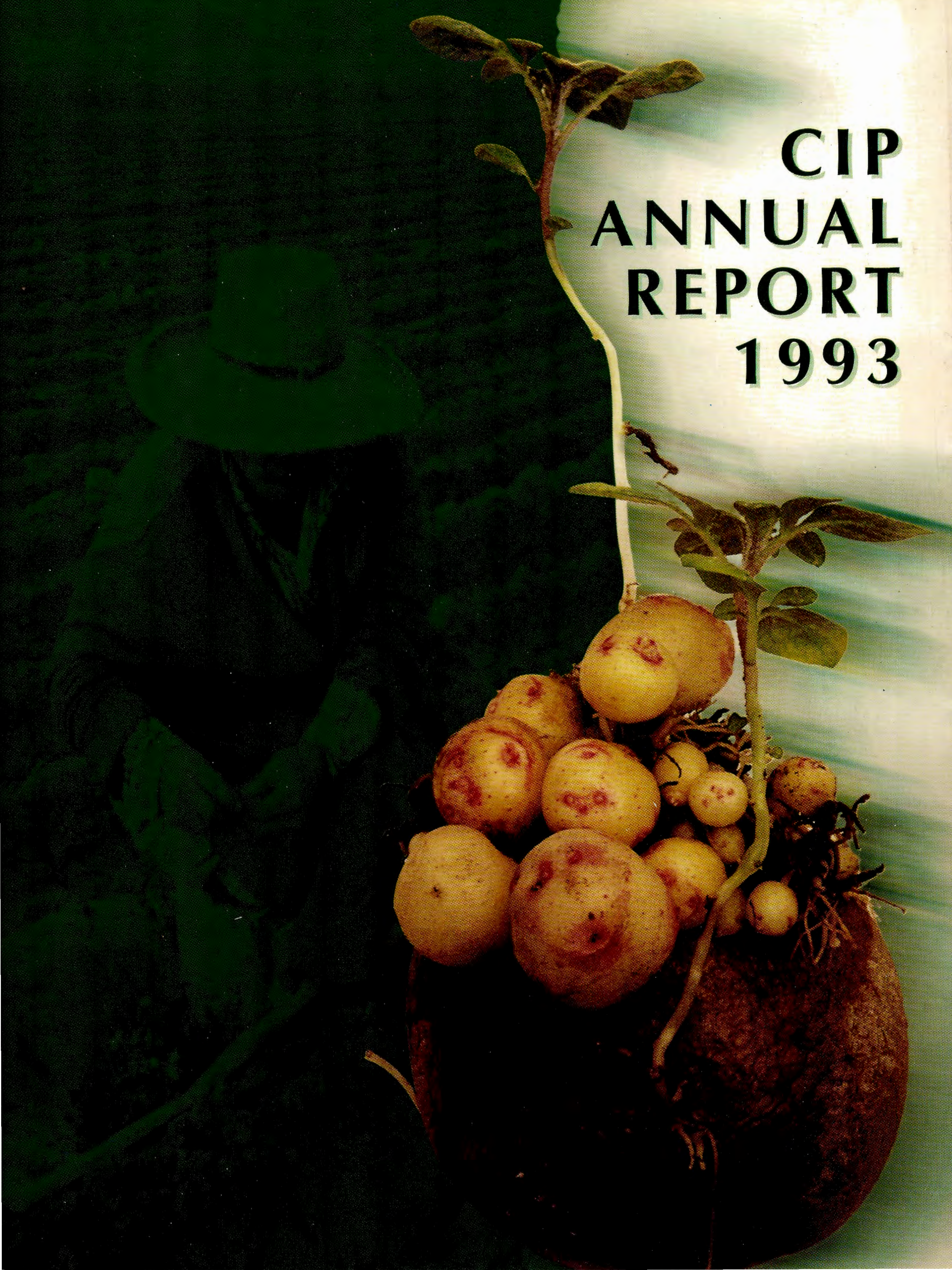
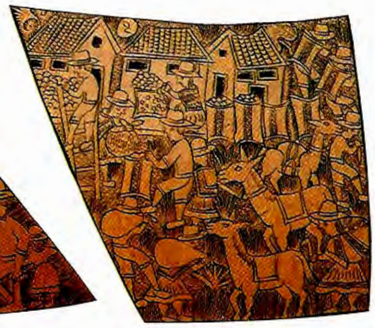
CIP ANNUAL REPORT 1993



1. Farmers prepare the land for planting.

They continue preparing the land, breaking up the earth with picks or plows.



2. Farmers haul seeds and fertilizer to the field for planting.

3. The planting of potatoes begins as the yoke of oxen open the furrow. The farmers plant and add fertilizer.

4. A farmer observes the potato crop as the leaves sprout and the potatoes grow.

5. Farmers weed the potato field and see that the crop has late blight and pests. They need to fumigate.

6. Farmers carry insecticides and spray them on the crop. They haul water from the river.

7. Farmers spray with insecticides against late blight and pests.

8. They add fertilizer and cultivate the potatoes.

9. The farmers remain alert, banging cans and bells, playing horns, shouting, and making fires to create smoke so that frost will not damage the crop.

10. The farmers weed the potato crop and play carnival.

Potatoes in an Andean Community

The campesino community of Cochas, Huancayo, Peru, is renowned for its skills in etching images on gourds, both telling a story and revealing the importance of an activity in community life. Craftswoman Bárbara Osores de Marticorena created this engraved gourd at CIP's request in 1991. There is a translation of the story captions below each panel.

CIP in 1993

The International Potato Center

Annual Report

RAYMUNDO MEDINA

CENTRO INTERNACIONAL DE LA PAPA
LA MOLINA
LIMA — PERU

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Introduction

The International Potato Center underwent major changes in 1993. Shifts in funding, continued staff reductions, and a revision of research, training, and international cooperation reshaped the Center. During the year, we also witnessed the maturing of CIP research and technologies into promising tools for fighting hunger. Both trends—the necessary adjustments to a new management environment with tighter budget restrictions and the payoff from past research investments—have placed CIP and its partners at a juncture for making valuable contributions to world food security.

CIP was well prepared for the challenge of 1993. We had undergone an exercise in priority setting in 1992 as part of drawing up the Medium-Term Plan for 1994-1998. This exercise produced three outcomes: it made us aware of the potential impact of our technologies; it allowed staff to gain team experience in making hard choices about how to invest research funds; and it helped create a Center-wide attitude willing to accept change. The CGIAR's Technical Advisory Committee (TAC) accepted the plan in October 1993.

Even before the plan was formally approved, CIP had to start implementing it out of necessity. Faced with funding shortfalls and a Peruvian foreign exchange policy that made it more costly to operate in the country, CIP was forced to cut its budget. CIP used the opportunity to reshape the institution and its activities. Our conceptual framework, program priorities, and field experience allowed us to focus on what was essential to CIP's mandate, what it did best, and what showed the most potential for having impact in farmers' fields. We reduced the number of core-funded research subprojects to 196 from more than 300.

PETER KEANE

These achievements were the result of a participatory management approach. Our six program leaders assumed, for the first time, full responsibility for drafting and executing their budgets. An expanded Program Committee created a forum where senior management could discuss options with the research and administrative staff responsible for daily operations and where staff could hold senior management accountable for decisions that affect operations. With the aid of an on-line budgeting system, program and project leaders are now thinking more clearly in terms of budgeting, prioritizing activities, measuring impact, and fund-raising. Researchers are more aware of the hard administrative

Potatoes are unloaded along the Ganges River near Dhaka, Bangladesh.

choices in providing support to scientific investigation, and administration is getting a better handle on the key components in giving researchers the institutional assistance they need.

While CIP's management and planning were put to the test, the research pipeline was producing significant advances in technologies and breeding material for national agricultural research systems (NARS). In this 1993 Annual Report, we are highlighting a crucial area of CIP research—our continuing work on potato late blight in collaboration with scientific institutions and national partners. Late blight constitutes a major constraint on production in the developing world so breeding resistance in new cultivars will help increase yield and also reduce pesticide usage, a big plus for the environment. Other areas also deserve recognition, such as true potato seed technology, integrated pest management, initiatives to protect vital natural resources, and postharvest utilization for sweetpotato.

RAYMUNDO MEDINA

Our successful initiative in Andean (and other high mountain) natural resource management has received significant interest from our donors and the Andean countries. Although CIP has always encouraged highly collaborative research networks, the consortium strategy used in the Andean program is providing new insights into collaborative work. As a result, we are combining efforts with a new spectrum of national institutions, universities, NGOs, and funding agencies. The CGIAR has asked CIP to serve as the focal point for research on sustainable mountain agriculture. In this venture, we hope to collaborate closely with several sister institutions to extend the approach to two other agroecosystems, East Africa and the Himalayas.

This experience of interacting with scores of partner institutions under different mechanisms gives CIP many ways of working in the developing world. We encourage a glance at the Core Research and Training sections to get an idea of the diversity of organizations with which we collaborate. We will need all these tools, experience, and goodwill to work in high-risk areas such as Africa, where the tragedy of Rwanda and the promise of South Africa exemplify the dilemmas we face.

Conditions in our host country, Peru, improved strikingly in 1993, ending half a decade of economic and political problems. The economy performed solidly, though CIP still had to compensate for high local operating costs, and political violence dropped off sharply. For CIP, these improvements mean that instead of concentrating on surviving a climate of uncertainty, we are able to devote more energy to our mandate.

CIP management and staff confidently look forward to the Fourth External Program and Management Review that starts in September 1994 and will continue until February 1995. Dr. David MacKenzie, a specialist in integrated pest management and currently the Director of the U.S. Department of Agriculture's Biological Impact Assessment Program, will chair the review panel. The Review's conclusions will be presented to the CIP Board of Trustees in February and to donors at International Centers Week in Washington, D.C., in October 1995.

Hubert Zandstra

Director General

In Huánuco, on the eastern slopes of the Peruvian Andes, farmers weigh the benefits of adopting new, high-yielding potato varieties that resist late blight disease. One variety—Canchán-INIAA—developed by the Peruvian national program, with assistance from CIP, withstood a record-breaking outbreak of late blight. Some producers also reported an 80% reduction in chemical fungicide spraying. The challenges in overcoming a major constraint to potato production loom even larger now. CIP has therefore set its sights on reducing pesticide use in the developing world. But a new, more aggressive strain of the fungus that causes late blight is making that goal more difficult to attain.

Late Blight: The Challenge Escalates

During the past century, scientists and farmers have learned to coexist with *Phytophthora infestans*, the fungus that causes late blight and brought on the Irish potato famine nearly 150 years ago. But they were lulled into a false sense of security even though late blight is the number-one potato disease worldwide.

A rude awakening came recently as agricultural scientists began to collect compelling evidence that a new strain of the fungus had spread to all major potato-producing areas and shown itself to be a resourceful opponent. This realization has mobilized a growing group of researchers and institutions, including CIP, to respond to the threat.

Practically anywhere in the world that the potato can grow, late blight can strike. The brownish-beige area on the map shows where the fungus *Phytophthora infestans* has spread.

GIGI CHANG

A History of Late Blight

Phytophthora infestans began as a local pest of the wild relatives of the potato (and tomato) in the central Mexican valley of Toluca. It was unknown to European and American farmers and consumers who adopted the South American potato as a staple. In the 1840s, the microorganism somehow broke out of its biological enclave and spread around the world with startling speed.

A late blight attack first shows up as a few grayish specks on the plant's foliage, and then a cottony film appears. Under certain climatic conditions (cool and humid weather), a single infected plant can lead to the destruction of a whole field of potatoes. Plants wilt and die within days. The disease also affects tubers, though this is a problem more connected to developed countries with temporate climates where storage is a more important factor. Spores transported in the wind or infected tubers carried to new areas can cause infestation.

The first late blight epidemic wreaked havoc in Europe, from France to Russia, and caused the devastating Irish famine in 1845-46.

The late blight aftershock drove the 19th century's trail-blazing scientists to apply their knowledge to agriculture. They began to study plant diseases, creating the discipline of plant pathology. They developed the first effective fungicides for crop application. They carried out the first trials in plant breeding to enhance crops with traits from wild species. In a sense, CIP itself can trace its bloodline back to those first investigators of potato late blight.

In the mid-1970s, a new migration of *P. infestans*, including both the A1 and A2 mating types, escaped from Mexico's Toluca valley. Previously, the A2 mating type had not been identified outside of Toluca. With both mating types, *P. infestans* can reproduce sexually, not just asexually. In a matter of years, the new migration colonized the world. "It was so mind-boggling in its magnitude that people could not believe us," says William Fry, a plant pathologist at Cornell University (USA).

Most ominously, the new migration is a superior adversary to the microorganism that first escaped Mexico because it is fitter and displaces earlier migrations of the fungus, according to initial research. First, it is more **aggressive**, causing more severe outbreaks of the disease and earlier in the growing season. Second, it develops **resistance to the fungicide metalaxyl** more readily. Third, the spores resulting from sexual recombination, called **oospores**, survive in a latent state in the soil for years and increase inoculum levels with a high diversity of the fungus. This characteristic means quicker adaptation to the environment and control measures. Oospores can infest the soil, making late blight linger on for years. "The hardiness of oospores spells disaster for developing countries," says Lod Turkensteen at the Netherlands' Agricultural Research Department. Fourth, single strains of the fungus may be more capable of

Map: RODOLFO CUETO

attacking both tomatoes and potatoes at the same time, making control measures more difficult.

What worries scientists and agricultural authorities most is that the new strain poses a problem on a scale and intensity that they have never anticipated. Despite 150 years of study, plant pathologists are still far short of the necessary understanding of late blight. The new strain highlights gaps in scientific knowledge on the relationship between the host and pathogen, mechanisms related to the adaptability of the pathogen, and the disease's behavior in the tropical highlands. Indeed, many scientists feel themselves torn professionally between the tentativeness of their recent late blight research and the scale of the menace.

An Opportunity for Disease Control

However, just as late blight poses an enhanced threat to potato growers, there is a unique opportunity for having a real impact in the short term. First, there is a new awareness in the developed and developing worlds and in the public and private sectors that something has to be done. In a world where global markets are erasing artificial borders, common control measures, such as quarantines, cargo inspections, and fungicide spraying, are not going to stop the spread of plant diseases.

The modern migration was possible because of the world seed trade. Pathologists trace the new strains to a shipment of potatoes from Mexico to Europe in the mid-1970s. The fungus then spread and was exported through the sale of infected potato seed. Even before the North American Free Trade Agreement (NAFTA) opened up the frontier between Mexico and the United States, the new strains of *P. infestans* had slipped across the border. It first invaded Texas, and then spread to Florida. The most serious outbreaks in the northeastern and northwestern U.S. came from Canada, which may have received the new migration from Europe. As a result, any successful initiative to control late blight has to be an international, coordinated effort incorporating both the public and private sectors.

Second, it has become less acceptable environmentally, legally, scientifically, and economically to continue spraying fungicides. More chemicals are applied to potatoes than to any other food crop. Each year, farmers spray about $1.8 billion in fungicides, says CIP breeder Juan Landeo, drawing on 1991 FAO estimates. The developing world sprays $600 million of chemical pesticides. Under heavy late blight pressure, some farmers apply fungicides more than 15 times per growing season in the highland tropics.

Many poor farmers in developing countries cannot control late blight adequately with fungicides. They simply do not have the money to buy agrochemicals nor can they assume the risk of having a crop wiped out.

Scientists and producers in the North and South now admit that other alternatives have to be found. For instance, by adopting potato varieties that resist late blight, farmers can reduce their fungicide applications by half. Practically all commercial varieties are susceptible to the fungus.

Third, scientists now have the technological tools to study the disease in detail, tracking its

THE POTATO, LATE BLIGHT, AND SCIENCE

CAROLUS CLUSIUS, 1601

1570-1750

- Potato introduced to the Old World.

1843

- Potato late blight in the U.S. eastern seaboard (only A1 mating type spread).

1844

- Late blight in Europe.

THE BETTMANN ARCHIVE

1845

- Irish potato famine led to 1.5 million deaths and emigration of another million people.

1846

- Fungus *Phytophthora infestans* identified as the cause of potato late blight.

1860-1861

- German scientist Anton de Bary developed methods to study life cycle of *P. infestans* and firmly established it as the cause of late blight.

spread around the world, monitoring its adaptation to new environments, and probing into its genetic makeup and evolution. Breeders are now beginning to use genetic mapping to identify desirable traits in wild species or native cultivated varieties. This will allow CIP and other institutions to speed up their breeding efforts to confront the late blight threat.

CIP Takes Actions

CIP has always given late blight research a top priority. In the developing world, CIP aims to put inexpensive tools—an integrated late blight management program—into the hands of farmers. After a recent trip to Uganda, Peter Gregory, CIP Deputy Director General for Research, said, "Potatoes have the potential to revolutionize Ugandan agriculture. They fit into the cropping system and consumer patterns. Farmers are having problems with their traditional crops, and the potato may replace them. Ugandans must be able to control late blight or they will never realize this potential."

The national seed programs themselves were an early source of late-blight-resistant potato varieties. CIP began evaluating a cross-section of varieties as soon as it started working on late blight and other potato pathogens. In 1974, it pulled together a group of promising national varieties, evaluated them, and made the best selections available to other national programs. For instance, a variety called Cruza 148 has since become the backbone of potato production in Burundi and Rwanda. This clone came out of the Mexican breeding program but was never released in that country. CIP breeders included it in a first group of late-blight-resistant materials drawn from national breeding programs in 1974 because it also resisted bacterial wilt and tolerated heat. Curiously, Cruza 148 provided an early clue to what has become a watershed in CIP's late blight breeding strategy. It did not have any major genes of late blight resistance.

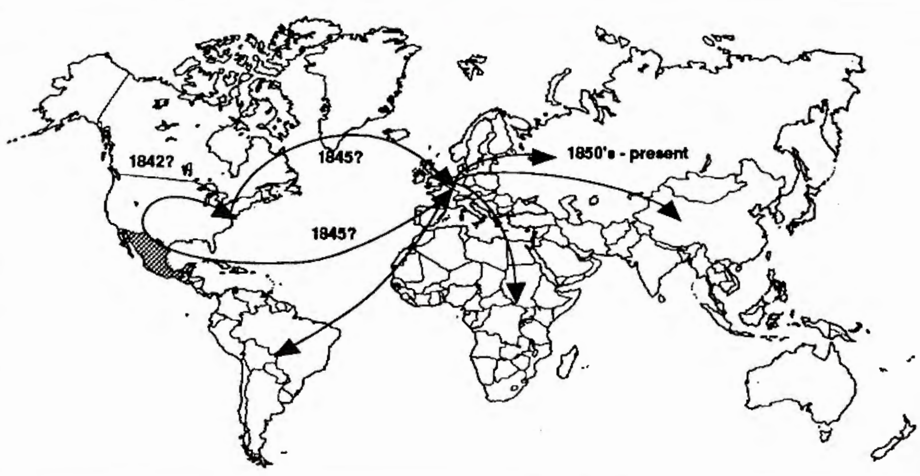
"The primary impediment to more and faster progress in potato breeding in the developing world has been the presence of major genes (or R-genes) in potato stock," says CIP plant pathologist Gregory Forbes.

New Breeding Strategies

In effect, major genes are too much of a good thing. They appear to provide immunity to late

RAINER ZACHMANN

The first symptom of a *P. infestans* attack is a few gray-white specks on a leaf. They later develop into a cottony film.



1882-1885

■ French botanist Pierre Millardet developed Bordeaux mixture (copper sulfate and slaked lime) for use against downy mildew (in grapes) and other fungi.

1892

■ Chemical treatment of late blight introduced in the U.S.

1910

■ The wild Mexican species *Solanum demissum* discovered to have late blight resistance. Wild species used to achieve a specific improvement for the first time through breeding.

1950

■ A2 mating type identified in Toluca valley, Mexico.


ROSSIO HADDAD

A microscopic view of ***P. infestans*** **on a leaf surface.**

blight until the pathogen overcomes this immunity completely and kills the plant. This could occur five years after a variety's release. Because it takes 10 years or more to breed potato cultivars, short-lived resistance is a risky investment. In fact, R-genes interfere with selection for horizontal resistance by masking its effect. Minor genes (or a group of them) provide a lower but more reliable and durable resistance against late blight. A potato variety with horizontal resistance would still be susceptible to the disease. Depending on the weather, it might lose some foliage and yield fewer tubers. But farmers would be able to control these outbreaks with moderate fungicide spraying and other integrated pest management (IPM) measures.

CIP's pre-1990 breeding material, known as population A and consisting of 200 clones combining R-genes and horizontal resistance, however, has still had immense value. "Population A has shown some successes and remarkable promise," Landeo says. During the 1993-94 growing season, Peru's highland farmers suffered 40% losses, valued at more than $100 million, because exceptionally heavy rainfall created prime conditions for late blight. One variety—Canchán-INIAA, developed from population A materials—was practically the only clone to withstand the outbreak.

However, only well-established national breeding programs could manage population A's selection process. This was a drawback for having an impact in incipient or funding-starved breeding programs or those in which a single breeder may have to manage four or five crops.

After 1990, and building on the assets in population A, a second breeding phase resulted in population B, a selection of the first 57 clones that have horizontal resistance without the presence of R-genes. Population B has also increased the options for working with national agricultural research systems (NARS). It can be distributed as botanical (or true potato) seeds, clones for crossing, or advanced materials for selection of adapted varieties, thus fulfilling a range of institutional and agricultural capacities. CIP is distributing samples of true potato seed to key countries in the developing world. Its regional offices will provide technical assistance for NARS on a priority basis so that this new material can reach farmers' fields quickly.

"Population B is already having an institutional impact even before it reaches farmers' fields," Forbes says. "NARS leaders are now talking in terms

CENTRO INTERNACIONAL DE LA PAPA
LA MOLINA
LIMA PERU

1971

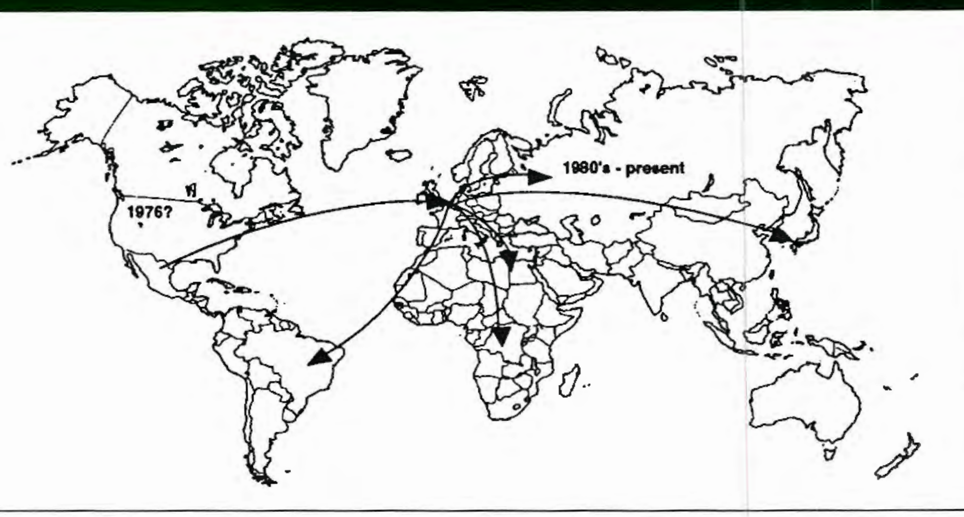
- CIP founded in Lima, Peru.

1974

- CIP distributed selected clones from national programs as a first response to the need for defenses against late blight in the developing world.

1976

- Probable migration of A2 population to Europe.



of potato varieties with horizontal resistance in the absence of R-genes. That wasn't the case three years ago."

In mid-1993, CIP began a third and more ambitious phase of late blight work by setting up an interdisciplinary team. This team aims to use genetic mapping to speed up and improve breeding by identifying genes linked to late blight leaf resistance in wild species and then incorporating that trait into breeding material with innovative selection techniques. This initiative draws on CIP's potato germplasm of traditional varieties and wild species from the Andes and Mexico.

"To work at the next stage of breeding, you need a level of detail that CIP is only now acquiring," says CIP molecular biologist Marc Ghislain. "This should allow us to become more accurate and effective than with classical breeding techniques." With support from the United Nations Development Programme (UNDP), CIP scientists and a wide array of cooperators are using genetic mapping to identify resistance genes in wild species. The real trick will be to pass on the wild species' durable resistance without transferring disadvantageous plant characteristics (low yield, bitter taste, or others).

This genetic mapping work is being conducted with national programs in Argentina, Uruguay, and Brazil. CIP is handling the field-testing in Peru, Ecuador, and Bolivia in cooperation with national institutions. The Scottish Crop Research Institute (SCRI) and the Centre for Plant Breeding and Reproduction Research (CPRO) and the Institute for Plant Protection (IPO) of the Netherlands are providing assistance with molecular techniques to find the genetic markers linked to late blight resistance.

In addition, CIP is concentrating on the development of more effective breeding and screening strategies and pathological research to understand *P. infestans* more comprehensively. CIP will continue field-testing its materials with national programs in Mexico, Colombia, Ecuador, Peru, Bolivia, Argentina, Kenya, the Philippines, and China.

International Cooperation for Research

CIP will also encourage national programs to use late-blight-resistant breeding materials and raise awareness about an IPM strategy for late blight. The Center is serving as a conduit to steer research results in the United States and Europe to NARS and provide worldwide monitoring capacity to late blight researchers. It helped raise public awareness of the problem by briefing the media at International Centers Week in Washington, D.C., in October 1993. It also cosponsored an international meeting to coordinate strategies in Toluca, Mexico, in early 1994, consolidating an international late blight program (PICTIPAPA) that got under way in Mexico in 1990.

"The crucial difference between CIP's work and other late blight investigation," Gregory says, "is that CIP is not thinking purely in terms of research, but also about the connections to development." CIP is setting its sights on developing a viable strategy so that poor farmers in the developing world not only coexist with late blight but also gain an edge on that threat to their well-being.

1982
- A2 spotted in Switzerland.
- CIP started breeding for late blight resistance.

1984
- Announcement of spotting of European A2 population and displacement of older A1 population. Pathologists begin to search for A2 populations outside of Mexico.

1985
- A2 mating types detected in Japan.

1987
- Isolated finding of A2 population in Pennsylvania, U.S.

1988
- Detection of A2 population in Brazil and Poland.

1989
- A2 detected in Ireland.

1990
- CIP restructured breeding program for horizontal resistance.
- An international late blight program (PICTIPAPA) was set up in Mexico.

1992
- A2 population entrenched in U.S., from Maine to Minnesota.

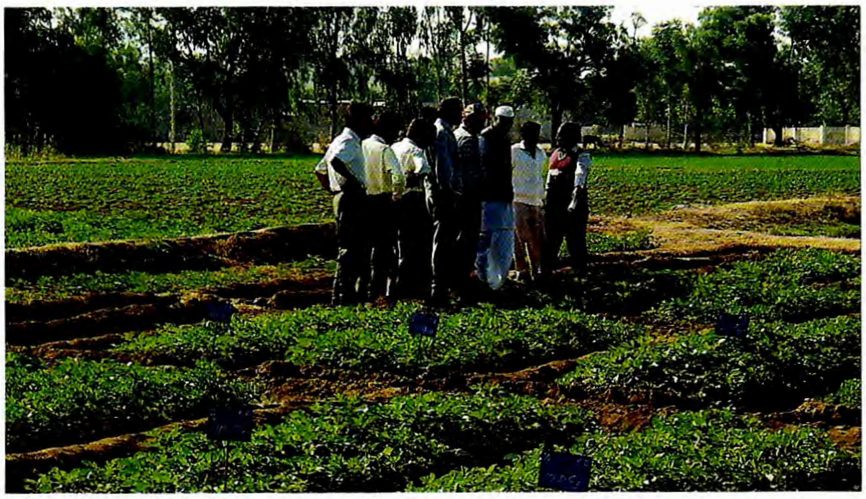
1994
- Toluca meeting to relaunch PICTIPAPA.

Highlights

True Potato Seed: Thriving in India

◆ New, stable-yielding potatoes developed in India are now available for distribution to farmers worldwide. Scientists believe that use of these new materials that come from true potato seed (TPS) could double production over the next ten years. They could also reduce production costs by 50% in many areas.

The new subtropical hybrids were bred to grow from what scientists call true potato seed. Farmers normally produce one hectare of potatoes by planting 2,000 kilograms of potato tubers, the underground part of the plant. They can achieve the same result by planting as few as 50 grams of TPS from the new, stable-yielding hybrids.



MAHESH UPADHYA

India's national program has enthusiastically adopted true potato seed technology as a means of increasing potato production.

Researchers from the Central Potato Research Institute (CPRI) worked with plant breeders from CIP's regional research program in New Delhi and in Lima, Peru, to develop TPS hybrids. These materials are extremely rustic, meaning they can survive where other potatoes often fail. They effectively resist both abiotic and biotic stresses, especially late blight.

"TPS is a revolutionary technology that has come of age," says Noël Pallais, CIP physiologist. "Small farmers in developing countries, who often live near bad roads, have difficulty obtaining large quantities of seed tubers. Now, instead of planting a ton of tubers, they can use the contents of a jar of TPS."

True seeds are produced aboveground by the flower of the plant, and are far cheaper and easier to transport than tubers.

Just five potato plants produce enough TPS to plant one hectare. But the seed is not sown directly into the field like wheat or maize. It is planted in a seedbed, like tomatoes, and then transplanted to the field as seedlings. TPS can also be used in nursery plots to produce high-quality tubers for planting.

"India has many high-yielding varieties, but the supply of healthy tuber seed to growers is the greatest constraint to increasing production," says Mahesh Upadhya, CIP Regional Representative for South and West Asia.

"TPS is a boon for farmers, particularly in areas where healthy seed is a problem," says J.T. Nankar, of the Kalyani Agro Corporation.

By the end of 1993, Indian production of the new TPS hybrids had expanded to an area exceeding 1,600 ha, a tenfold increase over the previous year. By the end of 1995, CIP analysts predict that 25,000 ha will be planted to the new varieties, as a result of the TPS technology.

"Advantages of TPS families selected are general hardiness against drought, heat, and mild frost under field conditions, along with good storage quality," Upadhya says.

Indian farmers are enthusiastic. "I used to hear from a neighbor that he was growing good potatoes from tiny seeds, just like tomato seeds," says Jahangir Hussain, a farmer in Sonamura, Tripura. "This year, I asked him to give me some seedlings and I raised 200 kg of potato from barely 500 seedlings. Next season, I will buy TPS."

One farmer's wife, when asked about using TPS, answered: "It is very good. We used to buy seed tubers every year, but now we are selling potato seed (seedling tubers raised from a transplanted crop)."

To assist farmers, the Indian government plans to establish three TPS production centers. The National Horticultural Board is taking steps to promote the new varieties and several nongovernmental organizations have begun to produce their own TPS.

If success with TPS continues, India could contemplate exporting TPS to other countries, such as Egypt, where demand has not been met. CIP will provide technical support to test TPS before exporting it to make sure PSTVd and PVT (the two pathogens transmitted by TPS) are not spread with it.

"Nowhere is the potential for TPS technology greater than in India," says Hubert Zandstra, CIP Director General. "India has the genetic material, the researchers, and the commitment from government needed to double national production by the year 2000. The country currently produces 16 million tons of potatoes annually, a figure that could reach 30 million by the end of the century."

Vietnam Honors CIP

◆ Vietnam's Ministry of Agriculture and Food Industry conferred on CIP the Vietnam Order of Friendship for CIP's positive contributions to the National Program for Food Crops Research over the past two decades.

This award recognizes CIP's collaboration with Vietnam in rapid multiplication and distribution of planting material of both potato and sweetpotato, the introduction of varieties, and training of Vietnamese scientists.

CIP scientists have collaborated with Vietnam for more than a dozen years and the country now produces 260,000 tons of potatoes and 2.5 million tons of sweetpotato.

A farmer-based rapid multiplication in the Da Lat highlands has made it possible to grow potatoes year-round. One grower who sold about 100,000 plantlets in 1979 now sells 1,300,000. "For rate of return on investment, this has probably been the most successful project in which CIP has participated," says Tom Walker, Leader of CIP's Production Systems Program.

Jump-starting an Information Network

◆ Agricultural research is based on the premise that knowledge is power. But when the application of knowledge goes against the steamroller effect of ecological degradation, genetic erosion, and population explosion, a crucial question arises. How do we guarantee that knowledge can be turned into practical measures before it is too late? Researchers in Andean natural resources frequently work on local studies or microenvironments. They lack sufficient opportunity to extrapolate their work across the Andes or transform their research into public policy.

The Consortium for the Sustainable Development of the Andean Ecoregion (CONDESAN) and CIP's Information Department are collaborating to set up INFOANDINA as a network for sharing information electronically in Peru, Ecuador, Bolivia, Colombia, and other South American countries. By accelerating the rate of exchange of information, encouraging cross-fertilization, and prioritizing key issues, INFOANDINA aims to speed up the impact of CONDESAN's research. The start has been promising. Trial bulletins reached an estimated audience of 70,000 people around the world.

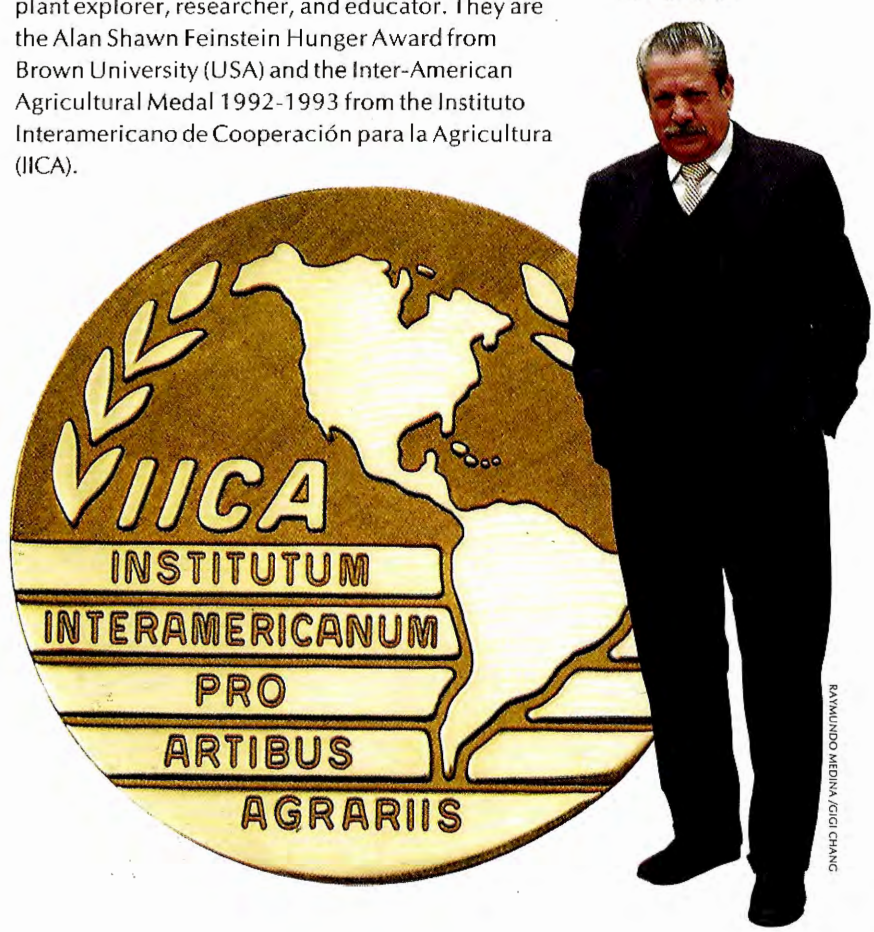
INFOANDINA is actually a CIP-backed activity that made progress by drawing on national partners' expertise to guarantee the initiative's adequate design and implementation. When necessary, CONDESAN has provided equipment, such as modems, the start-up costs for connecting to the local communication network, and support to get the linkup going. Frequently, CIP's own programs and partners serve as organizing hubs for the network, as in Huancayo, Puno, and Cajamarca in Peru; Cochabamba and La Paz in Bolivia; and Quito in Ecuador.

CIP hosted a conference in early 1994 that brought together 35 natural and social scientists, network representatives, and development specialists from Bolivia, Colombia, Ecuador, and Peru, as well as observers from Chile, Mexico, Canada, and the United States. In the future, INFOANDINA plans specialist-moderated electronic conferences on 10 topics, ranging from indigenous Andean knowledge to satellite mapping of natural resources.

Researcher Honored Twice

◆ CIP taxonomist Carlos Ochoa received two important prizes acknowledging his life's work as a plant explorer, researcher, and educator. They are the Alan Shawn Feinstein Hunger Award from Brown University (USA) and the Inter-American Agricultural Medal 1992-1993 from the Instituto Interamericano de Cooperación para la Agricultura (IICA).

A lifetime of science earned Carlos Ochoa two awards.



RAYMUNDO MEDINA /GIGI CHANG

Brown University recognized Ochoa's pioneering work with potatoes as a scientist and explorer. IICA acknowledged his meritorious contributions to the development of agriculture and improvement of rural life in Peru and in the Americas.

Ochoa announced that he would use the $10,000 cash prize from the Feinstein Award to establish an agricultural scholarship fund for students in his hometown of Cusco, Peru.

These awards are especially meaningful for a researcher working in the developing world. When Ochoa began his collecting missions, conditions were more difficult for researchers. He didn't have access to herbarium materials. He himself financed his early trips, and the publication of his first book on Peruvian wild potato species in 1962.

During his more than 30 years of collecting work, Ochoa often had to face more than the elements. Besides finding wild potatoes, he sometimes crossed paths with bandits, guerrillas, and foreign police.

The Washington Post called Ochoa "the Indiana Jones of the potato" and "raider of the lost spud." The Los Angeles Times referred to him as "the world's foremost spud spotter." At CIP, he is called "Professor," a tribute to his years as an educator at Peru's Universidad Nacional Agraria.

Over the years, Ochoa received help from researchers around the world. They included Latin American taxonomists, curators from herbaria in the United States, and botanists Dieter Washausen and José Cuatrecasas from the Smithsonian Institution.

"Ochoa's discoveries will enable scientists to develop new varieties that can grow under difficult environmental conditions, yield more, and resist insects and diseases," says Hubert Zandstra, CIP Director General.

Training field technicians is crucial to ensuring the conversion of CIP research into action in the field.

JESUS ALCAZAR

More Seeds for Burundi

◆ A good supply of clean seed is essential for potato production. CIP has thus worked with Burundi's Institut des Sciences Agronomiques du Burundi (ISABU) to strengthen the country's seed program and practically eliminate bacterial wilt disease from seed.

"The potato seed program in Burundi is one of the strongest in the Sub-Saharan Africa (SSA) region," says Donald Berríos, agronomist in CIP's liaison office in Burundi. "Cooperation with PRAPACE countries and ISABU's national potato program helps provide in vitro plantlets and prebasic tuber seed." This tuber seed is seed produced under strictly controlled conditions, such as in vitro or in the laboratory, unlike basic seed produced in the field.

Clean seed is produced from plantlets grown in tissue culture. Plantlets are then transferred to screenhouses to produce minitubers. These are multiplied as prebasic seed I and II at seed farms. This seed is then sold to Rural Development Projects (RDPs). RDPs further multiply seed and distribute it to farmers.

Potato seed production in Burundi has increased dramatically. In 1987, the seed farm at Mwokora (2,200 m.a.s.l.) produced 150.1 metric tons of prebasic seed, 65.8% of which was affected by bacterial wilt. In 1993, production at the Mwokora seed farm reached 327.7 tons, with only 0.2% bacterial wilt.

CIP assists potato and sweetpotato research in ISABU with support from Belgium's Administration Generale de la Coopération au Développement (AGCD). This project has helped to install additional screenhouses, diffused light storage areas, irrigation pumps, and other facilities.

"The system is well organized and effective," says Peter Ewell, CIP's SSA Regional Representative. "The potato program was the only ISABU seed program able to harvest seed in late 1993, in spite of an attempted coup and widespread rural strife."

CIP regional scientists also actively support ongoing potato seed programs in Kenya, Rwanda, and Uganda. This includes in-country training on seed management and pest and disease control.

Training for Success

◆ After four years of field testing in Peru, CIP's integrated pest management (IPM) technology for controlling the Andean potato weevil has shown that it can have a real impact. Studies indicate that farmers can reduce crop losses to as little as 5%,

down from 50%, and boost their family income by $350 per hectare.

A key to CIP's IPM strategy has been to package the technology with a model extension program, thus facilitating the conversion of research into impact in farmers' fields. This strategy includes courses for training local trainers; simple, inexpensive training and public awareness materials provided at cost to participating organizations; and technical assistance to local sponsors of IPM programs.

The United States Agency for International Development (USAID) approved a $770,000 three-year grant to CARE, the U.S. relief and development organization, to extend CIP's IPM technologies to low-income farm families in Peru's Sierra. The Center will assist with technical backstopping, training, and information services. This project will also focus on the potato tuber moth, another important insect pest that can devastate potatoes in the Andean region.

China—The Kingdom of Sweetpotato

◆ CIP researchers have been working for more than a decade in the Kingdom of Sweetpotato, China, which produces 85% of the world's sweetpotato. CIP sees potential for transferring experiences, results, and technology developed in China to other developing countries.

"We believe that this potential benefit from research on sweetpotato in China has been greatly underestimated," says Greg Scott, CIP economist and Leader of the Postharvest Management and Marketing Program.

China has made major progress in sweetpotato productivity. Although area planted dropped by 40% between 1961 and 1990, production tripled and yield more than doubled, reaching 16.6 tons per hectare.

China produces more than 104 million tons of sweetpotato per year (with an estimated value of US$75 per ton). But CIP is working with Chinese researchers to increase the crop's utilization. Currently, 40% of production is used for animal feed.

"Increased use of sweetpotato as animal feed follows a trend in developing countries," Scott says. "Shifts in utilization suggest that the sweetpotato sector is much more dynamic than production statistics indicate. Sweetpotato producers around the world are interested in improved technology."

The use of sweetpotato for feed responded to a shift in government policy from a system of production quotas to a free market system that allowed farmers to assume greater responsibility for what to produce and what to do with production. "Growth in incomes in cities also meant people could now diversify their diets to include more meat, such as pork," Scott says.


MASA IWANAGA

The sweetpotato as animal feed has driven production gains in China.

Prospects for expanded sweetpotato use in China thus appear strong for feed, and good for noodles and flour. CIP has worked on evaluating improved noodle-making technology on-farm using sweetpotato starch. This includes a cost analysis for noodle-making and the market for such products.

CIP continues to support research in China. This includes work on improved varieties for processing (varietal trials and laboratory evaluations), improved processing equipment (for farms or villages), and postgraduate degree training for young Chinese scientists. Efforts also focus on advising policy-makers on the potential for sweetpotatoes and supporting study tours to neighboring countries to participate in workshops and visit other research institutes.

CIP has evaluated sweetpotato materials that could have a future in China. One variety produces abundant leaves and stems, but no storage roots, and is designed for use as a fresh forage or silage.

This forage sweetpotato is high in protein (20-25%) and can yield 225 tons per hectare of fresh forage or silage per year. It can be grown with few inputs and under drought stress and low temperatures. The plants can also be harvested periodically for up to four years and provide excellent ground cover to prevent soil erosion.

CIP is now the only CGIAR center to have an office in China. By working with Chinese researchers on sweetpotato, CIP can help the country feed its 1.1 billion people.

Finance
and Administration

CIP began facing tough financial times in 1990. In a manner of speaking, Peru's severe economic crisis gave CIP a headstart in adjusting to a new, more demanding management environment. Now the Center has emerged from this difficult adjustment as a leaner, more efficient institution with tighter internal controls and more clearly defined goals. A sign of this enhanced performance is that CIP maintained a balanced budget through the year, despite unexpected reductions in funding and unbudgeted increases in expenditures.

Inflation in Peru skyrocketed to 7,650% in 1990 (320% in US dollar terms) and the government took harsh economic measures to defeat this hyperinflation. But these policies practically wiped out CIP's working capital and made Peru, where CIP spends 40% of its operating budget, a much more expensive country in which to work. While weathering Peru's economic storm, CIP saw its core funding drop from $17.7 million in 1990 to $14.7 million in 1993 because of the declining financial support to the CGIAR system.

This new reality meant that CIP had to change the way that it worked, set clearer priorities, break old habits, gain flexibility, and pare down or eliminate less essential activities. At the same time, these changes had to take place without undermining CIP's morale or a first-class work environment for internationally and locally recruited staff. Here are a few examples from 1993, building on measures from previous years:

- CIP reduced its liabilities-to-assets ratio to 23% in 1993, from 31% in 1992, so that it would have more leverage against future financial shifts.
- Full implementation of the Financial Information System (CIPFIS)—an on-line, project-based system—helped to closely monitor budget performance. CIPFIS also became a powerful management tool for resource allocation and decision-making, especially in the conversion to a project-based budgeting system.
- Research staff, especially project and subproject coordinators, assumed decentralized control of expenditures and gained financial awareness.
- The Deputy Director General for Research and his staff reduced the number of projects and subprojects from 300 plus to 196, thus decreasing administrative overhead and simplifying management.
- The Office of the Executive Officer reorganized itself into four operating units for more functional management.

Balance Sheet (US$000)	**1993**	**1992**
	Year ended 31 December	
Current Assets		
Cash and short-term deposits	1,684	3,341
Securities	49	
Accounts receivable:		
Donors	2,382	4,934
Employees	440	250
Others	130	177
Inventories	863	800
Prepaid expenses	931	533
Total current assets	6,479	10,035
Investments	451	622
Loans to employees	424	23
Fixed Assets		
Property, plant, and equipment	19,781	19,359
Less accumulated depreciation	(10,012)	(9,596)
Total fixed assets (net)	9,769	9,763
Total Assets	**17,123**	**20,443**

RAYMUNDO MEDINA

This table summarizes CIP's finances in 1993. A complete financial statement, audited by Arthur Anderson & Co.-Coleridge y Asociados, is published separately, and can be requested from the Controller's Office, CIP headquarters, Lima, Peru.

BALANCE SHEET (US$000)	1993	1992
	Year ended 31 December	
Current Liabilities		
Bank overdrafts	74	119
Short-term loans	592	900
Advances from donors	793	3,004
Accounts payable:		
Organizations and contractors	1,097	691
Suppliers, taxes, and others	968	862
Total current liabilities	3,524	5,576
Long-term Loan	437	
Provisions for Severance Indemnities	29	705
Fund Balances		
Capital invested in fixed assets	9,769	9,763
Capital fund	2,179	2,107
Unexpended fund balance	1,185	2,292
Total fund balances	13,133	14,162
Total Liabilities and Fund Balances	**17,123**	**20,443**

- The Information Department switched from a centralized, expensive computer system built around aging VAX microcomputers to a low-cost, flexible, decentralized, open architecture using PC compatibles and servers. This strategy gave research scientists and other users the chance to help set priorities in information management.

CIP's management strategy began to receive dividends in 1993. The Peruvian government had created a stable economic environment with declining inflation (only 39.6%, with 20% forecast for 1994), a more predictable economic performance, clear ground rules, and a trend toward more efficient administration.

Dividends came from both man and nature, as even an acute drought in the Andes ended, and abundant rains permitted an agricultural recovery and an end to power rationing. The year before, CIP had spent $200,000 on diesel fuel to ensure power for its mission-critical installations during blackouts and brownouts. CIP also got an unexpected boost because security conditions in Peru dramatically improved. Since the mid-1980s, CIP had to divert resources to strengthen security because the Shining Path guerrilla movement and competing groups were spreading from Peru's impoverished Sierra into Lima. As a result, CIP shifted some field research activities to safer places in Peru or to its experiment station in Ecuador. This situation also meant that insurance premiums increased sixfold over three years.

However, following the government's capture of the Shining Path founder and leader, Abimael Guzmán, in mid-1992, guerrilla activities dropped off sharply in the countryside and Lima. By early 1993, operations at the Huancayo, San Ramón, and Yurimaguas experiment stations had returned to normal and researchers returned to the field. CIP's Executive Committee of the Board of Trustees saw the change firsthand when it visited the Huancayo station in September 1993. The safer environment allowed CIP to cut back on security for research staff and installations. The three stations have reduced their security costs by more than 50% since 1992, resulting in savings of $85,000.

Donor **Contributions** in 1993

DONOR (ranked by levels of core contribution in US$000)	CORE	COMPLEMENTARY
United States of America	2,000	495
Japan	1,250	
European Economic Community	1,179	
Switzerland	1,072	3,009
Canada	1,056	
World Bank	1,000	
Inter-American Development Bank	976	
Sweden	963	
United Nations Development Programme	861	284
Germany	827	17
United Kingdom	722	160
Denmark	667	
Netherlands	655	35
Austria	350	
Italy	350	
France	252	47
Norway	172	
Australia	146	381
Belgium	112	122
China	90	
Spain	70	
Korea	60	
India	25	
International Development Research Centre		209
Finland		27
OPEC Fund for International Development		24
British Embassy (in Peru)		21
Asian Development Bank		11
Scottish Crop Research Institute		11
Sociedad Química y Minera de Chile		2
Calbee Potato Inc.		1
Total Contributions	**14,855**	**4,856**

CIP has had broad, strong support from its 31 donors. Seven funders provided contributions worth one million dollars or more each. Another seven gave more than half a million dollars each.

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JORGE DEUSTUA

Staff in 1993

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Peter Gregory, PhD, Deputy Director General for Research
Roger Cortbaoui, PhD, Associate Director for International Cooperation
Kenneth J. Brown, PhD, Senior Advisor for Management and International Cooperation (until July)

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Thomas S. Walker, PhD

Germplasm Management and Enhancement
Ali Golmirzaie, PhD

Disease Management
Edward R. French, PhD

Insect and Nematode Management
Kandukuri V. Raman, PhD (until Jan.)
Fausto Cisneros, PhD (from Feb.)

Propagation, Crop Management
Patricio Malagamba, PhD

Postharvest Management, Marketing
Gregory J. Scott, PhD

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(*country*) = post location, but activity regional in scope
country = post location

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Liaison Office - Chile
Primo Accatino, PhD

Sub-Saharan Africa
Sylvester Nganga, PhD, Regional Representative (*Kenya*) (until July) [2]
Peter Ewell, PhD (*Kenya*) (from Aug.)
Liaison Office - Burundi
Donald Berríos, MS [3]
Liaison Office - Cameroon
Carlo Carli, Ing. Agr. [2]

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South and West Asia
Mahesh Upadhya, PhD, Regional Representative (*India*)

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Liaison Office - Philippines
Enrique Chujoy, PhD

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Edward Carey, PhD, Breeder (*Kenya*) [4]
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T.R. Dayal, PhD, Breeder (*India*) [2]
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Haile M. Kidane-Mariam, PhD, Breeder (*Kenya*)
Juan Landeo, PhD, Breeder [4]

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Zósimo Huamán, PhD, Germplasm Curator [4]
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Carlos Ochoa, MS, Taxonomist, Consultant
Bodo Trognitz, PhD, Geneticist
Kazuo Watanabe, PhD, Cytogeneticist (*USA*) [4]

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[1] Staff who joined during the year
[2] Staff who left during the year
[3] Staff funded by special projects
[4] Project leader

Nematology and Entomology

Parviz Jatala, PhD, Nematologist, Head of Department (until July) [2,4]

Fausto Cisneros, PhD, Entomologist, Head of Department (from July) [4]

Ann Braun, PhD, Entomologist (*Indonesia*) [1]

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Kandukuri V. Raman, PhD, Entomologist [2]

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Upali Jayasinghe, PhD, Virologist [4]

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Lod J. Turkensteen, PhD, Adjunct Scientist, *Netherlands*

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Gregory J. Scott, PhD, Economist

Jurg Schneider, PhD, Associate Expert, *Indonesia* [3]

Research Support

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Víctor Otazú, PhD, Superintendent of San Ramón Experiment Station [2]

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Pons Batugal, PhD, Technology Transfer Coordinator

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Bill Hardy, PhD, English Writer/Editor [1]

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Michael L. Smith, Journalist, Head of Communication Unit (from Nov.) [1]

James H. Bemis, PhD, Consultant [1,2]

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Office of the Deputy Director General for Finance and Administration

William A. Hamann, BS, Assistant to the DDGF&A

Office of the Deputy Director General for Research

José Luis Rueda, PhD, Andean Natural Resources Management Coordinator

GIGI CHANG

Carlos Ochoa, Hubert Zandstra, Nicole Smit, and Mahesh Upadhya examine seedlings in a screenhouse.

Special Country Projects
SEINPA, Peru
Efraín Franco, MS, Economist, Team Leader [3]

FORTIPAPA, Ecuador
Albéric Hibon, PhD, Economist, Team Leader [3]

PROINPA, Bolivia
André Devaux, PhD, Seed Specialist, Team Leader [3]
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Javier Franco, PhD, Nematologist [3,4]
E. Fernández-Northcote, PhD, Virologist [3]
Greta Watson, PhD, Human Ecologist [3]

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Rubén Darío Estrada, MS, Natural Resources Economics [1,3]
Carlos León-Velarde, PhD, Animal Production Systems [1,3]
Osvaldo Paladines, PhD, Andean Pastures [1,3]
Elías Mujica, PhD, Policy and Rural Development [1,3]

Networks
PRAPACE
Marco Soto, PhD, Coordinator (*Rwanda*) [2]

CIP's annual staff meeting in Lima provides an opportunity for scientific debate and project coordination between regionally based and headquarters staff.

GIO CHANG

SAPPRAD
Eufemio T. Rasco Jr., PhD, Coordinator (*Philippines*)

UPWARD
Gordon Prain, PhD, Coordinator (*Philippines*)

Controller's Office
Carlos Niño-Neira, CPA, Controller
Oscar Gil, CPC, Internal Auditor

Office of the Executive Officer
César Vittorelli, Agr. Eng., Acting Executive Officer

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Gisella Orjeda, MS, Biologist
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Roxana Salinas, Ing. Agr., Biotechnologist

Nematology and Entomology
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José Luis Zapata, MS, Plant Pathologist, *Colombia*

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Víctor Suárez, BS, Statistician
Inge Verdonk, Ir., Nutritionist, *Philippines* [3]

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Lauro Gómez, Acting Supervisor, Huancayo
Hugo Goyas, Ing. Agr., Supervisor, Yurimaguas
Abilio Pastrana Ramírez, Accountant, San Ramón
Mario Pozo, Ing. Agr., Superintendent, La Molina
Miguel Quevedo, Ing. Agr., Off-station Field Supervisor, Cajamarca

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Beatriz Eldredge, Biometrist, Research Data Base Assistant
Alfredo García, MS, Biometrist, Coordinator

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Américo Valdez, MS, Training Material Specialist

Information
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Gigi Chang, MS, A.V. Section Coordinator
Information Technology Unit
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Jorge Palomino, VAX and Network Manager
Pía María Oliden, Database Manager
Jorge Apaza, PC Manager [2]
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Carmen I. Podestá, Archives and Verification

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Blanca Joo, CPA, Accountant
Eduardo Peralta, Accountant
Budget Unit
Denise Giacoma, CPA, Accountant
Alberto Monteblanco, CPA, Accountant
Treasury Unit
Luz Correa, CPA, Accountant
Sonnia Solari, Chief Cashier

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Marcela Checa, Liaison Officer

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Equipment and Maintenance
Gustavo Echecopar, Ing. Agr., Supervisor
Security
Jorge Locatelli, Capt. (ret.), Supervisor
Transportation
Carlos Bohl, Supervisor
Hugo Davis Paredes, Chief of Vehicle Maintenance
Jacques Vandernotte, Chief Pilot
Percy Zuzunaga, Co-Pilot

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Estanislao Pérez Aguilar, Paymaster
Martha Piérola, BS, Social Worker
Germán Rossani, MD, Medical Officer [2]
David Halfin, MD, Medical Officer [1]

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Arturo Alvarez, Local Purchasing and General Services Officer
Jorge Luque, MBA, Warehouse Officer
José Pizarro, Importations Officer

Visitors, Travel, and Auxiliary Services
Rosa Rodríguez, Manager
Auxiliary Services
Mónica Ferreyros, Supervisor
Travel
Ana María Secada, Supervisor
Visitor's Office
Mariella Corvetto, Supervisor

Contributions to **Scientific** Literature

Amalin, D.M. and E.A. Vásquez. 1993. A handbook on Philippine sweetpotato arthropod pests and their natural enemies. Philippine Root Crops Research & Training Center/International Potato Center (PRCRTC-ViSCA/CIP), Los Baños, Philippines. 82 p.

Canto-Sáenz, M. and A. González. 1993. Uso de gasolina para la separación de quistes de *Globodera pallida* y materia orgánica en muestras extraídas de suelo. Nematropica 23(1):57-61.

Cárdenas, H. and Z. Huamán. 1993. Valor nutritivo del camote, *Ipomoea batatas*, en una muestra representativa de cultivares del Perú. Boletín de Lima 15(87):63-68.

Centro Internacional de la Papa. 1993. El agroecosistema andino: Problemas, limitaciones, perspectivas. Taller Internacional sobre el Agroecosistema Andino, 30 Marzo-2 Abril de 1992. Lima, Peru. 355 p.

Cho, H.M., H.Y. Kim-Lee, and I.G. Mok. 1993. [Induction of haploids through parthenogenesis in potato. 3. Selection of haploids by pigment markers on seed and plant.] Korean J. Breeding 25(1):1-11. (In Korean.)

Collion, M.H. and P. Gregory. 1993. Priority setting at CIP: An indicative framework for resource allocation. CIP-ISNAR, Lima, Peru. 55 p.

Consorcio para el Desarrollo Sostenible de la Ecorregión Andina (CONDESAN)/CIP. 1993. Planificación y priorización de actividades de investigación y acción para el desarrollo sostenible de la ecorregión andina: Informe final. Taller de Planificación Participativa por Objetivos, 22-26 Marzo 1993, Lima, Peru. CIP, Lima, Peru. 82 p.

Covarrubias Z., C., C.C. Bustos, and L.P. Accatino. 1993. Diagnóstico socioagroeconómico del camote en Chile. Serie La Platina No. 41. INIA-CIP, Santiago, Chile. 23 p.

Crissman, C.C., L. McA. Crissman, and C. Carli. 1993. Seed potato systems in Kenya: A case study. CIP, Lima, Peru. 43 p.

Daza, M. and H. Rincón. 1993. Perfil tecnológico del camote (batata) en la costa central del Perú. Documento de Trabajo CIP No. 1993-1. CIP, Lima, Peru. 38 p.

Ekanayake, I.J. 1993. Evaluación de resistencia a la sequía en genotipos de papa y batata (camote). Guía de Investigación CIP No. 19. CIP, Lima, Peru. 16 p.

RAYMUNDO MEDINA

Ekanayake, I.J. and J.H. Dodds. 1993. In vitro testing for the effects of salt stress on growth and survival of sweetpotato. Scientia Horticulturae 55(3/4):239-248.

El-Sheikh, T.M., N.M. Wanas, and R.A. El-Bedewy. 1993. Evaluation of a local cultivar and two new clones of sweetpotato for yield and storageability. Zagazig J. Agric. Res. 20(1B):n.p.

Fonseca, C., J.P. Molina, and E.E. Carey. 1993. Selección de nuevas variedades de camote (batata) con la participación de los agricultores. Guía de Investigación CIP No. 5. CIP, Lima, Peru. 28 p.

Forbes, G.A., O. Trillos, L. Turkensteen, and O. Hidalgo. 1993. Field inoculation of potatoes with *Phytophthora infestans* and its effect on the efficiency of selection for quantitative resistance in the plants. Fitopatología 28(2):117-120.

Fuentes, S. and U. Jayasinghe. 1993. Amarillamiento de la papa, causado por un nuevo virus baciliforme. Fitopatología 28(1):22-37.

Fuglie, K.O. 1993. Measuring welfare benefits from marketing improvements: Potato storage in Tunisia. CIP Working Papers Series No. 1993-2. CIP, Lima, Peru. 27 p.

González, A. and M. Canto-Sáenz. 1993. Comparación de cinco enmiendas orgánicas en el control de *Globodera pallida* en microparcelas en Perú. Nematropica 3(2):133-139.

González, A. and J. Franco. 1993. Técnicas y métodos para estudios del nematodo quiste de la papa *Globodera* spp. CIP-PROINPA, Lima, Peru. 100 p.

International Potato Center. 1993. Sweetpotato: postharvest topics—Poscosecha de batata (camote)—Aspects de post-recolte de la patate douce. CIP Bibliography—Bibliografía CIP—Bibliographie CIP No. 28. Lima, Peru. 133 p.

Jayasinghe, U. 1993. Le virus de l'enroulement de la pomme de terre PLRV. Bulletin d'Information Technique No. 22. CIP, Lima, Peru. 21 p.

Jayasinghe, U. and L.F. Salazar. (eds.). 1993. Basic techniques in plant virology: Fascicles. CIP Pathology Dept. Technical Training Unit No. 1. Lima, Peru. (Also in Spanish.)

Jayasinghe, U., J. Rocha, and C. Chuquillanqui. 1993. Feeding behavior of potato aphids on potato cultivars resistant and susceptible to potato leafroll virus (PLRV). Fitopatología 28(2):107-111.

This list includes selected journal articles, book chapters, and CIP publications. CIP staff made many other contributions such as invited papers presented at meetings and published in proceedings. CIP's Library can provide a complete list of publications generated by CIP in 1993.

Kihurani, A.W., L.G. Skoglund, and R.W. Gatumbi. 1993. Occurrence of sweetpotato chlorotic leaf distortion caused by *Fusarium lateritium* in Kenya. Plant Dis. 77(12):1260-1261.

Manetti, P. and F. Ezeta (comps.). 1993. Memorias: Taller de manejo integrado de plagas, 24-26 Feb. 1993, Balcarce, Argentina. PROCIPA-INTA-CIP, Lima, Peru. 98 p.

Mont, J., M. Iwanaga, G. Orjeda, and K. Watanabe. 1993. Abortion and determination of stages for embryo rescue in crosses between sweetpotato, *Ipomoea batatas* Lam. (2n = 6x = 90), and its wild relative, *I. trifida* (H.B.K.) G. Don (2n = 2x = 30). Sexual Plant Reproduction 6(3):176-182.

Nakashima, J.T., L.F. Salazar, and K. Wood. 1993. Sweetpotato feathery mottle potyvirus (C1 isolate) virion and RNA purification. J. Virol. Methods 44:109-116.

Ochoa, C. 1993. Karyotaxonomic studies on wild Ecuatorian tuber-bearing *Solanum*, Sect. Petota. Phytologia 75(6):422-431.

Ortiz, R., M. Iwanaga, and S.J. Peloquin. 1993. Male sterility and 2n pollen in 4x progenies derived from 4x x 2x and 4x x 4x crosses in potatoes. Potato Res. 36(3):227-236.

Ortiz, R., C. Martin, M. Iwanaga, and H. Torres. 1993. Inheritance of early blight resistance in diploid potatoes. Euphytica 71(1-2):15-19.

Querci, M., R. van der Vlugt, R. Goldbach, and L.F. Salazar. 1993. RNA sequence of potato virus X strain HB. J. Gen. Virol. 74(10):2251-2255.

Raman, K.V., M. Palacios, and N. Mujica. 1993. Control biológico de la polilla de la papa *Phthorimaea operculella* por el parasitoide *Copidosoma koehleri*. Boletín de Capacitación CIP No. 3. CIP, Lima, Peru. 28 p.

Sala, F. and P.M. Oliden. 1993. Guía para el uso de información bibliográfica en micro-isis: Base de datos del CIP. CIP, Lima, Peru. 27 p.

Sawor, T., P. Chadikun, E. Atmodjo, E. Relwaty Silmorang, G.D. Prain, and I.G. Mok. 1993. Interdisciplinary collection of *Ipomoea batatas* L. germplasm and associated indigenous knowledge in Anggi, Irian Jaya, Indonesia. UPWARD/Universitas Cenderawasih/CIP, Los Baños, Philippines. 33 p.

Schneider, J., C.A. Widyastuti, and M. Djazuli. 1993. Sweetpotato in the Baliem valley area, Irian Jaya: A report on collection and study of sweetpotato germplasm, April-May 1993. CIP/ESEAP Region/CRIFC/RTCRC, Bogor, Indonesia. 54 p.

Scott, G.J. and J.E. Herrera. 1993. Desarrollo de productos para procesamiento rústico: Métodos de investigación socio-económica. Archivos Latinoamericanos de Nutrición (Venezuela) 43(3):105-118.

Scott, G.J. and J.E. Herrera. 1993. El programa andino cooperativo de investigación en papa. PRACIPA-Comercialización: Resultados e impacto de una red de investigación. Investigación Agraria: Economía (Spain) 8(2):223-238.

Scott, G.J., P.I. Ferguson, and J.E. Herrera (eds.). 1993. Product development for root and tuber crops. Vol. 3: Africa. International Workshop on Root and Tuber Crop Processing, Marketing and Utilization in Africa, 26 Oct.-2 Nov. 1991, Ibadan, Nigeria. CIP, Lima, Peru. 506 p.

Scott, G.J., D. Wong, and M. Alvarez. 1993. Improving village level processing in developing countries: The case of potatoes. Ecol. Food Nutri. 30:145-163.

Silva de Palacios, H.V., E.R. French, and J. Elphinstone. 1993. Interacción de *Erwinia carotovora* ssp. *carotovora* con especies de *Fusarium* en tubérculos de cuatro cultivares de papa en el Perú. Fitopatología 28(2):112-116.

Swindale, A. 1993. Sweetpotato production systems in the Dominican Republic: A comparison of two agroecological zones. In: Dvorak, K.A. (ed.). Social science research for agricultural technology development. CAB International, Wallingford, UK. p. 1-18.

Torres, H., A.M. Ortega, J. Alcázar, T. Ames, and L. Palomino. 1993. Control biológico del gorgojo de los Andes (*Premnotrypes* spp.) con *Beauveria brongniartii*. Guía de Investigación CIP No. 8. CIP, Lima, Peru. 43 p.

Trognitz, B.R. and P.E. Schmiediche. 1993. A new look at incompatibility relationships in higher plants. Sexual Plant Reproduction 6(3):183-190.

Watanabe, K.N. and M. Orrillo. 1993. An alternative pretreatment method for mitotic chromosome observation in potatoes. Am. Potato J. 70(7):543-548.

Wiersema, S.G. 1993. Développement physiologique des semences de pomme de terre. Bulletin d'Information Technique No. 20. CIP, Lima, Peru. 16 p.

Core Research in 1993

Program, Project, and Activity	Locations and Partner Institutions
PROGRAM 1: PRODUCTION SYSTEMS	
Characterization of constraints and opportunities for potato production	
Yield-gap analysis	• Ecuador - INIAP
Farmer participation in clonal evaluation	• Bolivia - PROINPA
Characterization of potato production systems	• East Africa - PRAPACE
Characterization of sweetpotato constraints and opportunities	
Sweetpotato characterization	• Africa • India - CTCRI (ICAR) • Southeast Asia
Users' Perspective with Agricultural Research and Development (UPWARD)	• Asia • China* • Netherlands - Wageningen U
Adaptation and integration of potato production technologies	
Varietal adaptation to diverse agroecologies	• Bolivia - PROINPA • Chile - INIA • North China • Peru - U Tacna • Philippines - MMSU
Adaptation of cultivated diploid potato species	• USA - NCSU
Intercropping	• Tunisia - ESH
Expanding production to new regions	• Burundi - ISABU • Dominican Republic - MA • USA - U Georgia
Adaptation and integration of sweetpotato production technologies	
Varietal adaptation to diverse regions	• Africa • Asia • Cameroon - IRA • China - GAAS • Egypt - MA • India - CTCRI (ICAR) • Peru - INIA
Evaluation of the impact and sustainability of potato production technologies	
Impact assessment	• Argentina - INTA • Bangladesh - BARI • Bolivia - IBTA • Chile - INIA • China - CAAS • Colombia - ICA • East Africa - PRAPACE • Ecuador - INIAP • Egypt - ARC • Ethiopia - IAR • India - CPRI (ICAR) • Indonesia - LEHRI • Kenya - KARI • Madagascar - FIFAMANOR • Nepal - LPRP • Peru - INIA • Sri Lanka - DA • Taiwan -TARI • Vietnam - BRC, INSA
Pesticides and sustainability	• Canada - McMaster U • Ecuador - INIAP, MA • USA - Cornell U, Montana SU
PROGRAM 2: GERMPLASM MANAGEMENT AND ENHANCEMENT	
Potato collection and characterization	
Collection, characterization, conservation, and distribution	• Peru - CERRGETYR/U Cusco • USA - USDA
In vitro conservation	• Ecuador - INIAP • Peru
Germplasm improvement for use in marginal but sustainable agriculture	• Chile - U Austral

* For reasons of space, we will write China instead of People's Republic of China in this list.

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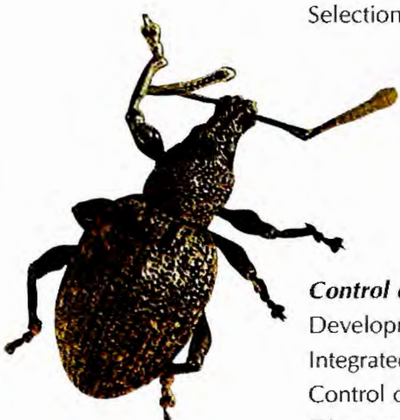
CIP's extensive research collaboration brings together many partners worldwide. This table summarizes of CIP's core research activities in 1993, and the principal places and institutions involved.

Program, Project, and Activity	Locations and Partner Institutions
Potato germplasm enhancement, application of molecular technology	
Germplasm enhancement	• Italy - ENEA • Peru
Genome mapping and application of marker technology	• Argentina - INTA • Brazil - CNPH (EMBRAPA) • Netherlands - CPRO - DLO, IPO - DLO • Philippines - UPLB • UK - SCRI • USA - Cornell U
Potato genetic engineering for pest and disease resistance	• Austria - ARCS • Belgium - PGS • Chile - CUC • Italy - Viterbo U, U Naples • Peru • UK - Axis Genetics Ltd., ODA • USA - LSU
Sweetpotato collection and characterization	
Collection, characterization, conservation, documentation, distribution, and evaluation	• Argentina - INTA • Bangladesh - TCRC (BARI) • Brazil - CNPH (EMBRAPA) • China - XSPRC • Mexico - INIFAP • Paraguay - IAN • Peru
In vitro conservation and virus eradication	• Austria - ARCS • Peru • USA - Cornell U • Venezuela - FONAIAP
Collection and evaluation of indigenous knowledge	• Indonesia - UPWARD
Sweetpotato germplasm enhancement and molecular techniques	
Combining traits using conventional techniques in diverse agroecologies	• China - GAAS, JAAS • East and West Africa (Cameroon, Kenya, Nigeria, Tanzania, Uganda, and national programs) • Indonesia - CRIFC • Japan - JICA • Peru
Utilization of wild relatives of sweetpotato	• Peru
Molecular techniques for sweetpotato improvement	• Japan - Nagoya U • Peru
Andean root and tuber crop collection and characterization	
Germplasm management in farmers' fields (in situ)	• Bolivia • Peru - INIA, U Cusco
Development of a network for ex situ conservation	• Bolivia • Brazil • Ecuador • Peru
In vitro conservation and distribution	• Ecuador • Peru - UNMSM, U Ayacucho
Pathogen eradication and seed production	• Ecuador - INIAP • Peru - INIA, UNCP, UTC
Commodity systems analysis	• Bolivia • Ecuador - U Ambato • Peru - NGO
PROGRAM 3: DISEASE MANAGEMENT	
Control of potato late blight *(Phytophthora infestans)*	
Breeding and screening for resistance	• China - SAAS • Colombia - ICA • Mexico - INIFAP • Peru - INIA
Integrated control	• Bolivia - PROINPA
Fundamental host-pathogen research	• Ecuador - FORTIPAPA, Central & Catholic universities, Quito, CIP - Quito • Kenya - KARI • Netherlands - IPO - DLO • Peru - INIA • Philippines - UPLB • Scotland - SCRI • USA - Cornell U

Program, Project, and Activity	Locations and Partner Institutions
Integrated control of potato bacterial wilt	
Fundamental research for control strategies	• China - CAAS • Colombia - ICA • England - RES • Italy - IAO • Peru
Development of resistance	• Brazil - CNPH (EMBRAPA) • Indonesia - LEHRI • Peru - INIA • Philippines - DA
Integrated control	• Burundi - ISABU • Kenya - KARI • Peru - CEPESER, INIA
Combining resistances to potato viruses and fungi	
Development of virus- and viroid-resistant materials	• France - INRA • Peru - UNA • Poland - IPR, IZ • Tunisia - CPRA
Breeding for early blight resistance	• Peru
Selection of combined resistance to viruses and fungi	• Argentina - INTA • Brazil - CNPH (EMBRAPA) • Cameroon - MA • Central America & the Caribbean • Colombia - ICA • East Africa - Kabete RS, Mau Narok RS • Ecuador - INIAP • Egypt - MA • Ghana - CSD • Mali - MA • Nigeria • Paraguay - MA • Peru - INIA • PROCIPA • Uruguay - CIAAB (INIA) • USA - Cornell U • Venezuela - FONAIAP
Control of field and storage diseases of Andean root and tuber crops	
Development of resistance to soft rot and blackleg	• Peru - UNA
Integrated control of *Erwinia* diseases	• Chile - INIA • Tunisia - ESH
Control of soil-borne fungi	• Peru - INIA
Diseases of ARTC	• Peru
Detection and control of potato viruses	
Resistance to PLRV	• Peru - U Ica • Scotland - SCRI
Detection of viruses and viroids	• Bolivia - PROINPA • China - U Inner Mongolia • Peru
Epidemiology of PVY	• Tunisia - INRAT
Transmission of potato viruses and viroids through TPS	• Peru
Identification and control of sweetpotato viruses	
Detection, identification, and eradication of viruses	• Peru
Resistance to viruses	• Israel - Volcani Center • Peru - UNA
Integrated control	• Kenya • Madagascar • Rwanda • Tanzania
Control of bacterial and fungal diseases of sweetpotato	
Etiology of fungal and bacterial diseases	• Kenya - NAL • Peru • USA - LSU
Resistance to diseases	• Peru • Southeast Asia - SARIF and NRI - UK



Program, Project, and Activity	Locations and Partner Institutions
Molecular approaches for detection and control of pathogens	
Genetic resistance and probe development	• Peru
Genome structure	• Peru • England - U Birmingham
Pathology of Andean roots and tubers	
Detection and characterization of viruses	• Bolivia - PROINPA • Ecuador - INIAP • Peru - CICA - Cusco, INIA - Puno, U Ayacucho, UNA, UNMSM
Elimination of pathogens	• Peru - INIA, UNCP, UTC
Production loss by viruses	• Bolivia - PROINPA • Ecuador - INIA • Peru - CICA, UNCP
PROGRAM 4: INSECT AND NEMATODE MANAGEMENT	
Potatoes with resistance to major insect and mite pests	
Development of resistant genotypes for potato tuber moth and leafminer flies	• Peru • USA - UNDP
Potatoes with glandular trichomes	• Peru • USA - Cornell U
Transgenic potatoes with insect resistance	• Belgium - PGS • Peru
Field evaluation of resistant plants	• Peru - CIED
Integrated methods for control of potato tuber moth	
Generation of technologies	• Bolivia • Colombia • Dominican Republic • Peru • USA - UNDP
Use of sex pheromones and granulosis virus	• Bolivia • Colombia & Peru - PRACIPA • Dominican Republic - MIP • Mexico & Costa Rica - PRECODEPA • Tunisia
Applied field management	• Bangladesh - BARI, TCRC • Bolivia - PROINPA • Colombia - ICA • Dominican Republic - MIP • Egypt • Kenya - KARI • Morocco - IAV, INRA • Tunisia - CPRA, INRAT • Venezuela - FONAIAP • Yemen - AREA, SPPC, YGPPP
Integrated methods for control of sweetpotato weevil	
Development of resistance	• Asia • Peru • USA - Miss SU
Use of sex pheromones	• Cuba • Dominican Republic • USA - U Fla
Biological control	• Cuba • Peru • USA - U Fla
Applied field management	• Bangladesh - BARI, TCRC • Burundi • Cuba - INIVIT • Dominican Republic - MIP • India • Kenya - ICIPE, KARI • Philippines - UPLB, ViSCA • Uganda
Integrated methods for control of sweetpotato nematodes	
Development of resistance	• Peru
Applied field management	• Peru - U Cusco, farmer co-ops

Program, Project, and Activity	Locations and Partner Institutions
Integrated methods for control of Andean potato weevil	
Development of resistance	• Peru - INIA
Cultural and biological control methods	• Bolivia - PROINPA • Peru - INIA
Applied field management	• Bolivia - PROINPA • Colombia - ICA • Ecuador - FORTIPAPA, FUNDAGRO, INIAP • Peru - CARE, INIA, TALPUY
Integrated methods for control of potato cyst nematode and false root-knot nematode	
Crop rotation schemes	• Peru (Cajamarca, Cusco, Puno)
Applied field management	• Bolivia - PROINPA • Ecuador - INIAP • Peru - INIA • PRACIPA
PROGRAM 5: PROPAGATION, CROP MANAGEMENT	
Propagation of healthy clonal potato planting materials in diverse agricultural systems	
Research support to in-country basic seed programs	• Bolivia - PROINPA • Burundi - ISABU • Cameroon - IRA • Colombia - ICA • Ecuador - FORTIPAPA, INIAP • India - CPRI (ICAR) • Italy - IAO • Paraguay - IAN, SEAG • Peru - SEINPA • Philippines - PCARRD • Uganda • Venezuela - FONAIAP • West Africa
Sexual potato propagation	
Breeding for improved TPS families	• Argentina - INTA • Chile - INIA • China - SAAS, YNU • India • Italy - U Naples • Kenya • Peru
TPS agronomic adaptation to diverse agroecologies	• China - CAAS • Egypt • India - CPRI (ICAR) • Indonesia - LEHRI • Italy - IAO • Montserrat - CARDI • Morocco - IAV • Nicaragua - MA • Paraguay - IAN • Peru - INIA, SEINPA • Philippines • Sri Lanka • Tunisia - CPRA • Vietnam
Studies on TPS production	• Bangladesh - TCRC • Chile - INIA • India - CPRI (ICAR) • Indonesia - LEHRI • Peru • Turkey - AARI
Sweetpotato production through improved management techniques	
Crop management practices	• Burundi - ISABU • Cameroon - IRA • China - GAAS, UCRI, • Peru - UNA • Philippines
Studies on tolerance of abiotic stresses	• China - GAAS, UCRI • Egypt • Peru - U Tacna • Philippines
Management of forage-type sweetpotatoes	• Peru - UNA
Maintenance, international distribution, and monitoring of performance of advanced potato germplasm	
Ongoing activities (seed units)	• Kenya • Peru • Philippines

Program, Project, and Activity	Locations and Partner Institutions
Maintenance, international distribution, and monitoring of performance of advanced sweetpotato germplasm	
Ongoing activities (seed units)	• Kenya • Peru • Philippines
Abiotic stresses and potato crop management	
Breeding for improved tolerance of abiotic stresses	• Bolivia - PROINPA • Chile - INIA • Peru - U Tacna • Philippines • Southeast Asia
Agronomic research for potatoes grown under stress	• Egypt - MA • Peru - UNA • Philippines - PCARRD • Uganda - MA • USA - U Georgia
Propagation of Andean root and tuber crops and management of Andean natural resources	
Seed production, Andean root and tuber crops	• Ecuador - INIAP • Peru - INIA, PICA, UNCP, UNDAC
Management of Andean natural resources	• Peru - UNA

PROGRAM 6: POSTHARVEST MANAGEMENT, MARKETING

Expanding utilization of potato in developing countries	
Low-cost storage of table and seed potatoes	• Egypt - MA • India - CPRI (ICAR) • Kenya - KARI • Netherlands - Wageningen U • Philippines - UPLB • Thailand - Chiang Mai U
Potato breeding for processing	• India - CPRI (ICAR) • Peru - INIA • Philippines - PCARRD, Benguet U
Marketing and demand for potatoes	• Bangladesh • Bolivia - PROINPA • England - Oxford U • India - IARI • Netherlands - Wageningen U • USA - IFPRI
Potato processing	• China - CAAS • Peru - Centro de Ideas
Product development for sweetpotato in developing countries	
Evaluation and distribution of elite sweetpotato materials for processing	• Peru - INIA, UNA • USA - NCSU
Marketing and demand for sweetpotatoes	• Argentina - IESR/INTA • China - CAAS, CNCQS • Netherlands - Wageningen U • Peru - INIA • Philippines - PCARRD • SAPPRAD • USA -Stanford U
Processing of sweetpotato	• Burundi - ISABU • Cameroon - PDA, IRA • China - CAAS, SAAS • India - CTCRI (ICAR) • Italy - FAO • Kenya - KARI, U Nairobi • Peru - IIN, UNA • Philippines - PCARRD, UPLB • SAPPRAD • Tanzania - TFNC • UK - NRI • USA - Cornell U, UNDP

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Training in 1993

Program, Title, and Topics	Countries Represented	Partner Institution
PROGRAM 1: PRODUCTION SYSTEMS		
Course on sweetpotato crop (3 days) General production course in the central jungle of Peru for the eastern foothills of the Andes.	Peru	Pichis-Palcazú Special Project
PROGRAM 2: GERMPLASM MANAGEMENT AND ENHANCEMENT		
Workshop on complementation of biotechnological and conventional methods for genetic improvement of food crops (5 days)	Argentina, Bolivia, Brazil, Chile, Colombia, Cuba, Mexico, Paraguay, Peru, Uruguay	FAO/CIP/PROCISUR /IICA/INIA
Workshop on improvement of potato assisted by biotechnology to reduce the use of pesticides (2 days)	Argentina, Brazil, Chile, Paraguay, Uruguay	
Course on tissue culture (5 days)	Chile, Ecuador, Peru	
International potato tissue culture (7 days) Rapid multiplication, germplasm maintenance, and disease eradication.	Indonesia, Malaysia, Philippines, Sri Lanka, Thailand	SAPPRAD
Sweetpotato germplasm management (12 days)	Tanzania, Zambia	GTZ
Sweetpotato variety evaluation (4 weeks) Research using interdisciplinary approach and in partnership with users of varieties.	Indonesia, Malaysia, Papua New Guinea, Philippines	SAPPRAD
Regional workshop on biotechnology-assisted breeding to reduce pesticide use in potatoes (5 days) Conventional breeding methodologies for resistance to late blight and IPM techniques to control major pests.	Burundi, Egypt, Ethiopia, Kenya, Morocco, Rwanda, Tunisia, Turkey, Uganda, Yemen	
Producers' and users' perspectives on the selection, diffusion, and adoption of new potato cultivars (4 days)	Bolivia, Colombia, Costa Rica, Ecuador, Panama, Peru, Uruguay	
PROGRAM 3: DISEASE MANAGEMENT		
Workshop on bacterial wilt of potatoes caused by *Pseudomonas solanacearum* (5 days) Progress made on bacterial wilt control in PRAPACE countries.	Burundi, Ethiopia, Kenya, Mauritius, Rwanda, Uganda, Zaire	PRAPACE
Bacteriology of potatoes (4 days) Etiology, epidemiology, and control of *Phytophthora* and *Erwinia*.	Argentina, Bolivia, Brazil, Chile, Paraguay, Peru, Uruguay	PROCIPA

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Program, Title, and Topics	Countries Represented	Partner Institution
Serological and molecular identification of the granulosis virus (8 days) Use of ELISA and nucleic probes.	Egypt, Morocco, Tunisia, Turkey, Yemen	ORSTOM/CIP
Workshop on selection of late blight resistant potato clones (5 days) PRACIPA and PROCIPA members helped identify promising clones for local needs.	Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Peru, Uruguay	PRACIPA/CIP
First international workshop on control of late blight of potatoes (7 days)	China	
Course on virus detection techniques (12 days) Serological methods for virus detection.	Chile, Ecuador, Peru	
Plant pathology with emphasis on late blight and sweetpotato viruses (4 days)	Burundi, Ethiopia, Kenya, Rwanda, Uganda, Zaire	PRAPACE
Bacterial wilt (2 weeks)	Chile	SAG
Course on potato virology (11 days) Theoretical practices for seed extension agents, producers, and ware potato farmers.	Paraguay	MAG/IAO
Integrated management of fungal diseases (2 days) Baseline and distribution studies of fungal potato diseases in the Southern Cone.	Argentina, Brazil, Chile, Paraguay, Peru, Uruguay, USA	PROCIPA
Integrated management of bacterial wilt (6 days) Situational analysis and progress review in SWA and ESEAP countries.	Bangladesh, Bhutan, China, India, Nepal, Papua New Guinea, Philippines, Sri Lanka, Vietnam	
PROGRAM 4: INSECT AND NEMATODE MANAGEMENT		
Integrated pest management in potatoes (2 days) Techniques and planned strategies.	Argentina, Brazil, Chile, Paraguay, Uruguay	PROCIPA
Integrated pest management for Andean potato weevil and potato tuber moth (2 days) Courses in Cusco, Cajamarca, and Huancayo.	Peru	
First national meeting on IPM for Andean potato weevil (2 days)	Peru	CIP/INIA

The responsibilities of CIP's staff members posted at our regional offices involve ongoing collaboration to support national program needs. Some of this is carried out through the courses and workshops in this list. But much of CIP's support comes from less tangible, day-to-day exchanges. Specialized individual training in 1993 at headquarters served 36 participants from 17 different countries.

Program, title, and topics	Countries represented	Partner institution
PROGRAM 5: PROPAGATION, CROP MANAGEMENT		
In-country TPS course (10 days) Use of true seed in potato production, true seed management, and pathogen control.	Peru	
In-country seed production courses (9 days) Theoretical aspects and hands-on experience for extension agents and private seed growers.	Cameroon	
Seed production through TPS (10 days) Emphasis on TPS direct seeding, transplanting, and production of seedling tubers.	Argentina, Peru	
International training on potato seed production and certification (2 weeks)	Bhutan, India, Nepal	CPRI/CIP
Training trainers on agricultural extension (4 days) Organizing and developing TPS production courses and preparing training material.	Paraguay	Italian funds
PROGRAM 6: POSTHARVEST MANAGEMENT, MARKETING		
Methods for agricultural marketing research (5 days) Exchange of ideas, methods, and experience by seasoned researchers with national program leaders.	Australia, Bangladesh, China, Ethiopia, India, Japan, Nepal, Pakistan, UK, USA, Vietnam	CIP/IFPRI/ UPWARD
Cassava and sweetpotato production and postharvest technology (10 days)	Burundi, Malawi, Nigeria, Rwanda	CIP/IITA/ISABU/ ESARRN
OTHER ACTIVITIES		
Short course on bibliographic information database management (2 days)	Peru	
Analysis and experimental results obtained by the potato research program (17 days) Reporting and presenting research results.	Bolivia	PROINPA
Planning and priority setting meeting on Andean natural resources (5 days) Program planning by objectives for land and water management, policy and socioeconomics, livestock and pastures, agroforestry, management, and training and communications. Designing CONDESAN consortium to promote development for the Andean agroecosystem.	Bolivia, Burundi, Chile, Colombia, Ecuador, Germany, Netherlands, Peru, Switzerland, Uruguay, USA	

Special Country **Projects** and Networks

Many donors provide CIP with complementary or restricted core funds for specific research projects. These initiatives often fall outside the bounds of activities listed earlier. Technical assistance efforts to fortify national programs—in particular CIP's Special Country Projects and Networks—are among these complementary activities.

Location	Project Title	Donor
RESTRICTED CORE		
Sub-Saharan Africa	Selection, maintenance, and distribution of improved potato and sweetpotato planting materials in Sub-Saharan Africa	GTZ - Germany
Peru/Colombia/Ecuador	Late blight activities	Inter-American Development Bank
Multiple sites	Integrated pest management	Netherlands government
Multiple sites	Biotechnology-assisted breeding to reduce pesticide use in potato production	UNDP
SPECIAL COUNTRY PROJECTS		
Burundi	Potato improvement	AGCD - Belgium
Bolivia	PROINPA	COTESU - Switzerland
Peru	SEINPA	COTESU - Switzerland
Ecuador	FORTIPAPA	COTESU - Switzerland
Peru/Bolivia/Ecuador	Biodiversity	COTESU - Switzerland
Peru	Sustainable Andean development	IDRC - Canada
Peru/Bolivia/Ecuador	Andean commodity systems	IDRC - Canada
Ecuador	Germplasm exploration and utilization of several under-utilized Andean tuber crops	GTZ - Germany
Uganda/Tanzania/Rwanda	Sweetpotato research & development	GTZ - Germany
NETWORKS		
Asia	SAPPRAD	ACIAR - Australia
Africa	PRAPACE	USAID
Caribbean	PRECODEPA	COTESU - Switzerland
Andean zone	PRACIPA	IDRC - Canada
Southern Cone (South America)	PROCIPA	Inter-American Development Bank
Asia	UPWARD	Netherlands government


RAINER ZACHMANN

Acronyms and Abbreviations

AARI	Aegean Agricultural Research Institute, Turkey
ACIAR	Australian Centre for International Agricultural Research
AGCD	Administration Generale de la Coopération au Développement, Belgium
ARC	Agriculture Research Center, Egypt
ARCS	Austrian Research Centre at Seidersdorf
AREA	Agricultural Research and Extension Authority, Yemen
ARTC	Andean root and tuber crops
BARI	Bangladesh Agricultural Research Institute
Benguet U	Benguet State University, Philippines
BRC	Biotechnology Research Center, Vietnam
CAAS	Chinese Academy of Agricultural Sciences
CARDI	Caribbean Agricultural Research and Development Institute, Trinidad
CEPESER	Central Peruana de Servicios
CERRGETYR	Centro Regional de Recursos Genéticos de Tubérculos y Raíces, U Cusco, Peru
CGIAR	Consultative Group on International Agricultural Research, USA
Chiang Mai U	Chiang Mai University, Thailand
CIAAB	Centro de Investigaciones Agrícolas A. Boerger, Uruguay
CIAT	Centro Internacional de Agricultura Tropical, Colombia
CICA	Centro de Investigación en Cultivos Andinos, Peru
CIDA	Canadian International Development Agency
CIED	Centro de Investigación, Educación y Desarrollo, Peru
CIMMYT	Centro Internacional de Mejoramiento de Maíz y Trigo, Mexico
CIP	International Potato Center, Peru
CNCQS	Chinese National Centre for Quality Supervision and Test of Feed
CNPH	Centro Nacional de Pesquisa de Hortaliças, Brazil
CONDESAN	Consortium for the Sustainable Development of the Andean Ecoregion
Cornell U	Cornell University, USA
COTESU	Cooperación Técnica Suiza, Switzerland
CPRA	Centre de Perfectionnement et de Recyclage Agricole de Saïda, Tunisia
CPRI	Central Potato Research Institute, India
CPRO - DLO	Centre for Plant Breeding and Reproduction Research-Agriculture Research Department, Netherlands
CRIFC	Central Research Institute for Food Crops, Indonesia
CSD	Crop Service Division, Ghana
CTCRI	Central Tuber Crops Research Institute, India
CUC	Catholic University of Chile
DA	Department of Agriculture
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuária, Brazil
ENEA	Comitato Nazionale per la Ricerca e per lo Sviluppo dell'Energia Nucleare e delle Energie Alternative, Italy
ESARRN	East and Southern Africa Root Crops Research Network, Malawi
ESEAP	East and Southeast Asia and the Pacific, CIP region
ESH	Ecole Supérieure d'Horticulture, Tunisia
FAO	Food and Agriculture Organization of the United Nations, Italy
FONAIAP	Fondo Nacional de Investigaciones Agropecuarias, Venezuela
FORTIPAPA	Fortalecimiento de la Investigación y Producción de Semilla de Papa, Ecuador
FUNDAGRO	Fundación para el Desarrollo Agropecuario, Ecuador
GAAS	Guandong Academy of Agricultural Sciences, China
GTZ	German Agency for Technical Cooperation
IAN	Instituto Agronómico Nacional, Paraguay
IAO	Istituto Agronomico per l'Otremare, Italy
IAR	Institute of Agricultural Research, Ethiopia
IARI	International Agricultural Research Institute, India
IAV	Institut Agronomique et Vétérinaire, Morocco
IBTA	Instituto Boliviano de Tecnología Agropecuaria
ICA	Instituto Colombiano Agropecuario
ICAR	Indian Council of Agricultural Research

CGIAR

ICIPE	International Centre for Insect Physiology and Ecology, Kenya
ICRAF	International Centre for Research in Agroforestry, Kenya
IDRC	International Development Research Centre, Canada
IESR/INTA	Instituto de Economía y Sociología Rural del Instituto Nacional de Tecnología Agropecuaria, Argentina
IFPRI	International Food Policy Research Institute, USA
IICA	Instituto Interamericano de Cooperación para la Agricultura, Costa Rica
IIN	Instituto de Investigación Nutricional, Peru
IITA	International Institute of Tropical Agriculture, Nigeria
ILRAD	International Laboratory for Research on Animal Diseases, Kenya
INIA	Instituto Nacional de Investigación Agraria, Peru
INIA	Instituto Nacional de Investigaciones Agropecuarias, Chile
INIAP	Instituto Nacional de Investigaciones Agropecuarias, Ecuador
INIFAP	Instituto Nacional de Investigaciones Forestales y Agropecuarias, Mexico
INIVIT	Instituto Nacional de Viandas Tropicales, Cuba
INRA	Institut National de la Recherche Agronomique, France
INRAT	Institut National de la Recherche Agronomique de Tunisie
INSA	National Root and Tuber Crop Improvement Institute, Vietnam
INTA	Instituto Nacional de Tecnología Agropecuaria, Argentina
IPGRI	International Plant Genetic Resources Institute, Italy
IPM	integrated pest management
IPO - DLO	Institute for Plant Protection-Agriculture Research Department, Netherlands
IRA	Institut de Recherche Agronomique, Cameroon
IRRI	International Rice Research Institute, Philippines
ISABU	Institut des Sciences Agronomiques du Burundi
ISNAR	International Service for National Agricultural Research, Netherlands
IZ	Instytut Ziemniaka, Poland
JAAS	Jiangsu Academy of Agricultural Sciences, China
JICA	Japanese International Cooperation Agency
KARI	Kenyan Agricultural Research Institute
Kobe U	Kobe University, Japan
LAC	Latin America and the Caribbean, CIP region
LEHRI	Lembang Horticultural Research Institute, Indonesia
LSU	Louisiana State University, USA
MA	Ministry of Agriculture
MAG	Ministerio de Agricultura
McMaster U	McMaster University, Canada
MENA	Middle East and North Africa, CIP region
MIP	Programa de Manejo Integrado de Plagas, Dominican Republic
Miss SU	Mississippi State University, USA
MMSU	Mariano Marcos State University, Philippines
Montana SU	Montana State University, USA
Nagoya U	Nagoya University, Japan
NAL	National Agricultural Laboratories, Kenya
NCSU	North Carolina State University, USA
NGO	nongovernmental organization
NPRCRTC	Northern Philippine Root Crops Research and Training Center
NPRP	National Potato Research Program, Nepal
NRI	Natural Resources Institute, UK
ODA	Overseas Development Administration, UK
OPEC	Organization of Petroleum Exporting Countries
ORSTOM	Office de la Recherche Scientifique et Technique Outre-Mer, France
Oxford U	University of Oxford, England
PCARRD	Philippine Council for Agriculture & Resources, Research & Development, Philippines
PDA	Provincial Delegation of Agriculture, Cameroon
PGS	Plant Genetic Systems, Belgium

PICA	Programa de Investigación de Cultivos Andinos, Peru
PICTIPAPA	International Collaborative Late Blight Program, Mexico
PRACIPA	Programa Andino Cooperativo de Investigación en Papa, CIP network
PRAPACE	Programme Régional de l'Amélioration de la Culture de la Pomme de Terre et de la Patate Douce en Afrique Centrale et de l'Est, CIP network
PRECODEPA	Programa Regional Cooperativo de Papa, CIP network in Central America and the Caribbean
PROCIPA	Programa Cooperativo de Investigaciones en Papa, CIP network
PROCISUR	Programa Cooperativo de Investigación Agrícola del Cono Sur
PROINPA	Proyecto de Investigaciones de la Papa, Bolivia
RCP	Red Científica Peruana
RES	Rothamsted Experiment Station, UK
SAAS	Sichuan Academy of Agricultural Sciences, China
SAG	Servicio Agrícola y Ganadero, Chile
SAPPRAD	Southeast Asian Program for Potato Research and Development, CIP network
SARIF	Sukamandi Research Institute for Food Crops, Indonesia
SCRI	Scottish Crop Research Institute
SEAG	Servicio de Extensión Agrícola y Ganadera, Paraguay
SEINPA	Semilla e Investigacion en Papa, Peru
SPPC	Seed Potato Production Center, Yemen
SSA	Sub-Saharan Africa, CIP region
Stanford U	Stanford University, USA
SWA	South and West Asia, CIP region
TARI	Taiwan Agricultural Research Institute
TALPUY	Grupo de Investigación y Desarrollo de Ciencias y Tecnología Andina
TCRC	Tropical Crops Research Center, Bangladesh
TFNC	Tanzania Food and Nutrition Centre
TPS	true potato seed
U Ambato	Universidad de Ambato, Ecuador
U Austral	Universidad Austral, Chile
U Ayacucho	Universidad Nacional San Cristóbal de Huamanga, Peru
U Birmingham	University of Birmingham, England
U Cusco	Universidad Nacional San Antonio de Abad, Peru
U Fla	University of Florida, USA
U Georgia	University of Georgia, USA
U Ica	Universidad San Luis Gonzaga de Ica, Peru
U Inner Mongolia	University of Inner Mongolia, China
U Nairobi	University of Nairobi, Kenya
U Naples	University of Naples, Italy
U Tacna	Universidad de Tacna, Peru
UCRI	Upland Crops Research Institute, China
UNA	Universidad Nacional Agraria, Peru
UNCP	Universidad Nacional del Centro del Perú
UNDAC	Universidad Nacional Daniel Alcides Carrión, Peru
UNDP	United Nations Development Programme, USA
UNMSM	Universidad Nacional Mayor de San Marcos, Peru
UPLB	University of the Philippines, Los Baños
UPWARD	Users' Perspective with Agricultural Research and Development, CIP network
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
UTC	Universidad Técnica de Cajamarca, Peru
ViSCA	Visayas College of Agriculture, Philippines
Viterbo U	Universitá Degli Studi Della Tuscia, Italy
Wageningen U	Wageningen University, Netherlands
XSPRC	Xuzhou Sweet Potato Research Center, China
YGPPP	Yemeni/German Plant Protection Project
YNU	Yunnan Normal University, China

The **Food** Equation

The CGIAR Factor in Agricultural Research

Ismail Serageldin, Chairman of the Consultative Group on International Agricultural Research (CGIAR), said recently:

"The challenge of global hunger, of sustainable development, and of sound resource management requires much in terms of policies, institution building, and investment. But it will most certainly also require the results of serious research done today in order to meet the challenges of tomorrow. For that essential part of the equation, the CGIAR remains the single most effective tool available to the world community."

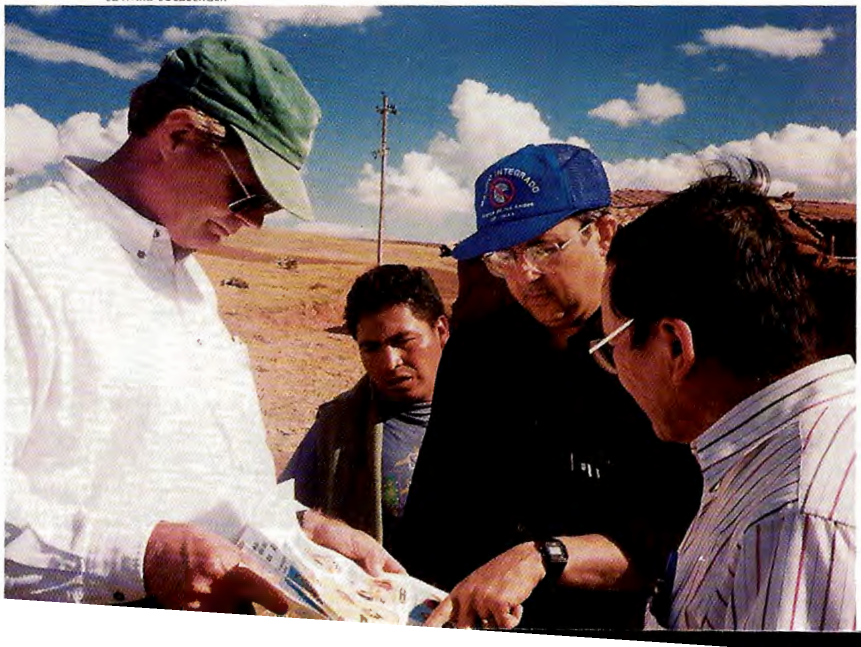
CIP is one of many multipliers in this worldwide formula to guarantee food security, provide basic research in developing countries, and train new generations of agricultural specialists. The CGIAR, founded in 1971, is an association of public and private donors that support 17 agricultural research centers around the world. The oldest centers began under the auspices of the Rockefeller and Ford Foundations in the early 1960s. Their initial breakthroughs encouraged a more ambitious effort to support agricultural research. The CGIAR is now led by the World Bank, the United Nations Development Programme (UNDP), and the Food and Agriculture Organization (FAO) of the United Nations. Forty government agencies, multilateral donor organizations, and private foundations fund the system.

The system is currently going through a process of change as its member centers have matured and an overpopulated world has raised the stakes during the past two decades. One billion people are going hungry every day, and another billion people will join them over the next 10 years. The CG system's own dynamics are affected by financial restrictions, research imperatives, new methodological approaches, and a new generation of scientists taking over from the founding staff.

CIP's sister organizations in Latin America are the International Maize and Wheat Improvement Center (CIMMYT) in Mexico and the International Center for Tropical Agriculture (CIAT) in Colombia. CIP also has a close working relationship with the International Centre for Research in Agroforestry (ICRAF) in Kenya because it is active in a sustainable high-mountain agricultural initiative. All 17 centers work collaboratively on scores of issues, besides setting the research agenda and sharing administrative resources.

For more information, contact the CGIAR Secretariat, 1818 H Street N.W., Washington, DC 20433, USA. Telephone (202) 473-8951, Fax (202) 334-8750, Internet/E-mail: cgiar@cgnet.com.

EDWARD SULZBERGER



CGIAR Chairman Ismail Serageldin (third from left) looks at a poster developed at CIP to help farmers control Andean potato weevil near the village of Chincheros, a major potato-growing area in Peru.

CIP's
Global Contact Points

(as of June 30, 1994)

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Networks

■ PRACIPA
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■ PRECODEPA
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■ PROCIPA
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Sub-Saharan Africa Regional Office

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Network

■ PRAPACE
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This list indicates CIP's principal contact points worldwide, by region. A more detailed list, including current staff contacts, can be obtained from the office of the Director for International Cooperation.

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South and West Asia Regional Office

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East and Southeast Asia and the Pacific Regional Office

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Networks

■ SAPPRAD
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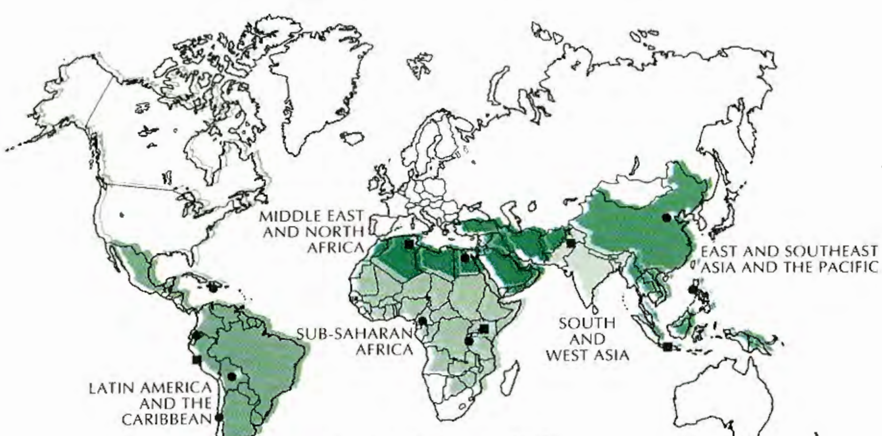
■ UPWARD
(same as Philippines - Los Baños Liaison Office)



CIP REGIONS AND NETWORKS
■ Regional Office ● Country Liaison Office

Photos: RAYMUNDO MEDINA

11. The potato crop ripens and the farmers cut the foliage.

12. The farmers throw the foliage on the field for their livestock to eat.

13. The potato harvest: the yoke of oxen open the furrows.

14. The farmers prepare a *pachamanca* (feast). They kill a lamb for lunch and make sweetcorn tamales.

15. They haul the potatoes on mules to the warehouse.

16. They select tubers according to their size and variety for consumption and sale.

17. They put the potatoes in sacks and weigh each one for the market.

18. They store tubers in their loft or warehouse for future consumption.

19. They carry potatoes to the truck bound for the market.

20. They sell potatoes at the market, wholesale or retail.

21. The farmers make flour (*chuño*) from potatoes.

22. They also make freeze-dried potatoes.

INTERNATIONAL POTATO CENTER (CIP)