrated pest management. The social sciences at CIP: report of the third social science planning conference. Lima, CIP**:** 220-229.

Entomologists at CIP had been working on component technologies for IPM. A social scientist was needed to integrate components into management systems of farmers. Diagnosis began with single-visit surveys, using insect specimens to elicit farmers' perceptions. Entomologists laid out experiments on borrowed land in representative production zones and monitored insect populations and damage. Samples of farmers nearby were interviewed to collect information on pest management practices, costs and, using simplified methods, insect populations and damage. Combined methods allowed an understanding of the logic of farmer decision making.

Ewell, P. (1997). Socio-economic aspects of farmer-oriented research for potato IPM. Proceedings of the workshop on the global status of and prospects for integrated pest management of root and tuber crops in the tropics. 25-30 October, Ibadan, Nigeria. S. Hahn and F. Caveness. Ibadan, IITA**:** 108-124.

Interdisciplinary teams of social scientists and entomologists from both CIP and national programs have worked for two years in Peru and in Tunisia to bring farmers' perspectives into various phases of development of alternative IPM programs. In Peru, the difficulties of organizing IPM strategies, developed in the past, among heterogeneous producers of such a perishable commodity as potato, have led to research into multiple pests and the highly variable conditions of farmers. Research focused on the Andean weevil (Premnotrypes spp.) in the highlands and the leaf miner fly (Liriomyza huidobrensis) on the coast. Methods used included single-visit diagnostic surveys and multiple-visit surveys linked to field monitoring and experiments. In Tunisia, where the major insect pest is the potato tuber moth (Phthorimaea operculella), a similar direction of research programs as in Peru, is being developed.

Ewell, P., H. Fano, K. V. Raman, J. Alcázar, M. Palacios and J. Carhuamaca (1990). Farmer management of potato insects in Peru. Lima, CIP.

Fano, H., O. Ortiz and T. Walker (1996). Peru: inter-institutional cooperation for IPM. New partnerships for sustainable agriculture. L. A. Thrupp. Washington DC, World Resources Institute**:** 85-98.

Farmers have participated actively in several pilot sites for IPM development in the Andean and coastal regions of Peru. As a result, strategies for IPM for controlling the Andean potato weevil, potato tuber moth, and leaf miner fly were designed. Farmer participation facilitated IPM which was disseminated through inter-institutional cooperation.

Fonseca, C., R. Labarta, A. Mendoza, J. Landeo and T. Walker (1996). Impacto económico de la variedad Canchán-INIAA, de alto rendimiento y resistente al tizón tardío, en el Perú. Estudios de casos del impacto económico de la tecnología relacionada con el CIP en el Perú. T. Walker and C. Crissman. Lima, CIP**:** 1-14.

Fonseca, C., J. P. Molina and E. E. Carey (1993). [Selection of new sweetpotato varieties with farmers' participation]. Selección de nuevas variedades de camote (batata) con participación de los agricultores. Lima, CIP.

Fonseca, C., J. P. Molina and E. E. Carey (1994). Farmer participation in the selection of new sweetpotato varieties. Lima (Peru).

Fonseca, C. (1992). [Comparative study on the adaptability of 16 sweetpotato clones and their acceptability by farmers of the Cañete Valley]. Estudio comparativo sobre la adaptabilidad de 16 clones de camote (Ipomoea batatas) y su aceptación por los agricultores en el valle de Cañete. Producción Agrícola. Lima (Perú), Universidad Nacional Agraria La Molina**:** 86.

This MS thesis studied the adaptability of 16 sweetpotato clones (coming from INIAA and CIP), and their acceptability by farmers of the Cañete Valley (the most important sweetpotato production area in Peru). A participatory methodology was used with 24 farmers. The analysis was both quantitative and qualitative, including the application of the statistical model BCR, and of the informal interview technique. Results showed significant differences between productivity of sweetpotato clones and farmers' preferences. Clones with higher yields (Weberbauer, DC-79, LM88.107) did not show satisfactory commercial qualities. This was an important attribute for farmers, on the basis of which they selected the clones Jewel, Valdivia, Tambeño, Huarco y Kon-tiki, because of their dark color skin and flesh, round and oval shape, and medium-sized roots. Also, these clones showed acceptable yields (approximately 25 t/ha). These selected clones have higher possibilities of being adopted by farmers of the Cañete Valley and Central Coast Valleys of Peru.

Esta tesis de M.S. estudió la adaptabilidad de 16 clones de camote provenientes del CIP e INIAA y su aceptación por los agricultores. Los análisis fueron cuantitativos y cualitativos, aplicándose el modelo estadístico del BCR y la técnica de "entrevista informal". Los resultados muestran una brecha grande entre la productividad de los clones de camote y la preferencia de éstos por los agricultores. Varios clones de alto rendimiento, como Weberbauer, DC-79, LM88.107, no cumplieron satisfactoriamente con la calidad comercial. Éste, es un aspecto importante para los agricultores, en base a lo cual seleccionaron los clones Jewel, Valdivia, Tambeño, Huarco y Kon-tiki, que tienen raíces reservantes de tonos oscuros, de forma y tamaño mediano. También mostraron rendimientos aceptables (aproximadamente 25 t/ha). Estos clones tendrían mayores posibilidades de adopción por los agricultores del valle de Cañete y los valles de la costa central del Perú.

Franco, E., M. Salas and H. J. Tillman (1990). [Agronomists and peasants: An attempt at meeting]. Agrónomos y campesinos: Un intento de encuentro. Lima, SEINPA. Universidad de Hohenheim.

Gabriel, J., R. Torrez and G. Thiele (2000). Participatory approaches in potato improvement: experience of PROINPA in Bolivia. Encouraging Diversity. The conservation and development of plant genetic resources. C. J. M. Almekinders and W. S. de

Boef. London, Intermediate Technology publications.

Continues Thiele *et al* (1997) which dealt with participatory varietal selection (PVS). In 1998, researchers in Bolivia initiated participatory plant breeding (PPB). The aim is to see if farmers themselves could breed improved varieties with higher yield potential and resistance using local genetic resources adapted to specific niches. Farmers identified late blight and false root knot nematode as the problems for which they would like new varieties and selected progenitors. Five farmers from the local research committee (CIAL), who have been active in PVS, were given specific training in making crosses. Farmers used caps of toothpaste tubes to collect pollen from flowers of Waych'a in field. They cut inflorescences of Gendarme and Runa Toralapa, fertilized the stigma using pollen from Waych'a, and put them in plastic bottles filled with water. They labeled the crosses using cardboard labels. A month later, farmers collected the fruits and extracted the botanical seed. Seed was dried and left for a month to break dormancy. This was planted in rustic wooden nursery boxes in farmers' houses. At the time of writing, seeds had germinated and will be planted out shortly. Conventional breeding complemented by PVS will continue. However, if experience shows that PPB is advantageous, at least under some circumstances, then it will be promoted more widely.

Gandarillas, E. (1996). [Participatory research: Alternatives for controlling the potato tuber moth (Phthorimaea operculella) in store.] Investigación participativa: Alternativas de control de la polilla de la papa (Phthorimaea operculella) en almacén. Cuarta reunión nacional de papa: Compendio de exposiciones. Cochabamba (Bolivia). 8-11 Oct 1996. Cochabamba, Bolivia, IBTA - PROINPA**:** 25-26.

El Comité de Investigación Agrícola Local (CIAL) de la comunidad de Tukma Baja (Provincia Mizque) priorizó, mediante un diagnóstico, el problema de la polilla de la papa durante el almacenamiento. Los agricutores del CIAL y los técnicos propusieron a las hojas secas de Eucalipto (T1) y Muña (T2), folidol (T3) y Baculovirus (T4) como tratamientos para el control de la plaga y los compararon con tubérculos sin aplicación (T5). En tres almacenes, los agricultores ejecutaron evaluaciones absolutas de los ensayos, asignando puntaje a cada uno de los tratamientos. Baculovirus (259), folidol (178), Eucalipto (150), Muña (146) y Testigo (10), fue el orden de preferencia de los agricultores. En los mismos ensayos se evaluó la infestación inicial, final e intensidad de daño de los tubérculos almacenados. Luego del análisis estadístico se arribó a resultados similares al de los agricultores.

Gandarillas, E., W. García. and R. Oros (1998). [Participatory evaluation of clones with resistance to Nacobbus aberrans by groups of farmer evaluators]. Evaluación participativa de clones con resistencia a Nacobbus aberrans por grupos de agricultores evaluadores. XVIII Reunión de la ALAP: Compendio de exposiciones. Cochabamba (Bolivia). 9-13 Feb 1998. Cochabamba (Bolivia), Ministerio de Agricultura. Proyecto Nacional de Semilla de Papa (PROSEMPA)**:** 267-268.

Se usaron técnicas de evaluación absoluta y orden de preferencias para determinar la aceptabilidad de los agricultores a cinco clones con resistencia a N. aberrans. Se evaluaron los criterios de resistencia al nematodo, morfología del tubérculo y calidad culinaria. La variedad Gendarme y los clones Jaspe y Proinpena obtuvieron los mayores porcentajes de aceptabilidad para resistencia (68; 72 y 71 %, respectivamente). No existieron diferencias en cuanto al criterio morfología del tubérculo. En calidad culinaria, la variedad Gendarme (66%) y el clon Proinpena (61%) fueron elegidos como los materiales resistentes más cercanos al porcentaje de aceptabilidad de la variedad local susceptible Waych'a (93%).

Gendarme y los clones Jaspe y Proinpena podrían ser adoptados por los agricultores.

Ganga, Z. N. and M. C. Posa (1996). Does farmer participation make a difference? Selection of sweetpotatoes in the northern Philippine highlands. Into action research: partnerships in Asian rootcrop research & development. Los Baños, UPWARD**:** 27-39.

Farmer input in varietal evaluation and selection was sought in the national sweetpotato crop improvement program. Clones and advanced lines were evaluated on-farm using farmers' criteria and preferences. Farmers were directly involved in monitoring progress of field trial, and in the quantitative and qualitative evaluation of root yield. Through the experience, farmers gained a better understanding of the varietal development process in the formal sector. Conversely, researchers discovered how farmers' inputs can guide varietal evaluation and selection.

Garcia, P. and I. Adion (1996). Potential role of sweetpotato in cattle fattening enterprises in post-Pinatubo Luzon, Philippines. Into action research: partnerships in Asian rootcrop research & development. Los Baños, UPWARD**:** 141-155.

To assess the potential of sweetpotato as supplementary cattle feed, a participatory feeding trial was designed comparing farmers' practice and the introduced sweetpotato-based feed formulation. Farmer cooperators monitored cattle weight gain and analyzed results with researchers at the end of the six-month trial. A market study to determine acceptability and preference of the recommended feed formulation by cattle growers was undertaken.

Ghimire, S. R., B. K. Dhital, A. Vaidya, T. B. Gurung and P. M. Pradhanang (1997). Community management of potato disease in Nepal: from micro experience to macro policy. Local R & D: institutionalizing innovations in rootcrop agriculture. Los Baños, UPWARD**:** 138-152.

Bacterial wilt (Pseudomonas solanacearum) is a destructive disease of potato in the hills of Nepal. In 1990, an integrated management program comprising seed multiplication in disease-free areas, roguing of self-sown seed potato, adoption of a three-year rotation with nonhost crops, creation of awareness among farmers of the safe disposal of infected potato, and crop hygiene through a community approach was tested by the Lumle Agricultural Research Centre (LARC) in two severely infected villages: Sabet and Ghandruk of Kaski district. The program was extended to include Ulleri and Jhilibarang villages of Kaski and Parbat districts, respectively, in 1993 with the financial support of Users' Perspectives with Agricultural Research and Development, Philippines. LARC's experience in the four villages of the western hills shows that the required level of participation was difficult to achieve mainly because of inadequate empowerment and recognition of farmer committees. Participation in the program was highly influenced by cultural, social, political, and economic factors and their interactions. Lack of awareness of the disease and the ongoing exchange of potato between villages constituted a major threat to the disease management effort. It is recommended that awareness of the disease as an intervention to the traditional system be initiated to discourage the spread and reintroduction of the disease and to implement the program in all socioculturally linked villages. Institutionalization of the program for sustainable management of bacterial wilt in Nepal will require policy support for potato research and development, seed certification, and internal and external quarantine.

Gichuki, S. T., V. Hagenimana, J. Low, M. A. Oyunga, E. Carey and J. Kabira (1997).

Evaluation of orange-fleshed sweet potato varieties by women's groups to improve vitamin A nutrition in western Kenya. Proceedings of the 4th triennial congress of the African Potato Association, held at Pretoria, South Africa, 23 - 28 February 1997. South Africa, ARC-Roodeplaat**:** 228-233.

Vitamin A deficiency is a serious nutritional concern for children and pregnant women in Africa. Promising orange-fleshed sweetpotato varieties were identified from variety trials jointly conducted by the Kenyan national agricultural program and CIP. Women villagers were the major participants in these trials.

Gunadi, N., M. Potts, R. Sinung-Basuki and G. Watson (1992). On-farm development of potato production from true seed in West Java. Experimental Agriculture **28**: 31-39.

Hagenimana, V. and C. Owori (1997). Feasibility, acceptability and production costs of sweetpotato-based products in Uganda. Program Report 1995-1996. Lima, CIP**:** 276-281.

Consumers evaluated bread, chapatis, and mandazis containing sweetpotato and similar products without. They preferred sweetpotato products for taste, texture, freshness, appearance, sweetness, and color and were willing to pay the same price as for similar products they had been buying.

Hagenimana, V., M. A. Oyunga, J. Low, S. M. Njoroge, S. T. Gichuki and J. Kabira (1999). The effects of women farmers' adoption of orange-fleshed sweetpotatoes: raising vitamin A intake in Kenya. Washington, DC, International Center for Research on Women.

An action research project was implemented by the Kenya Agricultural Research Institute (KARI), in collaboration with CIP and CARE International, where orange-fleshed sweetpotato varieties, both high yielding and rich in beta-carotene, were introduced to women farmers. Results demonstrated that orange-fleshed sweetpotato, both eaten alone and used as ingredients in processed foods, were highly acceptable to both producers and consumers in the target communities. Using standard methods of analysis, it was demonstrated that increased consumption did in fact contribute to alleviation of vitamin A deficiency in case-study households.

Haugerud, A. (1988). Anthropology and interdisciplinary agricultural research in Rwanda. Anthropology of development and change in East Africa. D. Brokenshaw and P. Little. Boulder and London, Westview Press**:** 137-160.

Interdisciplinary farm surveys were used to orient potato germplasm screening criteria. Farmer preference for mixed cultivars indicated that research should test comparative performance under late blight using different cultivar mixes. Diversity of skin color in new cultivars is a safer strategy than specialization, and the screening program should emphasize cultivars with short dormancy periods given the possibility of double cropping. Given the informal rural seed-distribution networks, impact of new cultivars could be increased by direct sale in small quantities to farmers or private traders.

Horton, D. (1984). Social scientists in agricultural research: lessons from the Mantaro Valley Project, Peru. Ottawa, IDRC.

From 1977 to 1980, two teams of social and biological scientists conducted farm-level research in the Mantaro Valley of Highland Peru. For both teams the farmers' own technology served as the control. The production constraints team tested different

packages of improved seed, fertilizer, and pest control. Improved seed was the weak component of the package, its use having reduced net earnings. Farmers selectively adopted components of the packages. The postharvest team, which experimented with fewer variables, strongly emphasized frequent interaction with farmer collaborators and conducted fewer experiments. Farmers did not copy the model store but applied the principle of diffused light storage usually by modifying existing stores. Researchers in the project learned much from farmers' creative adaptations. It is concluded that agricultural research involving active farmer participation is more likely to be successful than the "technology transfer" approach.

Horton, D. (1986). Farming systems research: twelve lessons from the Mantaro Valley Project. Agricultural Administration **23**: 93-107.

From 1977 to 1980, the International Potato Center (CIP), in collaboration with Peru´s Ministry of Agriculture and the International Maize and Wheat Improvement Center (CIMMYT), conducted a series of farm-level surveys and experiments in the Mantaro Valley of Highland Peru. The lessons of the Mantaro Valley Project can be summarized in 12 points:

1. Ecological conditions and farm type strongly influenced farmers' productions methods and technological requirements.
2. Small farmers were eager to improve their methods.
3. The recommended "technological packages" had many deficiencies.
4. Technical knowledge was available to solve some farmers' problems.
5. Most technologies could not be directly "transferred" to farmers, but needed to be tailored to their specific needs.
6. Scientific specialization presented several barriers to interdisciplinary research.
7. The project was costly, in terms of operating capital.
8. The project's most valuable result was an institutional innovation, not an impact on potato production.
9. Informal surveys and simple on-farm trials had many advantages over more "respectable", formal methods.
10. Anthropologists played many useful roles.
11. Many results of the on-farm research could be extrapolated.
12. On-farm research was useful for identifying and solving production problems within existing systems, but not for designing entirely new systems.

Entre 1977 y 1980, el Centro Internacional de la Papa (CIP), en colaboración con el Ministerio de Agricultura del Perú y el Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT), dirigieron una serie de experimentos y ensayos agrícolas en el Valle de Mantaro, en la sierra central del Perú. Las enseñanzas del Proyecto del Valle de Mantaro se pueden resumir en 12 puntos:

1. Las condiciones ecológicas y el tipo de agricultura influyen fuertemente en los métodos de producción y en los requerimientos tecnológicos de los agricultores.
2. Los pequeños agricultores estuvieron ansiosos de mejorar sus métodos.
3. Los "paquetes tecnológicos" recomendados han tenido muchas deficiencias.
4. El conocimiento técnico fue capaz de resolver algunos problemas de los agricultores.
5. La mayoría de tecnologías no pueden ser "transferidas" directamente a los agricultores, porque tienen que ser ajustadas a sus necesidades específicas.
6. La especialización científica presentó algunas barreras a la investigación interdisciplinaria.
7. El proyecto fue costoso, en términos de capital operativo.
8. El resultado del proyecto más valorado fue una innovación institucional, y no un impacto sobre la producción de papa.
9. Los estudios simples e informales sobre ensayos en la agricultura obtuvieron mas

ventajas que los métodos formales más "respetables".

10. Los antropólogos jugaron diversos roles útiles.
11. Muchos resultados de la investigación agrícola pueden ser extrapolados.
12. La investigación agrícola fue necesaria para identificar y resolver problemas de producción dentro de los sistemas existentes, pero no para planificar nuevos sistemas totalmente.

Horton, D. and G. Prain (1987). [CIP's experiences on farmer participation in on-farm research]. Experiencias del CIP sobre la participación del agricultor en la investigación en fincas. La investigación del frijol en campos de agricultores en América Latina. Cali (Colombia). 16-25 Feb. 1987. CIAT. Memorias de un taller. Cali (Colombia), CIAT**:** 239-250.

Horton, D. and G. Prain (1988). The International Potato Center's experiences with farmer participation in on-farm research. Culture & Agriculture **34**: 1-4.

Takes specific experiences to show how farmer participation contributed to on-farm research in CIP in five areas: 1) it has improved understanding of farmers' conditions, and has shown how farmers could contribute to the design and management of on-farm trials; 2) it has improved agronomic and socioeconomic analysis; 3) it has enabled farmers to assess results themselves and so provide feedback on desirable characteristics to incorporate in new technology; 4) it has facilitated the diffusion of information and technology; 5) it has improved linkages between formal and informal research and development systems. Disadvantages of farmer participation are the variability it introduces, which hampers the pooling of information and the use of statistics, and the additional time and resources required.

Horton, D. and G. Prain (1989). Beyond FSR: new challenges for social sciences in agricultural R & D. Quarterly Journal of International Agriculture **28**(3/4).

The first generally accepted role of social scientists in international agricultural research centers, including CIP, was to develop methodologies that would help the centers and national programs transfer improved technology to small farmers. In the late 1970s, a successful interdisciplinary project on seed storage at CIP demonstrated that social scientists could also contribute to the generation of appropriate technology to meet local needs. Since then, researchers at CIP headquarters, in regional programs, and in national agricultural research systems (NARS) have used a range of FSR methods within a farmer-centered, problem-solving approach known as Farmer-Back-to-Farmer. In 1986, when CIP's mandate was broadened to include sweetpotato, this presented social scientists with an historic opportunity and challenge: to systematically assess users' needs for the different kinds of information and technology that CIP could provide, and to help establish an appropriate balance among research thrusts. The required analysis goes beyond FSR; it must be conducted within a broader food systems perspective that includes not only farmers but market agents, consumers, and NARS. Social science work at CIP is now focused on introducing "users" perspectives into center decision making.

El primer rol de los científicos sociales, generalmente aceptado en los centros internacionales de investigación agrícola, incluyendo al CIP, fue desarrollar metodologías que pudieran ayudar a los centros y programas nacionales a transferir tecnología mejorada a los pequeños agricultores. A finales de 1970, un proyecto interdisciplinario exitoso sobre almacenamiento de semilla en el CIP, demostró que los científicos sociales también pueden contribuir a generar tecnología apropiada para satisfacer las necesidades locales. Desde entonces, investigadores de la sede principal, de

programas regionales y de los sistemas nacionales de investigación agrícola (NARS) han usado un rango de métodos FSR dentro de un centro agrícola, dando solución al problema conocido como El agricultor-retorna-al-agricultor. En 1986, cuando el mandato del CIP fue ampliado para incluir al camote, se produjo una oportunidad histórica y un desafío para los científicos sociales: valorar sistemáticamente las necesidades de los usuarios para los diferentes tipos de información y tecnología que el CIP pudiera proporcionar, y ayudar a establecer un balance apropiado entre los avances de investigación. El análisis requerido, que va mas allá del FSR, debe ser conducido dentro de una perspectiva más amplia del sistema de alimentación, que incluya no sólo a los agricultores, sino a los agentes del mercado, consumidores y NARS. El trabajo de Ciencia Social en el CIP está ahora focalizado en introducir las perspectivas de los usuarios dentro del proceso de toma de decisiones del centro.

Indrasari, S. D., B. A. Susila Santosa, Suismono, P. Wibowo Narta, C. Wheatley and Irfansyah (1998). Sweetpotato utilization and the agro-snack food industry in West Java, Indonesia. Los Baños, CIP-UPWARD.

A participatory approach was used to identify opportunities for improving "kremes" and other sweetpotato flour-based snack food products. Focus group discussions with consumers were conducted to identify local food preferences and criteria. The product development/improvement process was mainly user-driven - snack food producers obtained samples of sweetpotato flour and experimented with different formulations of bakery products. Subsequently, sensory evaluation was done among consumer groups, the results of which guided researchers and the snack food producers in further improving the food products.

Khatana, V. S., A. S. Chilver, S. G. Ilnagantileke and M. D. Upadhya (1997). "Use of TPS technology for potato production in India: prioritization of research and diffusion agenda." International Journal of Tropical Agriculture **16**(1-4): 1-11.

Khatana, V. S., S. G. Ilangantileke and M. D. Upadhya (1996). Socio-scientific evaluation of the post harvest quality of the potatoes produced using TPS technology. Production and utilization of true potato seed in Asia. M. D. Upadhya, B. Hardy, P. C. Gaur and S. G. Ilangantileke**:** 191-198.

Farmers evaluated quality traits of potato produced from TPS. Farmers in most states have nothing to say about tuber shape; farmers in Gujararat do not like the shape. Farmers in all states except Bihar like the skin color. Potatoes grown with TPS were found to have a better taste except where farmers were growing Kufri Chandramukhi.

Khatana, V. S. and M. D. Upadhya (1995). "Cool comfort: indigenous methods to store potatoes." Down to Earth **3**(20): 43-44.

Lama, T., M. P. Chaturvedi, R. L. Mandal, S. P. Dhakal and M. S. Kadian (1998). On-farm true potato seed (TPS) technology in Nepal. Journal of the Indian Potato Association **25**(3-4): 131-133.

Initial research on TPS was not sufficient to bring the technology into commercial production. The technology verification study was carried out under the participatory research approach accommodating farmers' option and decision in conducting the various activities. Trials were laid out in 5-7 clusters by Agricultural Service Center to make follow-up visits convenient. Hybrid TPS were sown in nursery beds following recommended dosages of fertilizers, seedling densities, and agronomic practices. Field visits by farmers were organized at critical stages of crop growth. In one site, farmers preferred

transplanting of seedlings in the main field to producing seedling tubers.

Lan, D. T. (1998). Sweetpotato-canna starch and noodle processing in Vietnam: applying the UPWARD approach. Sustainable Livelihood for Rural Households: Contributions from Rootcrop Agriculture. Los Baños, UPWARD**:** 137-148.

Participatory trials with noodle processors showed that sweetpotato can subtitute for 30-50% of canna starch at reduced production costs. The technology was piloted at village level through an enterprise managed by a group of local households. Local experts on starch and noodle production served as trainors and advisers for the enterprise. Cross-visits and workshops facilitated exchange of knowledge and experiences among growers, processors, traders, and consumers from different communities.

Lemaga, B., J. J. Hakiza, F. O. A. Alacho and R. Kakuhenzire (1997). Integrated control of potato bacterial wilt in southwestern Uganda. Proceedings of the 4th triennial conference of the African Potato Association. Pretoria, South Africa, 23-28 February 1997**:** 188-195.

An on-farm experiment on the integrated control of potato bacterial wilt was conducted in close collaboration with farmers and the extension department of the Ministry of Agriculture in southwestern Uganda. Farmers participated in the identification of treatments, planting, data record, and harvest. They also provided potato seed used in their method and labor throughout the experiment. Partners met occasionally to evaluate the treatments and the acceptability to farmers of the different components of IDM. Farmers have adopted most of the components.

Matos, A., M. Gastelo., N. Alvarado and J. Landeo (1994). [Selection of clones with resistance or tolerance to potato cyst nematode with farmer participation]. Selección de clones con resistencia o tolerancia al nematodo quiste de la papa en campos naturalmente infestados, con participación de agricultores. Tercer congreso peruano de nematología: Programa y compendios. Arequipa (Perú). 28 Ago - 1 Set 1994. Arequipa (Perú), Asociación Peruana de Nematología (APN); Universidad Nacional de la Amazonía Peruana (UNAP)**:** 35.

Este experimento se inició en la campaña 92-93, con la evaluación de 106 clones en la localidad de Jauja-Junín, en un campo con infestación natural del nematodo Globodera pallida. Durante la cosecha se seleccionaron 59 clones por su buen rendimiento, con participación de los agricultores. 25 clones fueron resistentes y 34, tolerantes. En la campaña 93-94 estos clones se sembraron nuevamente para una segunda evaluación, seleccionándose 19 clones por resistencia, con un rendimiento superior a la variedad testigo María Huanca; 12 clones fueron seleccionados por tolerancia. Estos clones serán probados en ensayos en red para comprobar su adaptación y su futuro como variedades potencialmente resistentes a Globodera pallida. En esta misma campaña se realizó la primera evaluación en campo de 85 genotipos, con un ciclo más de recombinación para resistencia, seleccionándose 62 clones para este carácter, lo que demuestra que, comparando con la población anterior, se ha incrementado el porcentaje de resistencia.

Mendoza, A., M. Gastelo, D. Flores and P. Blas (1993). [Behaviour of four promising potato clones in the department of Huánuco-Perú for late blight resistance in farmers' fields]. Comportamiento de cuatro clones promisorios de papa en el departamento de Huánuco-Perú para resistencia al tizón tardío en campo de agricultores. Compendios: XVI Reunión de la ALAP. Santo Domingo (Dominican Republic).

22-26 Mar 1993. Santo Domingo (Dominican Republic)**:** 39.

En esta región se cuenta con dos zonas de trabajo y dos ciclos de evaluación al año. Mayobamba, a 2700 msnm, para el tamizado de resistencia genética a rancha por la presencia de 13 a 15 razas del patógeno, y Chaglla, para evaluar el comportamiento y rendimiento comercial, donde también existen de 7 a 9 razas del patógeno. Ambas son zonas endémicas de tizón tardío. Predomina la var. Yungay, que necesita un control químico de 7 a 10 aplicaciones con fungicidas, que eleva los costos de producción y contamina el ambiente. Desde 1983, el Programa de papa del INIAA, a través de la EEA Canchán - y ahora de Tulumayo-, está evaluando clones de estas zonas. A la fecha, cuenta con cuatro clones promisorios con resistencia de campo al tizón tardío, con 10-15% de infección al follaje, buenos atributos agronómicos, amplio rango de adaptación, precocidad intermedia y buenos rendimientos. Estos clones son: 85LB70.5, P-7, 380076.1 y 85LB51.13, los cuales presentan ventajas comparativas frente a las variedades tradicionales. Sobresale en estos trabajos la participación de los agricultores en la selección de genotipos promisorios, bajo el asesoramiento directo del investigador.

Mendoza, A., J. Landeo, M. Gastelo and A. Morales (1995). ['Chagllina-INIA' (380496.6) promising potato variety with field resistance to late blight, for Peru. Selected with farmer participation]. 'Chagllina-INIA' (380496.6) variedad promisoria de papa con resistencia de campo al tizón tardío, para el Perú. Seleccionada con participación de agricultores. Memorias: XVII Reunión de la Asociación Latinoamericana de Papa (ALAP). Mérida (Venezuela). 9-15 Jul 1995. Mérida (Venezuela), Fondo Nacional de Investigaciones Agropecuarias (FONAIAP)**:** 52-53.

La participación de los agricultores en la generación de tecnologías es importante, porque incorpora criterios que combinados con los de los investigadores están permitiendo darle mayor solidez al desarrollo del programa de papa orientado a la selección de nuevas variedades. Este nuevo enfoque de investigación, desarrollado por el programa de papa del INIA, conjuntamente con el Centro Internacional de la Papa y los agricultores de Mayobamba y Chaglla en Huánuco, desde hace 10 años, está posibilitando obtener una nueva variedad de papa (clon 380469.6), proveniente del CIP, con el nombre de "Chagllina-INIA". Proviene del cruce de INDIA 1058 X Bulk XY, cuya resistencia en campo al tizón tardío viene siendo ratificada desde hace 10 años en zonas endémicas de la enfermedad (se obtienen cosechas con 1 a 3 aplicaciones). En ensayos realizados a nivel de red nacional en Huánuco, Cajamarca, Chota, Huasahuasi, Comas y Huaraz, esta nueva variedad presenta un buen vigor de planta, tallos vigorosos, hojas de color verde claro, mediana floración de color morado con tintes blancos, escasa fructificación, desarrollo radicular bueno con estolones cortos. Los tubérculos son de color blanco con jaspes morados alrededor de los ojos, pulpa de color blanco, forma redonda achatada de tamaño mediano a grande y ojos superficiales. Tiene buena aptitud para fritura, con un período vegetativo de 120 a 140 días, desde la siembra. Posee una mayor velocidad de crecimiento, desde los 40 hasta los 70 dias, por lo que los agricultores indican que es una variedad que "jala rápido", lo cual le confiere resistencia al tizón, al mostrar rápidamente un buen vigor de planta. También mencionan que es una "variedad del pobre", porque requiere la mitad de dosis de fertilizantes que normalmente usan otras variedades. La dosis normal, 180-180-160, en esta variedad disminuye entre 20 y 50%, de acuerdo a la fertilidad de los suelos. Además de estos atributos, posee rendimientos de 30 a 40 tn/ha a nivel del agricultor y por su precocidad se pueden hacer dos campañas por año. Tiene un amplio rango de adaptación, desde el nivel del mar hasta los 3.700 metros de altitud. En ensayos realizados en Huasahuasi y otros lugares ha mostrado tolerancia al ataque de Epitrix y a la sequía. Se le denomina "Chagllina-INIA" en honor a la mayor zona

productora de papa en Huánuco, denominada Chaglla.

Monares, A. and P. Malagamba (1988). Design of a client-oriented technology: the case of true potato seed. The Social Sciences at CIP: report of the Third Social Science Planning Conference. Lima, CIP**:** 173-181.

Research focused on (1) identifying the key elements of TPS technology that influence the economic performance and acceptability at the farm level and (2) identifying agroeconomic conditions under which different methods of using TPS would have greatest potential for farmer adoption. Field research was conducted mainly in Peru using a combination of farm surveys, on-farm trials, and field observations. In traditional potato zones, farmers were less interested and less successful when using TPS due to limited experience with vegetable growing practices used for proper management. Farmers suggested some managerial improvements. Biological scientists initially proposed direct seeding in equidistant rows in seed beds but farmers preferred broadcasting, a method they used for growing seedlings for transplanting with vegetables. TPS required more chemical input use than normal seed at lower altitudes, which might limit its adoption. Successful progenies must be able to tolerate sub-optimal cultural practices; be resistant to local diseases; have high seedling vigor; have vegetative cycles that fit the complex cropping patterns of warmer areas; and meet consumer preferences for tuber size, color, and taste. As a complex composite technology, TPS is likely to require a specialized transfer system.

Mujica, N. and F. Cisneros (1998). Developing IPM components for leaf miner fly in the Cañete Valley of Peru. International Potato Center. Program Report 1995-1996. Lima, CIP**:** 177-184.

Nazarea, V. (1998). Cultural memory and biodiversity. Tuczon, University of Arizona Press.

A "memory banking" protocol was developed to guide the collection and conservation of cultural information to complement the genetic, agronomic, and biochemical characterization of important crops. Partly drawn from experiences with an UPWARD project in southern Philippines, it provides guidelines for supporting community-based in situ conservation of local varieties. Among the specific methods suggested are sorting/ranking exercises, triad test, diagramming, life history elicitation, participant observation, PRA, and specimen collection and preservation.

Oanh, N. T. K., N. T. Son, T. D. Hoa and E. van de Fliert (1999). Integrated needs assessment of rootcrops production-utilization systems in Vietnam. Enhancing sustainable livelihood with root crops; potentials of local R&D. Los Baños, UPWARD.

As a collaborative effort of seven Vietnamese institutions, CIP, and UPWARD, a participatory needs assessment on rootcrop production-utilization systems was conducted in major rootcrop production provinces of Vietnam in the winter-spring season of 1998/99. Needs assessment methodology is described in four phases: (1) study design and preparation, (2) training of study teams and pretesting of data collection methods, (3) data collection, and (4) data analysis and follow-up planning. Collaborative research and development programs on rootcrop production and utilization were planned based on the results. Since farmers were intensively involved in the data collection process, the study was expected to reveal potential options for improved rootcrop production-utilization systems, and facilitate active farmer involvement in technology and training development activities later.

Ortiz, O. (1993). [Systems approach and participatory methodology to develop written agricultural communication media. The potato case in subsistence agriculture]. Enfoque de sistemas y metodología participativa para desarrollar medios escritos de comunicación agrícola. El caso de la papa en la agricultura de subsistencia. Producción y Extensión Agrícola. Lima, Universidad Nacional Agraria La Molina**:** 161.

This document describes the experience of participative research developed in four communities in Cajamarca, Peru. The main objective was to include farmer participation in the qualitative diagnosis of the production system and in the preparation of written communication media for mass distribution. In these communities, the production system is a subsistence one, the potato being an important crop. Farmers and technicians identified and prioritized potato crop problems; with this information, alternative practices were sought in a local research center. Farmers' and technicians' priorities in crop or agroecosystem aspects were similar, but there was a lack of coincidence in socioeconomic problems. By analyzing the existing technology, it was found that few alternatives could be directly applied to the subsistence production systems in these communities. It was also discovered that farmers have two sources of information about the potato crop: a) internal sources (family and community), which provided 77% of the information received by families and b) external sources (fieldworkers, market, mass communication media), which provided only 33% of information. Agricultural information was exchanged among families and communities within the cropping season, mainly during activities that concentrated the highest number of people, such as potato earthing-up and harvesting, and in local religious celebrations that usually coincide with agricultural activities. Traditional potato technology was described by farmers using their own drawings and words. This demonstrated that they prefer realistic drawings instead of cartoons. A glossary of agricultural words frequently used in these communities was compiled. Finally, written mass communication media was created with farmer participation, which demonstrated their interest in producing and reading written media that refer directly to their problems and realities, particularly if the media design includes common expressions and drawings with which they are familiar.

Esta experiencia de investigación participativa fue desarrollada en cuatro comunidades de Cajamarca, Perú. El objetivo fue incorporar al agricultor en el diagnóstico cualitativo de su sistema de producción y en la elaboración de un medio escrito participativo. En estas comunidades, el sistema de producción es de subsistema, con la papa como un cultivo importante. Los agricultores y técnicos agrícolas identificaron y priorizaron los problemas de este cultivo, luego se buscaron alternativas de solución en un centro de investigación local. Se compararon las priorizaciones de agricultores y técnicos, encontrándose coincidencias en problemas del cultivo, o agrosistema, no así en lo referente al subsistema socioeconómico. Al analizar la oferta tecnológica existente se encontró que existen pocas alternativas que puedan aplicarse directamente a los sistemas de producción de subsistencia existentes en las comunidades visitadas. También se encontró que los agricultores tienen dos fuentes de información sobre el cultivo de papa: a) las fuentes internas (familia, comunidad), que aportan el 77% de información recibida sobre este tubérculo y, b) las fuentes externas (extensionista, mercado y medios de comunicación), que aportan sólo el 33% de información. Los agricultores comparten información agrícola principalmente en las labores de cultivo que utilizan mano de obra en mayor proporción, como aporque y cosecha, y durante las fiestas comunales, que generalmente son religiosas y coinciden con alguna actividad agrícola. Asimismo, se logró una descripción de la tecnología tradicional del cultivo representada en gráficos (dibujos) y textos realizados por los agricultores, en los cuales se aprecia que prefieren los dibujos sencillos y realistas y

rechazan las caricaturas. Además, se obtuvo un glosario de términos agrícolas referidos a la papa, usados en las zonas visitadas. Por último, se presenta el bosquejo final de un folleto como fruto de la investigación participativa con los agricultores, el cual fue revisado previamente por ellos y cuya elaboración permitió observar el gran interés de los agricultores en los medios escritos, siempre y cuando traten de su realidad y empleen las palabras y los gráficos que ellos conocen.

Ortiz, O. (1999). Understanding interactions between indigenous knowledge and scientific information. Indigenous Knowledge and Development Monitor **7**(3): 7-10.

The paper presents a group of interactions between scientific information related to IPM and indigenous knowledge, and proposes a model to help understand the complex cognitive process by which farmers interpret information about pest control. The effects of correct or incorrect interpretation of information on the implementation of IPM practices are also presented.

Ortiz, O., J. Alcázar, W. Catalán, W. Villano, V. Cerna, H. Fano and T. Walker (1996). Economic impact of IPM practices on the Andean potato weevil in Peru. Case studies of the economic impact of CIP-related technology. T. Walker and C. Crissman. Lima, CIP**:** 95-110.

Farmers participated in the pilot sites by evaluating IPM practices and by providing information about adoption and adaptation of control practices. This helped define an appropriate strategy for integrated control of the Andean potato weevil. The benefits of IPM practices were also defined and estimated with farmers' participation.

Ortiz, O., J. Alcazar, W. Catalán and T. Walker (1993). [Socioeconomic evaluation of the first year of using integrated control of andean potato weevil (Premnotrypes latithorax) in Huatata, Cusco, Peru]. Evaluación socioeconómica del primer año de aplicación del control integrado del gorgojo de los Andes (Premnotrypes latithorax) en Huatata, Cusco, Perú. Compendios: XVI Reunión de la ALAP. Santo Domingo (Dominican Republic). 22-26 Mar 1993. Santo Domingo (Dominican Republic)**:** 13-14.

La participación de los agricultores en la evaluación de las tecnologías es muy necesaria, ya que son ellos los que finalmente decidirán adaptarlas o adoptarlas a sus sistemas de producción. En la comunidad de Huatata, durante la campaña 1990-91, el 31% de la cosecha de papa estaba dañada por el gorgojo, lo cual redujo significativamente el valor comercial. La reducción del valor estuvo en función al grado de daño por gorgojo. Así, el daño de grado 4 redujo el 67% del valor, el grado de daño 3, el 50% del valor y los grados de daño 1 y 2, el 17% del valor. Se calculó que los agricultores perdían alrededor de US$276/ha debido al ataque del gorgojo, a pesar de que el 95% de ellos aplicaban algún tipo de insecticida para controlarlo. Durante la campaña agrícola 1991-92 se recomendaron diversas medidas de control integrado, de las cuales los agricultores seleccionaron las que más se adaptaban a sus sistemas de manejo. Como resultado, sólo el 15% de los tubérculos fue afectado y las pérdidas bajaron a US$ 134/ha. La principal fuente de beneficio fue la mejora en la calidad del producto cosechado. Aún no se observan beneficios significativos en la reducción de los costos del uso de pesticidas. Gran parte del éxito se debe a que los agricultores han mejorado su conocimiento acerca del ciclo biológico de la plaga, entendiendo mejor la razón de las prácticas de control que se recomiendan.

Ortiz, O., J. Alcazar and M. Palacios (1997). [Teaching integrated pest management for the potato crop: CIP's experience in the Andean region of Peru]. La enseñanza del manejo integrado de plagas en el cultivo de papa: La

experiencia del CIP en la zona andina del Perú. Revista Latinoamericana de la Papa **9/10**(1): 1-22.

Integrated pest management (IPM) is considered a promising alternative to solve problems caused by insects to crops. However, this technology has not been widely adopted because of diverse technical, socioeconomic, and political factors. One of these factors is related to the use of training approaches that do not respond to local needs. This paper presents CIP's experience with IPM training in the Andean region of Peru for andean potato weevil and potato tuber moth, and argues that this technology must be taught through a sequential training process. Extension workers and researchers who participated in this project acted as facilitators in the learning process. It began by identifying areas where farmers lacked knowledge in pest control. Training focused on topics unknown to farmers and on reinforcing aspects already known to them. Teaching insect biological cycles and behavior - the first step in the training process - enabled farmers to understand the technical principles of IPM practices. Diverse conventional and non-conventional training techniques e.g. the use of nature as the main training aid, and learning by doing were used during the process. IPM practices to be effective require not only the integration of control methods, but also their integration with general farm management practices, the integration of farmers' and scientists' knowledge, the integration of farming communities with research and extension organizations and the implementation of policies to facilitate communication between the different levels.

El manejo integrado de plagas (MIP) es considerado como una solución promisoria para los problemas causados por los insectos a los cultivos. Sin embargo, esta tecnología no ha sido adoptada ampliamente debido a diversos factores técnicos, socioeconómicos y políticos. Uno de estos factores se refiere al uso de enfoques de capacitación inapropiados. Este artículo presenta la experiencia del CIP sobre la enseñanza del MIP con gorgojo y polilla de la papa en la zona andina del Perú, a través de un proceso secuencial y paulatino. Tanto los extensionistas como los investigadores que participaron en este proyecto actuaron como facilitadores del aprendizaje. El proceso se inició con la identificación de los vacíos de conocimiento que tenían los agricultores. La capacitación se priorizó de acuerdo a esos vacíos, reforzándose los conocimientos sobre sus prácticas habituales de manejo. Se utilizaron diversas técnicas de capacitación convencionales y no convencionales, para facilitar el proceso de aprendizaje. Las experiencias demostraron que para que el MIP funcione, no sólo se requiere de la integración de métodos de control, sino también de la integración con el manejo de finca, el conocimiento campesino y el conocimiento técnico de la comunidad con organizaciones de investigación y extensión, y de políticas que apoyen su difusión.

Ortiz, O. and A. Valdez (1993). [Systems approach and participative research for the development of written communication media. The case of the potato crop in subsistence agriculture]. Enfoque de sistemas y metodología participativa para desarrollar medios escritos de comunicación agrícola. El caso de la papa en la agricultura de subsistencia. Revista Latinoamericana de la Papa **5/6**(1): 103-121.

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priorities in crop or agroecosystem aspects were similar, but there was a lack of coincidence in socioeconomic problems. By analyzing the existing technology, it was found that few alternatives could be directly applied to subsistence production systems in these communities. It was also discovered that farmers have two sources of information about the potato crop: a) internal sources (family and community), which provided 77% of the information received by families and b) external sources (extension agents, market, mass communication media), which provided only 33% of information. Agricultural information was exchanged among families and communities within the cropping season, mainly during activities that concentrated the highest number of people, such as potato earthing-up and harvesting, and in local religious celebrations that usually coincide with agricultural activities. Traditional potato technology was described by farmers using their own drawings and words. This demonstrated that they prefer realistic drawings instead of cartoons. A glossary of agricultural words frequently used in these communities was compiled. Finally, written mass communication media was created with farmer participation, which demonstrated their interest in producing and reading written media that refer directly to their problems and realities, particularly if the media design includes common expressions and drawings with which they are familiar.

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Ortiz, O., P. Winters and H. Fano (1999). [Farmers' perception of the late blight problem (Phytophthora infestans) and its management: case studies from Cajamarca, Peru]. La percepción de los agricultores sobre el problema del tizón tardío o rancha (Phytophthora infestans) y su manejo: estudio de casos en Cajamarca, Perú. Revista Latinoamericana de la Papa **11**: 97-120.

Farmers participated by providing their perceptions and views about late blight and its control. Their participation enabled the establishment of a baseline in terms of what farmers know and do not know about the disease and its management, and the effects of late blight and its control measures.

Los agricultores proporcionaron sus percepciones y puntos de vista sobre el tizón tardío y su control. Su participación permitió establecer un punto de partida sobre lo que conocen e ignoran acerca de la enfermedad y su manejo y cuáles son los efectos del tizón tardío y de las medidas de control.

Peters, D. and C. Wheatley (1997). Small scale agro-enterprises provide opportunities for income generation: sweetpotato flour in East Java, Indonesia. Quarterly Journal of International Agriculture **36**(4): 331-352.

Farmers and flour end-users participated in a study to examine the feasibility of sweetpotato flour processing to add value to sweetpotato roots. Farmer participation in flour processing trials made it possible to calculate labor requirements and cost, to examine the extraction rates, and to assess the quality from on-farm processing. Farmers informed researchers about *their* view of "profit", which was gross income less raw material costs. This gave researchers a direction to work on that was relevant to farmers' needs and aspiration, which was to select for high dry matter varieties with high extraction rates. In trials using flour produced by farmers, flour end-users made final products for the market to determine the marketability of such products, and the quality and price requirements of the flour.

Peters, D., C. Wheatley and J. Roa (1998). Linking rural enterprise development with sustainable agriculture. Sustainable livelihood for rural households: contributions from rootcrop agriculture. Los Baños, UPWARD**:** 15-35.

A participatory research approach in sweetpotato postharvest and utilization was applied and evaluated through field projects in China, Indonesia, the Philippines, and Vietnam. It involved identification of key "participants" (e.g. processors, traders, consumers), development and improvement of technologies through participatory trials, field evaluation of technologies through pilot enterprises, and consumer testing and market studies.

Peters, D. C. (1998). Improving small scale pig production in northern Vietnam: The case of pig production in Northern Vietnam. World Animal Review **91**(2): 2-12.

Farmers were involved from the beginnning in an on-farm trial with six households to improve pig feed nutrition by balancing the diet and processing some of the feed crops. They identified the problems with pig-raising and formulated pig diets. Their suggestion to ferment the feed was incorporated in the trial.

En la provincia de Thanh Hoa, de Viet Nam septentrional, se realizó un ensayo en alimentación de cerdos, buscando mejorar el sistema actual de administración de batata, estableciéndose una ración diaria equilibrada de piensos, en la que se sustituyó las batatas naturales por otras secas en trocitos, más una cantidad mayor de suplemento proteico. La formulación del pienso y los tratamientos se basaron en los resultados de un estudio de las prácticas utilizadas, a fin de conocer la situación local. El ensayo se realizó en fundos de seis hogares, con la supervisión del servicio de extensión del gobierno vietnamita. Los resultados del ensayo indican que la ración diaria equilibrada y las batatas secas en trocitos mejoraron el crecimiento de los cerdos, con un costo menor por kilogramo de aumento de peso. Por otra parte, la mayor cantidad de suplemento

proteico aumentó considerablemente los costos adicionales, debido a lo cual la rentabilidad fue baja. Estos resultados se están comprobando en un ensayo complementario de validación.

Piniero, M. and G. Prain (1995). Approaches to community-based PGR conservation. Taking root: Proceedings of the third UPWARD review and planning workshop. 2-5 Apr 1994. Manila (Philippines)**:** 146-159.

This paper examines preliminary results from three UPWARD projects in southern Philippines which have been applying and at the same time evaluating community-based action research (CBAR), especially focusing on the integration of biodiversity conservation with household socio-economic development. This paper initially traces the shifting subjects and objects of agricultural R&D from the reductionist focus on the plant and its improvement, through attention to farmers and their economic benefits, to a concern for household food security and currently, a systems oriented attention to supra-household issues, often under the broad notoion of "community" in relation to watershed sustainability and food systems.

The paper outlines the geographical and R&D context of the projects under review including accompishments to date and then goes on to identify a number of lessons which have emerged so far from the evaluations of the community-action approach. Preliminary findings showed that multiple family groups made up of households linked together through close kinship relations were rather stable groups for implementing CBAR. Communal groups linked either formally or informally through women proved to be reliable. Women-based linkages combined with a focus on either communal or household based gardening, appears to be a potentially very effective means for plant biodiversity conservation and to improve the household food security.

Potts, M. (1981). Reflections on on-farm research in the Philippines. Social science research at the International Potato Center: report of the second social science planning conference. Lima, CIP**:** 91-100.

Potts, M., G. Watson, R. Sinung-Basuki and N. Gunandi (1992). Farmer experimentation as a basis for cropping systems research: a case study involving true potato seed. Experimental Agricultural **28**: 19-29.

Farmers were given true potato seed (TPS) to experiment with. They agreed to design and carry out all field operations and to provide information requested. Farmers were actively encouraged to use their own experience and improve any situation. Farmer experimentation resembled closely that of experimental station researchers, with the use of replication in space, often neighboring farmers' plots, and time. TPS was new in the nursery and farmers noted data on emergence and seedling mortality. However in the field, impressions from several plots such as that concerning disease resistance appeared more important and, consequently, yield data was often lost or inaccurately reported. Statistical analysis was difficult as no two farmers adopted identical practices. Farmers wished to introduce factors to improve productivity or manageability of their system. However, they did not wish to change the system itself; they preferred to use TPS only occasionally, perhaps only once in four years, rather than use labor intensive TPS continually. The farmer-led approach is particularly suited to resource-constrained National Institutes, which cannot provide large multidisciplinary teams. Similarities in logic between farm research and traditional scientific research allow rapid common understanding between farmers and researchers, especially when intensive discussion takes place.

Pradhanang, P. M. and J. Elphinstone (1997). Integrated management of bacterial wilt

of potato: lessons from the hills of Nepal. Pokhara, LARC.

Communities were organized and mobilized in managing potato bacterial wilt in the midwestern hills of Nepal. The approach involves identification of problem villages, discussion and agreement to launch the program, formation and empowerment of a program management committee, implementation of a three-year integrated disease management strategy, and monitoring and evaluating program impact. Important lessons were learned on the technical, socio-economic, political, and cultural factors influencing the success of community-managed integrated crop disease management.

Pradhanang, P. M., R. R. Pandey, S. R. Ghimire, B. K. Dhital and A. Subedi (1993). An approach to management of bacterial wilt of potato through crop rotation and farmers' participation. Bacterial wilt. ACIAR Proceedings. no. 45. Kaohsiung (Taiwan). 28-31 Oct 1992. G. L. Hartman and A. C. Hayward. Canberra (Australia), Australian Centre for International Agricultural Research (ACIAR)**:** 362-370.

A community approach was used to manage bacterial wilt of potato (Pseudomonas solanacearum) in infested seed-production pockets of the western hills of Nepal. This included a three-year crop rotation, clean-seed multiplication, and education of farmers on crop-hygiene practices. This paper presents a case study illustrating the success and limitations of integrated management of bacterial wilt in subsistence farming. A cropping-pattern experiment was conducted at two sites at elevations of 1,750 and 2,100 m above sea level. This involved a 1-3 year crop rotation and integrated management. Crops, such as maize, finger millet, barley, cold-tolerant upland rice, and mustard were tested. Integrated management included the applications of nitrogen, and liming and weeding, to control bacterial wilt. Results of short rotations and management in controlling bacterial wilt are discussed.

Prain, G. (1993). Mobilizing local expertise in plant genetic resources research. Cultivating knowledge. W. D. Boef, K. Amanor, K. Wellard and A. Bebbington. London (UK), Intermediate Technology Publications**:** 102-110.

The author identifies three ways in which local R&D expertise can be integrated into genetic resources research: through participation of users as consultants, as evaluators of genetic material, and as research curators of in situ collections. These are illustrated by examples of research conducted by the International Potato Center (CIP) in Latin America and by the Users' Perspectives with Agricultural Research and Development (UPWARD) program in Asia. The paper concludes by considering how, instead of inviting users to join a schedule that is essentially researcher-determined, scientists might participate in locally-driven research.

Prain, G. and D. Campilan (1999). Farmer maintenance of sweetpotato diversity in Asia: dominant cultivars and implications for in situ conservation. Impact on a Changing World. Program Report 1997-98. Lima, CIP**:** 317-327.

Analyzes the dynamics of farmer maintenance of sweetpotato diversity by characterizing and evaluating the diversity present in key sweetpotato-growing regions of Indonesia and the Philippines. Long-term field monitoring used PRA, community workshops, and household case studies. Data covered farmers' knowledge, practices, and strategies in conserving and using sweetpotato cultivars. It draws conclusions for the future role of in situ maintenance in crop conservation strategies.

Prain, G., H. Fano and C. Fonseca (1994). Involving farmers in crop variety evaluation and selection. Local knowledge, global science and plant genetic resources: Towards a partnership: Proceedings. International Workshop on User Participation in Plant Genetic Resources Research and Development. Pangasinan, Los Baños (Philippines). 4-8 May 1992. G. D. Prain and C. P. Bagalanon. Los Baños, Laguna (Philippines), UPWARD**:** 245-277.

Reports on CIP's experiences in Latin America in involving farmers in the evaluation and selection of potato and sweetpotato clones. Group assessment is an alternative to surveys to elicit varietal preferences. The methodology used and results of group evaluation of sweetpotato clones at harvest with farmers in one location are explained. Group assessment approach to variety evaluation was a relatively easy way to get at the more striking criteria used by farmers. Participatory trials offer a better opportunity to obtain details and two examples are drawn on to provide a general methodology: participative testing within the Peruvian seed program to identify material for clean-up and diffusion and a smaller scale effort to understand the selection criteria of commercial sweetpotato farmers on the Peruvian coast. Sites representative of different agroecologies were identified and two farmers at each site were given approximately half the total clones to be identified. Farmers who were given relatively small quantities of seed, selected the fields and designed the trials. Farmers were encouraged to treat the plot in the same way as their other plots. Usually they laid clones out in parallel rows and used their own planting material as a border around the trial. Farmers recorded their observations, which varied because of differences in observational skills and literacy level. Researchers informally interviewed farmers during regular visits and used probing questions when necessary to stimulate discussion. A final evaluation was conducted at harvest with joint weighing of the production of each clone. Group evaluations allowed visiting cooperators to observe the stands of each clone with the host farmer and comment on interesting characteristics and often to dig up and examine tubers or roots. Researchers facilitated and stimulated the discussion and recorded observations, debates, and disagreements as "minutes". Potato farmers, who grow in a climatically complex and risk-prone environment and for whom home consumption is important, mentioned 39 different criteria. Coastal sweetpotato farmers, who grow their crop in a predictable desert climate and market almost all production, mentioned few criteria that concentrated on root characteristics and productivity and market potential. The paper shows how farmers' knowledge and experience in rootcrop agriculture can be combined with modern plant breeding to achieve faster, more cost-effective selection of appropriate varieties.

Prain, G. and U. Scheidegger (1988). User friendly seed programs. The Social Sciences at CIP: report of the Third Social Science Planning Conference. Lima, CIP**:** 182-203.

Prain, G., F. Uribe and U. Scheidegger (1992). "The friendly potato": farmer selection of potato varieties for multiple uses. Diversity, Farmer Knowledge and Sustainability. J. L. Moock and R. E. Rhoades. Ithaca, New York, Cornell University Press**:** 52-68.

Applied “Farmer-back-to-farmer” approach to germplasm evaluation. Official germplasm improvement programs have often concentrated on narrower production conditions, especially improved yield. Farmers like the "friendly potato" because it is obliging, understanding, adaptable, one of the gang. A new variety should adapt easily to their food system. Material was tested at five locations in the highlands. To increase farmer input and stimulate the swapping of opinions and preferences, the clones were divided into two groups of 8-9, each of which was given to two farmers in each location. Farmers selected the fields and designed the trials. In most cases, they chose to plant all 50 tubers of each clone in one row. Farmers used their own seed as a border around the trial. Clones were planted in one or two adjoining rows without spatial

replications. The research team visited each site every 2 to 3 weeks to discuss performance of the clones and weighed clones at harvest with the farmers. Farmers at each site visited each other's trials. Three group evaluation sessions were organized to enable all farmer cooperators to discuss findings. In the last session, all the yield results were displayed and a summary of farmers' comments during the season was made available. Farmers spontaneously evaluated varieties using 39 criteria. For example, farmers preferred earliness to catch higher off-season prices and fill seasonal scarcities, short stolons, a high percentage of first-sized better-priced tubers and colored skins. Researchers learned that farmers prefervarieties that produce adequate quantities of small tubers for seed and a good percentage of large tubers for sale. Breeders should recognize the need for a range of varieties that fulfill these diverse criteria and satisfy different segments of the farmers' food system. Two friendly potato candidates emerged after the final postharvest group evaluation. Farmers wanted to test these under a wider range of conditions.

Prain, G., C. Wheatley and N. Duy Duc (1997). The potential of rootcrop processing for rural development in Vietnam. Program Report 1995-1996. Lima, CIP**:** 282-290.

A participatory assessment of the status and potential of rootcrop processing was conducted in north and central Vietnam. A preliminary training workshop enabled interdisciplinary teams to learn participatory methods and to plan the conduct of the study. Methods included informal interview, focus group discussion and various PRA tools. Discussions between researchers and various user groups, helped to determine opportunities for expanded utilization of rootcrops for animal feed, starch, and noodles.

Prain, G. and C. Widyastuti (1999). Sweetpotato conservation means survival for Irian Jaya families. UPWARD Fieldnotes **7**(1): 5-6.

The complementary roles of in situ and ex situ conservation strategies were empirically assessed in Irian Jaya, a known secondary center of global sweetpotato diversity. Local cultivars were conserved through community genebanks while a duplicate collection was maintained ex situ. Documentation of local knowledge associated with these cultivars helped guide researchers in their choice of accessions for evaluation. Drought and famine in the locality required tapping the ex situ collection to reintroduce the lost cultivars in the community and to reestablish the in situ collection.

Prain, G. and M. Piniero (1999). Management of rootcrop genetic diversity in Southern Philippines. Biological and cultural diversity: the role of indigenous agricultural experimentation in development. G. Prain, S. Fujisaka and M. D. Warren. London, Intermediate Technology Publications**:** 92-112.

A long-term study of farmer maintenance of rootcrop genetic diversity in the hilly areas of northern Mindanao, southern Philippines. An action research component of the project involved piloting alternative institutional arrangement to support existing conservation. Various types of "local curator groups" based on kinship group, informal network, individual households and formal authority were organized, Factors internal and external to these groups affected the sustainability of conservation efforts.

Recharte, J. (1992). [Farmer participation in the selection of potato varieties: a challenge for interdisciplinary work]. La participación de agricultores en la selección de variedades de papa: un reto para el trabajo interdisciplinario. II Reunión Nacional de Papa: Resúmenes. Cochabamba (Bolivia) 22-25 Sep 1992. PROSEMPA; PRONAPA; IBTA - PROINPA. Cochabamba (Bolivia)**:** 16.

Presenta los resultados de una selección de clones con resistencia a rancha (P. infestans) mediante una metodología basada en la participación de agricultores del departamento de Cajamarca. La experiencia se inició en la campaña 1990-91, con 120 clones que fueron reducidos a 22, por un equipo mixto de técnicos y agricultores. En la campaña 1991-92 se redujo esta selección a 9 clones, por medio en ensayos en parcelas de agricultores. Los ensayos se ubicaron en las provincias de Chota, Cutervo y Cajamarca (en las dos primeras la incidencia de rancha fue alta y en la tercera, baja). La selección en este segundo año estuvo a cargo sólo de los agricultores. El estudio de 1991-92 incluyó la documentación de criterios seguidos por los agricultores en la selección. En la campaña 1990-91, la selección de clones realizada por los técnicos y la de los agricultores estuvieron altamente correlacionadas. En la campaña 1991-92, la selección hecha por los agricultores de las tres ubicaciones fue consistente, particularmente en los dos lugares más expuestos a la rancha. Los resultados se utilizan para esbozar ideas sobre el trabajo interdisciplinario que requiere esta metodología, que involucra a científicos en fitomejoramiento, científicos sociales y a los agricultores y su conocimiento sobre la tecnología de variedades.

Recharte, J. (1992). [Final report of selection trials with native clones with farmer participation: Cusco 1991-1992]. Informe final de los ensayos de selección de clones nativos con participación de agricultores: Cusco 1991-1992. Lima, SEINPA.

Rentian, Z. and W. Jianhua (1997). Impact of UPWARD on potato farming and agricultural research in Zheijiang. Local R & D: Institutionalizing innovations in rootcrop agriculture. Los Baños, UPWARD**:** 178-189.

To promote and sustain potato production, researchers introduced new varieties which farmers evaluated in their farms for adaptability and performance. Through participatory on-farm trials, farmers discovered the potential of optimizing land use by introducing potato as a winter crop in a wheat-based cropping system. To improve access to seed, researchers assisted an upland community as source of clean seed for the lowland areas.

Rhoades, R. (1986). Breaking new ground: agricultural anthropology. Practising Development Anthropology. E. Green. Boulder, Westview Press**:** 22-66.

Explains the contribution of anthropology to agricultural research in general and to CIP in particular, concentrating on the case of postharvest technology. Since 1972, CIP had been experimenting with diffused light storage. Ethnographic research showed that in the Andes, seeds specialized farm buildings are not used because food, seed, and tools are considered domestic activities. On-farm trials with farmers acting as advisers enabled introduction of principles of diffused light storage in existing buildings. After seeing in a demonstration model that diffused light storage reduces sprout elongation, farmers expressed interest but were concerned about the cost. Farmers began to experiment on their own and more than 3000 cases of adoption of the principle of diffused light storage were documented. Ethnographic information on farmer creativity in experimentation and adaptation was collected. National programs were encouraged to establish demonstration stores promoting farmer experimentation and illustrating different ways of applying the principle. Since extension workers sometimes became frustrated when farmers did not precisely copy their design, the CIP team emphasized in training courses anthropological principles of cultural adaptation and indigenous experimentation.

This postharvest research led to the development of the "Farmer-Back-to-Farmer model" by Rhoades, an anthropologist and

Booth, a plant physiologist, combining anthropological and applied technological thinking. Farmers should be involved during the diagnostic stage of the research process through a variety of methods including on-farm experiments, farmer field days, farmer advisory boards, and participants observation. In general, building upon rather than replacing traditional practices is the route to problem solving. Once solutions are identified, the objective is to fit the technology to local conditions with the farmers as equal members of the problem-solving team. Generally, testing and adaptation occur first on the experiment station followed by on-farm trials. A critical element of the model is follow up. Data must be collected on the reception of the technology by farmers, the ultimate judges as to the appropriateness of a proposed technology. At this stage, the goal is not only to determine acceptability but to understand how farmers continue to adapt and modify the technology.

Rhoades, R. (1988). Food systems research. The social sciences at CIP: report of the Third Social Science Planning Conference. Lima, CIP.

Rhoades, R. (1989). The role of farmers in the creation of agricultural technology. Farmer First. Farmer innovation and agricultural research. R. Chambers, A. Pacey and L. A. Thrupp. London, Intermediate Technology Publications**:** 3-9.

Rhoades, R. (1992). The art of the informal agricultural survey. Lima, CIP.

Suggests basic ideas to carry out an informal survey successfully. Explains how to interact with farmers appropriately and organize an informal interview.

Rhoades, R. and A. Bebbington (1991). Farmers as experimenters. Joining farmers' experiments. Experiences in participatory technology development. B. Haverkort, J. van der Kamp and A. Waters-Bayer. London, Intermediate Technology Publications**:** 251-253.

Rhoades, R. and R. Booth (1992). The farmer-back-to-farmer model: ten years later. A conference on participatory on-farm research and education for agricultural sustainability, University of Illinois at Urbana-Champaign**:** 17-27.

Rhoades, R. E. (1988). CIP's philosophy on farmer participatory research. The social sciences at CIP: report of the third social science planning conference. Lima, CIP**:** 159.

Rhoades, R. E. (1990). Coming revolution in methods for rural development research. Proceedings of the inaugural planning workshop on the Users' Perspectives with Agricultural Research and Development. Baguio City (Philippines). 3-5 Apr 1990. Los Baños (Philippines), UPWARD. CIP Reg. Office, Region VII**:** 196-210.

Rhoades, R. E. (1991). Models, means, and methods: personal reflections of third world agricultural research. Root crops in the Philippines: status, potential, and policy issues. Book series. no. 111. A. R. Librero and M. K. Palomar. Los Baños, Laguna (Philippines), Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD). Rainfed Resource Development Project**:** 52-67.

This paper discusses how models and ways of thinking about agricultural research in the country have changed since 1950. It also

reflects on some of the new ways of relating to the users new models of agricultural research. How the models should adapt to changing conditions is also discussed.

Rhoades, R. E. and R. H. Booth (1982). Farmer back to farmer: a model for generating acceptable agricultural technology. Agricultural Administration **11**: 127-137.

Rhoades, R. E., D. H. Horton and R. H. Booth (1987). Anthropologist, biological scientist and economist: the three musketeers or three stooges of farming systems research? Social science and farming systems research: methodological perspectives in agricultural development. J. R. Jones and B. J. Wallace. London, Westview Press**:** 21-42.

Rhoades, R. E., V. N. Sandoval and C. P. Bagalanon (1990). UPWARD: Asian training of trainers on farm household diagnostic skills. Los Baños. (Philippines), UPWARD. CIP Regional Office. University of the Philippines.

A training manual on participatory research methodologies with user-orientation. A philosophy of getting users to be actively involved in the research process. Through such philosophy, a better understanding of the users' circumstances, needs, motivations, and preferences as well as that of their relationship with other members of the community and their environment could be achieved.

Roncal, E., M. Gastelo, M. Figueroa, J. Landeo and L. Calua (1991). [Impact of the evaluation and selection for potato late blight resistance in farmers' fields]. Impacto de la evaluación y selección para resistencia al tizón tardío de la papa en campo de agricultores. Reunión de ALAP. Lima (Perú). 8-14 Set 1991. Lima, ALAP**:** 68-69.

Durante los años 1983 a 1989 en Huánuco (Perú), se evaluaron aproximadamente 3,500 clones para resistencia al tizón tardío bajo condiciones de alta incidencia del hongo en campo de agricultores. Los clones procedían mayormente del Centro Internacional de la Papa (CIP) y de la Universidad Nacional Agraria de La Molina (UNA). Como resultado de la participación del agricultor en el proceso de evaluación y selección, sobresalieron por su resistencia, rendimiento y otros caracteres agronómicos los siguientes clones: 84PT62.8, 84PT185.1, 380474.6, 380496.6, 381127.150, 380454.18, 380389.1, 380435.8, 381382.2 y UNA22-15. Asimismo, la participación del agricultor en la multiplicación de estos clones en sus propios campos, a través del sistema de compartir la cosecha, originó la difusión inmediata de algunos clones a otros agricultores, habiéndose cubierto aproximadamente 6% del area cultivada en dicha región (113 Has). La variedad Canchán-INIAA, liberada en marzo de 1990 por la Estación Experimental de Canchán, es un producto obtenido a través de este sistema. Las implicancias de este sistema en la obtención de variedades resistentes al tizón tardío y su difusión serán discutidas en la sesión.

Sandoval, V. N. and R. E. Rhoades (1992). Keep rolling: upside down. ILEIA Newsletter **8**(4): 27-28.

Within the setting of international agricultural research, some researchers felt the need to put the user's perspective higher on the agenda. Together they formed a network in Southeast Asia to try and turn agricultural research and development upside down.

Scheidegger, U., G. Prain, F. Ezeta and C. Vittorelli (1989). Linking formal R & D to

indigenous systems: a user oriented seed programme for Peru. London, ODI.

Andean potato farmers have developed a sophisticated technology well adapted to the complex and risky mountain environment. Seed and varieties are key elements. Attempts made in Peru to establish potato seed program to improve productivity have had little impact at the field level. A Peruvian-CIP joint seed project began in 1983 to produce high-quality seed and evaluate and compare with farmer seed, and understand existing farmer seed management practices and variety use. Basic seed production centers were established in five highland research stations to clean and multiply seed of modern and native varieties of regional importance. Basic seed was compared to farmers' seed of the same variety in 40 on-farm experiments and 80 unreplicated trials. The whole family participated in the evaluation, in which qualitative information, including expectations and problems for technology adoption, is as important as crop yield. Interactions between high-quality seed and other technologies were also evaluated and it was found that seed can be successfully adapted for use with farmer practices and did not benefit from association with a technological package. A concrete and encouraging result was the insistence of the farmer-cooperators on buying a small amount of high-quality seed despite only a moderate yield advantage. Analysis showed that the informal seed system offered the opportunity for efficient distribution of high-quality seed. Two distribution strategies that built on the small farmer seed system -- direct sales of small quanitities of seed and informal seed plots--. Volumes of seed increased rapidly and the seed maintained good quality over the three years of the follow-up study.

Silva, K. de, A. Premathilake and H. D. Jayawickrama (1996). Screening of sweetpotato genotypes in rice-fallow environments: incorporation of users' criteria in variety development of sweetpotato. SAPPRAD on the fourth year of phase III, selected research papers July 1994 - June 1995. E. T. Rasco Jr. and V. dr Amante. Manila (Philippines), SAPPRAD. **2:** 1-6.

The DOA/SAPPRAD sweetpotato project in Sri Lanka recently introduced user participation in early selection stages of the breeding program. Though the participatory varietal selection approach is still new, experience over the past four seasons (1993-95) has shown a high potential for accelerating the adoption of new sweetpotato varieties through this approach.

Sinchi, J. (1995). [Evaluation of potato clones with participatory research (PR) in the southern region of Ecuador]. Evaluación de clones de papa con investigación participativa (IP) en la región Sur del Ecuador. Memorias: XVII Reunión de la Asociación Latinoamericana de Papa (ALAP). Mérida (Venezuela). 9-15 Jul 1995. Mérida (Venezuela), Fondo Nacional de Investigaciones Agropecuarias (FONAIAP)**:** 55.

En la zona sur del callejón interandino ecuatoriano, encontramos condiciones ecológicas y de mercado diferentes a las dos regiones norteñas del país. Esto motivó al Programa de papa a buscar uno o más clones de papa, con amplia aceptación regional hasta 1998, mediante criterios de selección usados por los agricultores. Por esta razón, en tres localidades del Canar se evaluaron 103 y 23 clones de primera y segunda generación respectivamente. La metodología usada para seleccionar los clones fue la investigación participativa (IP) en tres etapas: floración (método de evaluación absoluta), tubérculo fresco y tubérculo cocido (matriz de ordenamiento según criterios). En las evaluaciones participaron de 10 a 20 agricultores, de los cuales 25% fueron mujeres. Los resultados de la evaluación absoluta con criterios de cinco evaluadores aplicada a grupos de cinco clones dieron un valor máximo de 5 puntos a la "mejor planta", representando un 20% del cálculo final. La evaluación del

tubérculo fresco y del tubérculo cocido se diferenció de la anterior en los criterios de selección y en valoraciones de 30% a 50% respectivamente para el cálculo final. Estos porcentajes son diferentes por la importancia que dan los evaluadores a las etapas de evaluación. Sumados los puntajes finales de las tres evaluaciones y seleccionados los clones por encima del 75%, escogimos a 38 y 12 clones de primera y segunda fase respectivamente, cuyos rendimientos fluctuaron entre 2 y 40.5 t/ha. De los clones seleccionados en la fase dos, se destacaron: B-35, C-78 y C-25.

Sinchi, J., M. Acero, G. Solórzano and J. Bravo (1994). [Participatory evalation of clones for resistance to late blight Phytophthora infestans in small farmers' fields]. Evaluación participativa de clones con resistencia a Phytophthora infestans en campos de pequeños agricultores. Quito (Ecuador), FORTIPAPA.

En tres localidades de Canar se evaluaron 103 clones de la primera fase, provenientes de Quito (70 del CIP y 33 del Programa de Papa) y 23 clones de la segunda fase existentes en Canar. La metodología usada para seleccionar todos los clones fue la investigación participativa en tres etapas: follaje-floración, tubérculo fresco y tubérculo cocido. Para la primera etapa se usó el método de evaluación absoluta y para las dos últimas, la matriz de ordenamiento según criterios, con participación de 10 a 20 agricultores, de los cuales entre 20 y 30% eran mujeres. Los resultados de la evaluación absoluta, con criterios de cinco personas aplicada a grupos de cinco clones, dieron un valor máximo de 5 puntos a la "mejor planta" por sus tallos y hojas, que representa un 20% del cálculo final. La evaluación de tubérculo fresco y tubérculo cocido siguió la misma modalidad (grupo de clones y puntajes máximos), según diferentes criterios para tubérculo fresco y cocido, así como también en proporciones de 30% (tubérculo fresco) y 50% (tubérculo cocido) para el cálculo final. Los porcentajes son diferentes por la importancia que dan los consumidores a los factores de evaluación. Sumados los puntajes finales de las tres evaluaciones y seleccionados los clones que están por encima del 75%, se escogieron 38 clones de la primera fase, con rendimientos que fluctúan entre 4.9 y 39.7 t/ha; y 12 clones de la segunda fase, con rendimientos de 2 a 40.5 t/ha. De los clones seleccionados en la fase dos se destacan B-35, especialmente para la pequeña industria (papas en forma de "chips"), y C-78 y C-25 por su precocidad.

Sinchi, J., G. Solorzano, J. Bravo and M. Acero (1994). [Purifiying potato seed of Boloña with the participation of experienced farmers]. Purificación de semilla de papa Boloña con participación de agricultores experimentados. Proyecto Fortalecimiento de la Investigación y Producción de Semilla de Papa en el Ecuador (FORTIPAPA). Informe anual 1994 del Programa Nacional de Raíces y Tubérculos - rubro papa y el Proyecto FORTIPAPA. Quito (Ecuador), FORTIPAPA**:** 8.

En Canar se escogieron cinco áreas tradicionalmente paperas para seleccionar Boloña Amarilla (o Auténtica) y analizar la participación de agricultores experimentados en cada una de estas zonas. En los lotes sembrados en noviembre, diciembre y febrero de 1993-1994, y conseguidos con gran dificultad cerca de la floración, se pudieron visualizar mejor las diferencias con otras variedades nativas en tallos, hojas, flores, forma de planta y coloraciones de tubérculos. Los resultados indican que los agricultores experimentados manejan los criterios de diferenciación entre variedades locales. Los pocos lotes encontrados con Boloña Amarilla tienen altos porcentajes de virus PVX, PVY (100%) y PVS (59%), pero no existe PLRV. También tienen entre 15 a 64% de mezclas varietales. Además, los cultivos con pocas mezclas (15 a 30%) proporcionaron rendimientos en una proporción de 10:1 a 8:1, respectivamente. Se recomienda sembrar en sus zonas de origen, la semilla seleccionada en los cinco lotes (11.34 qq), para estudiar su comportamiento y otras características

desconocidas. Además, se debe intentar realizar cruzamientos con los clones de mayor preferencia en Canar.

Sinchi, J., G. Solórzano., J. Bravo and J. Romero (1995). [Agroclimatic and complementary evaluations of yield and quality (fresh and/or processed product). Participative selection in Canar, and multiplication in the EESC laboratory]. Subproyecto 1.2.5a: Evaluaciones agroclimáticas y complementarias de rendimiento y calidad (producto fresco y/o procesado). Selección participativa en Canar, multiplicación de semilla en el laboratorio EESA. Quito, FORTIPAPA.

Desde 1992 estamos seleccionando clones de papa para el sur de Ecuador, apoyados por la metodología de investigación participativa (IP) y la experiencia técnica, para que las futuras variedades tengan aceptación en el mercado local. Evaluamos 16, 32 y 10 clones en la fase I, II y III respectivamente, en 11 localidades con altitudes desde 2490 hasta 3550 msnm y escasas precipitaciones (máximo 110 mm) en el ciclo. Para recolectar la información de cinco evaluadores por localidad sobre los estados de follaje-floración, usamos el formato de evaluación absoluta y, para tubérculos frescos, cocidos y fritos, la matriz de ordenamiento según criterios. En cada evaluación las calificaciones fueron, 5 (para la mejor planta), 3 (preferencia intermedia) y 1 (para las peores características de planta o tubérculo). El puntaje 5 en follaje-floración se ponderó a 20%; en tubérculo fresco, a 30%; y, en tubérculo cocido, a 50%. Ello, debido a la importancia que poseen las etapas de evaluación para los productores. Los clones con puntajes superiores a 80% continuarán siendo evaluados en el siguiente ciclo agrícola (fase I y II) o se iniciará la multiplicación de su semilla en laboratorio, en el caso de los de la fase III. Los evaluadores emitieron sus criterios favorables y desfavorables para cada una de las tres épocas de evaluación y selección y escogieron clones con rendimientos que fluctuaron entre 1.81 y 10.17 t/ha. De éstos, los clones con un potencial de rendimiento superior a 5 t/ha fueron N-4 y B-35 (fase III), CHP-173, CHP-58 y CHP-69 (fase II) y el Clon-31 (fase I).

Sinung-Basuki, R. (1994). Farmer-led experimentations as the basis of new technology development: a case study of TPS technology in Indonesia, University of Reading**:** 354.

Sinung-Basuki, R. and N. Gunadi (1993). Understanding farmers behaviour and their capacity to experiment to develop true potato seed (TPS) technology sustainable and appropriate to farmers. TPS in Asia: Proceedings of a workshop on true potato seed in Asia. Lembang (Indonesia). 26-30 Oct 1992. Manila (Philippines), CIP**:** 66-81.

Smit, N. and B. Odongo (1997). Integrated pest management for sweetpotato in East Africa. Program Report 1995-1996. Lima, CIP**:** 191-197.

The most promising IPM components - cultural control practices and sex pheromones - require adaptation by farmers. To increase the likelihood of practical success, some modification of the CIP IPM model is required. An ICM program began in the pilot area in 1996. During PRA exercises, farmer-experimenters, selected from and appointed by the farmers involved in the pest problem assessment, were trained on the biology and behavior of insect pests, the ecological basis for pest outbreaks, and the rationale for control measures to be tested. Besides IPM components, farmers also expressed interest in testing other technologies, such as new varieties, storage methods for fresh sweetpotato, and use of sweetpotato for pig feeding. With the ICM approach, it became clear that weevil damage is one of several related constraints farmers face in sweetpotato production.

Sola, M., J. Moreno, N. Borja and H. Andrade (1994). [Participatory evaluation of clones with resistance to Phytophthora infestans in farmers' fields]. Evaluación participativa de clones con resistencia a Phytophthora infestans en campos de productores. Quito (Ecuador), FORTIPAPA.

A través de la investigación participativa, en ocho localidades de la sierra ecuatoriana, con participación directa de productores, comerciantes y procesadores, fueron evaluados dos grupos de clones de papa correspondientes al primer (IPC<sub(1)>) y segundo ciclo de selección (IPC<sub(2)>). Las localidades y productores fueron escogidos entre los que cumplían los requisitos de organización y capacidad de autogestión para la multiplicación de los materiales promisorios. En las evaluaciones participativas, tanto agronómicas como de calidad culinaria, usamos las técnicas de evaluación abierta, evaluación absoluta y matriz de ordenamiento según criterios. El balance de los resultados de la selección en las tres categorías de evaluadores, permitió escoger seis clones (C-220, C-41, C-231, 0-19, C-23, C-399 y 0.21). Inmediatamente se iniciará la limpieza del material más promisorio y la multiplicación rápida de semilla, para disponer oportunamente del volumen necesario de la misma.

Terrazas, F., G. Watson and R. Torrez (1994). [Evaluation methods of the marketing potential of promising clones: Participatory evaluation with farmers]. Métodos de evaluación del potencial de comercialización de clones promisorios: Evaluación participativa con agricultores. Congreso Internacional de Sistemas Agropecuarios Andinos. 21-26 Mar 1994. Resúmenes de trabajos presentados al VIII Congreso Internacional de Sistemas Agropecuarios y su proyección al tercer milenio. Valdivia (Chile), Universidad Austral de Chile.

Este artículo investiga el potencial comercial de los clones con resistencia a tizón (Phytophthora infestans) en Cochabamba, Bolivia. Se escogieron comunidades en dos zonas de alta incidencia de la enfermedad. La evaluación incluye la participación activa de los agricultores, con aplicación de miniencuestas en la cosecha y en prueba de degustación. Se evaluaron las siguientes características: sabor, consistencia de la pulpa, forma y color de tubérculos, potencial de comercialización y autoconsumo. Los resultados indican que los agricultores productores tienen diferentes grados de calificación para la venta y consumo domiciliario, siendo más ligera para la papa comercial. Esta situación se presenta posiblemente como respuesta a los diferentes grados de aceptación de la papa por los consumidores en el mercado. Los clones con potencial de comercialización más seleccionados fueron: 84-34-3 y 85-87-3, y los criterios de evaluación para zonas de producción y para sus clientes.

Thiele, G. (1997). [Informal seed systems in the Andes: why are they important and what should we do with them]. Sistemas informales de semilla de papa en los Andes: ¿Por qué son importantes y qué hacer con ellos? Lima, CIP.

En los países andinos de Bolivia, Perú y Ecuador, los sistemas informales de semilla son mucho más importantes que los sistemas formales. La demanda formal de semilla ha sido reducida debido al alto costo de la semilla, el limitado acceso al crédito, las lentas tasas de degeneración y la posibilidad de producir semilla en un buen estado fisiológico. La oferta de semilla formal ha sido inadecuada por las dificultades en sostener esquemas de certificación, una cobertura limitada, la producción de un número reducido de cultivares y calidad deficiente.

En los tres países se están desarrollando estrategias para vincular el sistema formal con el informal. Se examinan cuatro argumentos para apoyar este vínculo y se acepta cada uno con ciertas reservas. Primero, los agricultores tienen tecnologías que les ayudan a mantener la calidad de la semilla, pero no todos siguen las mejores prácticas y existen deficiencias generales. Segundo, el sistema informal puede difundir

semilla ampliamente, pero no siempre mantiene su calidad. Tercero, para muchos, pero tal vez no para todos los agricultores, existe una brecha económicamente recuperable entre semilla del agricultor y semilla formal. Cuarto, el mejoramiento de germoplasma y la distribución de semilla están vinculados en el sistema informal. Los agricultores han tenido éxito en sacar nuevos cultivares, pero están limitados por las técnicas de multiplicación que manejan y las posibilidades limitadas de generar germoplasma nuevo para seleccionar.

Se analizan los objetivos y estrategias de intervención en el sistema informal de SEINPA (Perú), FORTIPAPA (Ecuador) y PROSEMPA y PROINPA (Bolivia). Las estrategias varían desde una intervención mínima en el caso de SEINPA (al inicio), que se limitaba a inyectar semilla de calidad a puntos estratégicos en las redes de difusión de semilla del sistema informal, hasta una intervención amplia en las áreas de producción y uso de semilla en el caso de PROSEMPA. La estrategia más apropiada depende de la tasa de degeneración de la semilla, de la brecha económica entre semilla formal e informal, del grado de integración de los agricultores con el mercado y de los recursos que maneja el proyecto.

Se proponen lecciones generales para trabajar con el sistema informal que incluyen el uso de diagnósticos para entender el uso de semilla en el sistema informal, el reforzamiento de flujos de semilla entre áreas y un procedimiento flexible en base a diferentes estrategias y mecanismos de enlace según las condiciones locales.

Thiele, G. (1999). Informal potato seed systems in the Andes: why are they important and what should we do with them? World Development **27**(1): 83-99.

In Bolivia, Peru, and Ecuador informal potato seed systems are much more important than formal systems. National seed projects recognize complementarities between the two systems and are seeking to link them. Arguments used to underpin linkages are assessed in light of available evidence and accepted with some reservations. Project strategies have ranged from seed injection with minimum intervention to extensive reform of the informal system. All of the projects have met with some success. A number of general lessons are drawn for tapping the potential of informal seed systems.

Thiele, G., G. Gardner, R. Torrez and J. Gabriel (1997). Farmer involvement in selecting new varieties: potatoes in Bolivia. Experimental Agriculture **33**: 275-290.

The strengths and weaknesses of the evolving techniques used by researchers in Bolivia to evaluate potato germplasm with farmers are assessed. When detailed knowledge of farmers' criteria is required, questionnaires or forms are most appropriate; otherwise techniques from participatory rural appraisal could be used. Initially, when evaluating large numbers of clones, scientists' and farmers' choices tended to coincide, although subsequently they diverged. This suggested that it may be more efficient to involve farmers later in the selection process, ensuring that an interesting amount of diversity still exists, and work to improve breeders' knowledge of farmers' criteria. Integration between social scientists and breeders was less than ideal at the start of the study, reducing the impact of farmer evaluation on the breeding program.

Thiele, G. and F. Terrazas (1998). The wayq'os (gullies) are eating everything!' Indigenous knowledge and soil conservation. PLA Notes **32**: 19-23.

PROINPA, the Bolivian Potato Research Programme, has been working for three years with farmers in the communities to control gullies near its research station. Two participatory rural appraisals (PRAs) designed

to help farmers to resolve the problem themselves were carried out simultaneously. PRA techniques included walking transects, where farmers named and described soil types, the crops they grow and the problems they face in soil, crop and livestock management; farm plans, in terms of soil types and crops; mapping gullies and indicating whether they had formed recently; and preference matrices of the suitability of different trees and shrubs for erosion control. At the end of the PRA, farmers used pairwise ranking to rank problems in order of importance. Gullies and soils susceptible to erosion were ranked as most important. Farmers identified some concrete measures that could be taken without outside assistance, such as planting pasture and trees.

Thiele, G., G. Watson, R. Torrez and J. Gabriel (1996). [Evaluation of clones for late blight resistance: Farmers experience]. Evaluación de clones resistentes al tizón: Experiencias con agricultores. Cochabamba (Bolivia), Instituto Boliviano de Tecnología Agropecuaria (IBTA). Programa de Investigación de la Papa (PROINPA).

El IBTA-PROINPA ha trabajado con agricultores en la evaluación participativa de clones resistentes a tizón durante cinco años. Como resultado de este trabajo se ha desarrollado un conjunto de técnicas, apropiadas a diferentes etapas del proceso de mejoramiento y selección de germoplasma. En este documento, se describen y evaluan las diferentes técnicas usadas. La integración de científicos sociales y mejoradores ha sido menor que el ideal y esto ha tendido a reducir el impacto de las evaluaciones hechas por los agricultores. Se concluye que se debe involucrar inicialmente a los agricultores en la evaluación de material cuando se trata de 30 clones avanzados, con pequeños grupos de agricultores, hombres y mujeres, en parcelas controladas por los investigadores. Después, con ocho a doce clones, se debe dejar a los agricultores ensayar bajo sus propias condiciones. Cuando se necesita tener un conocimiento más detallado de los criterios de los agricultores, es más apropiado usar cuestionarios. De otra manera, se podrían usar técnicas más rápidas y participativas, como la matriz de preferencias.

Torrez, R., J. Tenorio, C. Valencia, R. Orrego, O. Ortiz, R. Nelson and G. Thiele (1999). Implementing IPM for late blight in the Andes. Impact on a changing world. Program Report 1997-98. Lima, CIP**:** 91-99.

An FFS approach for managing late blight was pilot-tested in Peru and Bolivia in 1997-98. In Bolivia, the focal point was an existing strategy for controlling late blight in susceptible varieties using fungicides. At the core of the FFS in Peru was a trial managed by farmers to evaluate resistant cultivars and understand the interaction between resistance and fungicide use. In Bolivia participation in the FFS resulted inincreased in farmer knowledge, reduced blight, higher yields, and additional net benefits per hectare of more than $2,000 compared to a control group of non-participating farmers. Farmers in Peru selected three cultivars and one clone (perceived to have good market acceptability and yielded well even with low levels of fungicide use) for further evaluation and use. . Facilitators in both countries received little training and tended to revert to traditional extension methods. Peruvian farmers did not fully understand more complex concepts, such as experimentation, randomization, and genetic resistance included in the FFS. Inspite of difficulties, FFS was a success as judged by the enthusiasm of the farmer participants.

Torrez, R. and G. Thiele (1995). [Participatory evaluation of technology with farmers: experiences with the potato crop in Cochabamba, Bolivia]. Evaluación participativa de tecnologías con agricultores: experiencias

con el cultivo de papa en Cochabamba, Bolivia. Memorias: XVII Reunión de la Asociación Latinoamericana de la Papa (ALAP). Mérida (Venezuela). 9-15 Jul 1995. Mérida (Venezuela), Fondo Nacional de Investigaciones Agropecuarias (FONAIAP)**:** 54.

La participación de los usuarios en el proceso de investigación y generación de tecnologías contribuye a mejorar la evaluación, modificación o difusión de éstas. Asimismo, los métodos participativos de investigación permiten una aceleración en la adopción de nuevas tecnologías. El PROINPA, con la finalidad de determinar metodologías de evaluación participativa durante cuatro campañas agrícolas (90-94), ha efectuado estudios participativos en la evaluación de clones promisorios con resistencia a tizón (Phytophthora infestans) para la región de Cochabamba, en dos ambientes representativos de la producción de papa (Morochata y Escalante). Durante estos estudios se ha desarrollado, comprobado y ajustado una serie de técnicas para la evaluación de clones que podrían ser aplicables en otros casos. Las evaluaciones de los clones promisorios se realizaron en la floración y cosecha y fueron complementadas con pruebas de degustación. Estas evaluaciones se hicieron con tres formas de participación de grupos heterogéneos de agricultores (por edad y género). La participación de los agricultores en la evaluación de clones promisorios orientó a los investigadores a considerar aspectos socioeconómicos y ambientales, que probablemente resultarán en una aceptación más rápida por parte de los agricultores. Para seleccionar una técnica apropiada de evaluación con agricultores es importante considerar los siguientes aspectos: edad, género, posición social y experiencia del agricultor. Por ejemplo, se logró determinar que los hombres realizan un mayor análisis visual en la floración y cosecha, pero con criterios muy similares entre ellos, en relación a las mujeres. Estas, tienen mayor capacidad de análisis en las pruebas de degustación.

Torrez, R. and G. Thiele (1998). [The use of jampis, planting date and cultivars: Participatory diagnoses and training in integrated management of the blight]. El uso de jampis, épocas de siembra y cultivares: Diagnósticos participativos y capacitación en manejo integrado del tizón. Asociación Latinoamericana de la Papa (ALAP). XVIII Reunión de la ALAP: Compendio de exposiciones. Cochabamba (Bolivia). 9-13 Feb 1998. Cochabamba (Bolivia), Ministerio de Agricultura. Proyecto Nacional de Semilla de Papa (PROSEMPA)**:** 190-191.

Se realizó un diagnóstico rural participativo (DRP) en la comunidad de Compania Pampa (Cochabamba, Bolivia) con la participación de 19 agricultores y una ONG. Las técnicas más utilizadas para la realización del trabajo fueron: transectos, calendarios agrícolas y entrevistas en grupo. Se encontró que entre el 70 y 80% de los ingresos de los agricultores de Compania Pampa provienen del cultivo de papa. El tizón causa mayor daño en la siembra de noviembre-diciembre, debido a lo cual en esta época se cultiva principalmente Runa Toralapa. Aún siendo una variedad tolerante al tizón, se realizan hasta 4 aplicaciones sólo con fungicidas sistémicos. El DRP sirvió para caracterizar la zona en términos generales y para crear un ambiente de confianza mutuo, pero tenía limitaciones como instrumento para establecer una línea de base para medir el impacto de un programa de capacitación.

Uribe, S. F. (1989). [Experiments on potato varieties selection with farmers participation]. Experimentos de selección de variedades de papa con participación de agricultores. VIII Seminario: Métodos y experiencias de investigación agrícola en campos de agricultores. Chiclayo (Perú). 22-26 Ago 1988. B. Ramakrishna. Quito (Ecuador)., IICA. BID. PROCIANDINO**:** 144-152.

Vaidya, A. K., B. K. Dhital and T. B. Gurung (1996). Policy, socio-cultural and technical constraints to a community approach in integrated management of bacterial wilt. Integrated management of bacterial wilt of potato: lessons from the hills of Nepal, proceedings. National Workshop. Pokhara (Nepal). 4-5 Nov 1996. P. M. Pradhanang and J. G. Elphinstone. Pokhara (Nepal)., Lumle Agricultural Research Centre (LARC); Users' Perspectives with Agricultural Research and Development (UPWARD); Winrock International (WI): 70-78.

Bacterial wilt (Pseudomonas solanacearum), one of the most problematic diseases of potato in the hills of Nepal, is spreading through traditional seed flow systems favored by the present sociocultural and policy environments. This is compromising food security and the livelihood of hill people. In 1993, a disease management effort was initiated by the Lumle Agricultural Research Centre in partnership with Users' Perspectives with Agricultural Research and Development (UPWARD), Philippines, in the traditional upland potato-growing areas of the Western Hills with community participation. After seven years, the approach is yet to achieve its full success largely due to exogenous factors. This paper decribes the policy, sociocultural, and technical constraints to integrated management of potato bacterial wilt. The paper stresses the importance of bringing all stakeholders together to develop common understanding and a vision of future commitments. Success of the program depends on restricting the free movement of infected seed potato through sanctions and political will; ensuring researchers' accountability; increasing public awareness; empowerment of local committees; and availability of appropriate technology to supply pathogen-free/healthy seed. The approach requires considerable resources, effort, and time to maintain momentum. Before scaling up, the approach needs to be modified to reduce the limitations encountered over the past years, and to make it less resource-intensive and more locally-manageable.

Valdivia, R., V. Choquehuanca, J. Reinosos and M. Holle (1997). Identification of the dynamics of biodiverstiy microcenters of Andean tubers in the Circumlacuster Highlands, Puno Peru. Strengthening the scientific basis of in situ conservation of agricultural biodiversity on farm. Proceeding of Workshop to develop tools and procedures for in Situ conservation on Farm 25-29 August 1997. J. D. T and T. Hodkin. Rome, IPGRI: 19-20.

Valdivia, R., E. Hallpa, V. Choquehuanca and M. Holle (1996). Monitoring potato and oxalis varieties in mixtures grown in farm family fields in the Titicaca Lake basin in Peru. 1990-1995. Participatory plant breeding. Proceedings of a workshop. P. Eyzaguirrra and M. Iwnanga. Rome, IPGRI: 144-150.

Van de Fliert, E. (1999). Integrative, farmer-participatory methodology for poverty-sensitive research: sweetpotato integrated crop management in Southeast Asia. CIAT International Workshop "Assessing the Impact of Agricultural Research on Poverty Alleviation", 14-16 September 1999, San José, Costa Rica. http://www.ciat.cgiar.org.

A methodological framework for integrative, participatory research and development is presented as a methodological example for designing, conducting, and evaluating research and development projects targeting poor farmers. The framework was developed in the context of CIP's sweetpotato Integrated Crop Management (ICM) project in Indonesia. The framework is characterized by farmer-participatory and integrative approaches, and includes the following research and development phases: (1) problem, needs, and opportunity assessment; (2) applied technology development; (3) farmer training development and institutionalization; and (4) monitoring and evaluation. The methodological issues are illustrated by practical experiences, outputs, and measured impact of the sweetpotato program in

Indonesia. Suggestions and experiences are provided for application of the framework in other situations based on lessons learned.

Van de Fliert, E., R. Asmunati, Wiyanto, Y. Widodo and A. Braun (1996). From basic approach to tailored curriculum: participatory development of a farmer field school model for sweetpotato. Into action research: partnerships in Asian rootcrop research & development. Los Baños, UPWARD**:** 59-74.

A collaborative project was initiated in November 1994 in East and Central Java, Indonesia, to identify sweetpotato farmers' Integrated Crop Management (ICM) and ICM training needs, and to develop a sweetpotato ICM training model. This paper describes the process and some first experiences of the participatory needs identification, and applied technology and training development as implemented by the project. Training development departs from the basic approach of the IPM Farmer Field School model, which emphasizes learning by doing, experiencing and experimenting. Adaptations based on a needs identification of crop and farming community are needed to develop an adequate, "tailored" curriculum for a sweetpotato ICM farmer field school. The project applies a participatory strategy involving farmers at all project stages.

Van de Fliert, E. and A. Braun (1998). From problem to impact: a model for integrative, participatory research and development for sustainable agriculture. UPWARD Annual Review and Planning Workshop. Hanoi (Vietnam). 19-22 Oct 1997. User's Perspectives with Agricultural Research and Development (UPWARD). Sustainable livelihood for rural households: contribution from rootcrop agriculture. Laguna (Philippines), UPWARD**:** 81-97.

A model for integrative, participatory research and development for sustainable agriculture aimed at achieving impact is presented. Explicit boundaries are drawn between research and development, development and extension, and between extension and implementation. The objectives, activities, and actors associated with each of these realms are described and the desired focus for monitoring and evaluation during the whole process is clarified. The purpose of such a model is to systematize a framework for participatory research, allowing for better documentation of results, hence, addressing several criticisms commonly made of farmer participatory research.

Van de Fliert, E., A. Braun, R. Asmunati, Wiyanto and Y. Widodo (1997). One step back, two steps forward: sweetpotato ICM development in Indonesia. Local R & D: institutionalizing innovations in rootcrop agriculture. Los Baños, UPWARD**:** 153-167.

After two years of project implementation, Sweetpotato Integrated Crop Management (ICM) project conducted a national Sweetpotato ICM planning workshop. Results achieved during needs assessment, technology development, and FFS piloting activities were presented to representatives from government and non-governmental agricultural research and extension institutions. Workshop participants designed a scenario for institutionalization of sweetpotato ICM, and generated alternatives for solving some of the key problems encountered in scaling-up activities. The scenario most likely to result in successful sweetpotato ICM implementation on a larger scale included involvement of the already existing cadre of rice IPM farmer trainers. The challenge faced is how to convince national institutions to allocate some of their budgets to field schools for sweetpotato.

Van de Fliert, E., A. Braun, S. R. Ghimire and J. Brons (1998). Three cases and a model: application of an integrative, participatory R&D framework to UPWARD projects in Indonesia, Nepal and the Philippines. UPWARD Annual Review and Planning Workshop. Hanoi (Vietnam). 19-22 Oct 1997. User's Perspectives with Agricultural Research and Development (UPWARD). Sustainable livelihood for rural households: Contribution from rootcrop agriculture. Laguna (Philippines), UPWARD**:** 99-109.

Three case studies of participatory projects are presented in a retrospective analysis and self-critique based upon the framework for integrative, participatory research described in the previous paper (Van de Fliert and Braun, 1998). The case studies include (1) Sweetpotato ICM FFS development in Indonesia, (2) Bacterial wilt project in Nepal, and (3) Community-Based Pest Management for Sustainable Vegetable Production project in Northern Mindanao, Philippines.

Van de Fliert, E. and A. R. Braun (1999). Farmer field school for integrated crop management of sweetpotato. Field guides and technical manual. Bogor, CIP.

A training manual for Farmer Field School (FFS) facilitators with a focus on Integrated Crop Management (ICM) for sweetpotato. It contains three sections: (1) an introduction to the ICM FFS methodology, (2) field guides for sweetpotato ICM FFS activities, including group dynamics exercises, and (3) technical guidelines for sweetpotato ICM covering all steps in the production-utilization process from soil preparation to marketing and processing.

Van de Fliert, E., Warsito and A. Lagnaoui (1999). Participatory needs and opportunity assessment for potato IPM development planning: the case of Indonesia. Impact on a Changing World. Program Report 1997-98. Lima, CIP**:** 171-177.

A participatory potato cutivation needs assessment was initiated in Indonesia in 1998 as a basis for planning further potato IPM research. The paper describes methodology and tentative results. The study provided an overall picture of potato-growing systems in major production areas in Indonesia, the problems farmers face, the effort they expend, and opportunities for improving potato cultivation. Additionally, it triggered high interest in participating in follow-up technology development activities within the farming communities.

Van de Fliert, E., Wiyanto and A. R. Braun (1998). The farmer field school as an arena for farmer participatory research. LEISA in perspective: 15 years ILEIA. C. Reijntjes, M. Minderhoud and P. Laban. Leusden, Netherlands, ILEIA**:** 40-41.

Vega, B. (1998). Community-based genebanking of sweetpotato. Sweetpotato genetic resources conservation and use in Asia. S. T. Sanico. Leyte, MAFF/ PRCRTC**:** 37-44.

Interdisciplinary approach in pilot testing a community-based genebanking approach within the context of a rapidly changing agro-economic environment in southern Philippines. It examined how options for sweetpotato enterprise development can serve as incentive for farmers to conserve sweetpotato genetic resources. Through community validation workshops, researchers and farmers assessed the social, political, economic, and cultural factors influencing the feasibility of community-based approaches.

Watson, G., N. Estrada and C. Bejarano (1992). Andean farmer's evaluation of late-blight resistant clones. CIP Circular **19**(2): 6-7.

Watson, G. and J. Quiroga (1994). The social science and participatory research in germplasm management. Social science in the CGIAR. Proceedings of a meeting of CGIAR social scientists held at the International Service for National Agricultural Research (ISNAR), the Hague, the Netherlands, August 1992. M. P. Collison and K. Wright Platais. Washington, D.C. (USA), The International Bank for Reconstruction and Development (IBRD); The World Bank**:** 45-49.

Watson, G. A. C. (1988). Group farmer discussions and technology evaluation: potato and sweet potato cultivation in Java, Indonesia 1988. Farmer and Food Systems: An International Workshop. Lima (Peru). 26-30 Sep 1988. Lima (Peru), CIP**:** 15.