



Scientists  
of the **CGIAR**

THIS PUBLICATION IS DEDICATED TO  
THE MEMORY OF DR. ROBERT J. CARSKY  
1955–2004





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Scientists  
of the CGIAR

A large, stylized green leaf graphic that serves as a background for the page. The leaf is composed of several thick, rounded segments that branch out from a central stem. The top part of the leaf is more intricate, with a central teardrop shape and two side lobes. The bottom part consists of several broad, sweeping curves that resemble the base of a leaf or a stylized plant.

# Honoring Our Scientists

WE ARE PLEASED TO INTRODUCE THESE INTERESTING AND INSPIRING VIGNETTES ABOUT THE LIVES AND WORK OF SCIENTISTS AT THE INTERNATIONAL AGRICULTURAL RESEARCH CENTERS SUPPORTED BY THE CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH (CGIAR).

The scientists selected for inclusion were recommended by their peers as great examples of CGIAR scientists at work. This compilation does not encompass all the significant research taking place at the Centers or focus on all the scientists involved. It is a representative sample.

Without science we would all starve to death, Carl Sagan pointed out, because agricultural technology, the product of scientific research, makes it possible for us to feed an ever growing population. However, agriculture does much more than ensure adequate food production. Science-based agricultural technology has helped developing countries fight poverty and



hunger, improve nutrition and health, manage natural resources, and enhance the well-being of people overall. The contributions of CGIAR scientists to this process are knowledge, technology, policy advice and other services related to global public goods.

CGIAR Centers are home to a staff of some 8,500 people including managers, scientists, science-support professionals and technicians, and administrators. Approximately 1,000 of the staff are internationally recruited scientists of the highest quality. About half of them are from developing countries. Some are based at the headquarters of the various Centers; others are posted in regional and field offices. In all, they live and work in over 100 countries.

Many of them work under exacting and sometimes dangerous conditions. Some have died under tragic circumstances, others have been abducted or held hostage, and many have had to cope with the consequences of

political turmoil and insecurity. We honor the memory of colleagues who lost their lives and share the grief of their loved ones. We honor, as well, all the scientists who face formidable challenges without wavering in their commitment to place the benefits of cutting-edge science at the service of the poor.

Our hope is that the CGIAR System will continue to attract scientists of the same caliber and commitment down the years so that the impact of CGIAR-supported research will continue to make a difference in the lives of the neediest.

Ian Johnson  
Chair

Francisco J.B. Reifschneider  
Director



## Focused on People and Opportunities

STARTING AT THE WORKING END OF A HAND HOE, DANIEL JAMU ACCEPTED HIS VOCATION TO HELP SUBSISTENCE FARMERS MAKE THE MOST OF AVAILABLE RESOURCES WITH A MINIMUM OF DRUDGERY



Daniel Jamu's father had hoped that his son would find work in town after completing school. Being raised in Malawi's commercial capital of Blantyre certainly provided the boy with opportunities, and the elder Jamu felt he had done the right thing to move away from the village. After all, it was in the cities that the promise of modernization was first felt after Malawi's independence in 1964. Other seekers had journeyed further in those days, joining a large migration to work the mines of South Africa or the farms in Rhodesia.

Young Daniel, however, was enchanted by the school vacations he and his siblings spent with his grandparents and other relatives in their village only an 18-kilometer drive away

in the family car. Life in the village moved at a slower pace, punctuated by the excitement of going into the forest to hunt mice or trap birds, fishing in nearby streams, and collecting wild fruit. These pleasures would shape the boy's ambitions, and before long he was hooked on the world of agriculture — this despite the grueling work to be done on the farm using basic hand tools. Among the most difficult tasks was turning the earth with nothing more than a hand hoe.

“Our parents always emphasized the need for hard work and the need for us to grow our own food,” he recalls. “We were therefore encouraged to work in the field. We would have blisters on our hands within the first week. No one in the village used plows, and the closest thing to improved farm equipment that one could see was the occasional oxcart. We quickly got used to it, but the drudgery of cultivating with hand hoes still remained. I soon became aware of the need for something to be done to make the work easier.”

By the time Daniel entered the University of Malawi in 1981, he was determined to devote his time and energy to making agricultural life easier. Although 90 percent of Malawians live in rural areas, the agricultural college of the university was, he recalls, “quite small at that time.” Agricultural engineering and rural development became his main areas of focus. The challenges these areas posed, coupled with a growing fascination with managing water for food production, piqued his interest in fish culture, a field that did not yet receive much attention at the university.

“We were exposed a lot to the technologies and science of managing water and soil conservation for both field crops and livestock,” he recalls. “I decided to focus on managing water and soils for fish culture because I saw this as a new frontier in the production of food in developing countries and an exciting field of study where there were — and still are — a lot of unknowns.”

Nearly 25 years later, having climbed several rungs up the ladder of experience in research, publishing, teaching and extension work, Dr. Jamu is now the officer in charge and regional director of the Malawi office of the WorldFish Center and an acknowledged expert on integrated aquaculture-agriculture systems. He develops low-cost technologies for farming fish alongside conventional crops in resource-poor environments in southern Africa. He simultaneously promotes the use of these techniques, which recycle nutrients to make the most of farmers' meager resources.

“The approach has changed from being technology focused to development focused,” he explains. “If the focus on technology is too strong, we

risk losing touch with the grassroots problems and needs of the farming people we aim to serve. Yes, we apply technology to help solve people's problems, but we can't improve farm family incomes and increase food production without being people centered.”

Dr. Jamu's pragmatic philosophy and commitment to subsistence farmers guide his method of acquiring their grassroots knowledge and combining it with state-of-the-art research and analysis to formulate sustainable integrated aquaculture-agriculture systems. He recognizes the challenge of integrating these scientific innovations into the productive culture of subsistence farm villages, as there are no guarantees that farmers will adopt the technologies developed for them.

“You learn a lot by linking science outputs to development impact on the ground,” he explains. “This makes it essential to get feedback from those on the ground, the farmers in their fields. Also, convincing policymakers to invest in science is an important undertaking. I find this challenge exciting.”

Inspired by his childhood experiences, Dr. Jamu strives to alleviate hunger in his native Malawi and other parts of the world. His decision to dedicate his life to research for development was, he believes, a response to a calling. Certainly, his attitude of idealism and hope sustains him as he strives to untangle the intertwining causes and effects of hunger and malnutrition, a goal made “even more difficult when politics come into play.” Yet, when taking time out to enjoy his hobbies of reading and playing golf, Dr. Jamu's reflections usually conclude on a hopeful note. Just as the young Daniel never let his struggles with a hand hoe in the fields around his family village ruin his school holidays, so the committed scientist remains focused on the positive.

“The more problems you encounter, the more opportunities you see,” he observes. “I have witnessed people moving out of poverty and hunger through our efforts. It takes time to see results, but they come.”



## Till the Cowpeas Come Home

**CAPPING A PRODUCTIVE BREEDING CAREER IN AFRICA, BIR BAHADUR SINGH PLANS A WORKING RETIREMENT THAT INCLUDES INTEGRATING INTO THE RICE-WHEAT ROTATION OF HIS NATIVE INDIA A QUICK-MATURING CROP OF COWPEAS**



A sentimental 1960s alumnus returning to Pantnagar, India, and strolling the university halls may imagine hearing folksongs and laughter. The sweetness of this distant echo will likely be tinged by bitter memories of the hunger and desperation that India then endured. But the singing voice will be almost certainly be that of Bir Bahadur Singh.

G.B. Pant University of Agriculture and Technology is one of 23 Indian agricultural schools modeled on American land grant universities and set up with assistance from the United States Agency for International Development (USAID). Admitted by merit, B.B. Singh left an indelible mark on the memories of his classmates and professors. Popular because of his fondness for

writing verse, singing, telling jokes and reading palms, the young scholar earned serious recognition with his stellar academic achievements.

Dr. Singh's subsequent career as a grain legume breeder at the International Institute of Tropical Agriculture (IITA) has catalyzed, through improved varieties, soybean production in India and cowpea production in Nigeria and many other countries. A fellow of the American Society of Agronomy, he has published over 200 research papers, delivered keynote talks at countless conferences, and received recognition from the Silicon Valley Tech Museum. In Nigeria, where he is based, the Kano state government has given him its Agricultural Honors Award, and ordinary men and women who farm the semiarid north have named him, as a token of their love and appreciation, to the honorary chieftaincy Sarkin Noma, or King of the Farmers.

The breeder savors his success with modesty and reverence. "My wife has been key to my professional success by freeing me from household tensions and by understanding my work," he explains. "My mother gave me love and affection during my childhood. This helped me to remain innocent and free of negative thoughts. Also, she advised me to concentrate on my studies and always be first in the class, because that was the key to winning the love and respect of teachers and friends."

Graduating first in his class with honors, the newly minted bachelor of science in agriculture and animal husbandry was one of five students from G.B. Pant University of Agriculture and Technology selected to enter an American master of science program at the University of Illinois, Urbana. Singh earned his doctorate at the University of Illinois in Plant Breeding and Soybean Genetics. Dr. Singh considers the ingredients of success to be a "positive attitude, compassionate heart, clear mind and dedicated mission."

His motivation to study agriculture grew naturally from his agrarian background in a small village in the northern Indian state of Uttar Pradesh. Born on May 1, 1944, he was aware from early childhood of the suffering farmers endured when drought struck their tiny farms. "India's history of food shortage is no secret," he says, citing the Bengal Famine of 1943, in which 4 million subjects of the embattled British Raj died of hunger. "Images of India as a starving nation are common to most people." Neither independence in 1947 nor infusions of food aid brought lasting respite from hunger, with drought hammering India in 1965 and 1966.

Dr. Singh soon completed his American studies and returned to G.B. Pant University as an assistant professor of plant breeding. "I started from scratch working on soybean, a crop unknown to most of India," he recalls.

Meanwhile, he was impressed by the new rice and wheat varieties from the International Rice Research Institute and the International Maize and Wheat Improvement Center then being disseminated by the university. "I had planned never to leave India, but witnessing the Green Revolution there and hearing about international agricultural research from Dr. Norman Borlaug during his frequent visits, I wished to join the system."

When offered a position breeding grain legumes for an IITA project in Tanzania funded by USAID, Dr. Singh jumped at the chance. Working initially on cowpea, soybean and other legumes, Dr. Singh focused on quick-maturing cowpea and developed a variety that is ready for harvest in only 60 days. Adopted in 65 countries, it has significantly alleviated poverty and hunger. As principal cowpea breeder at IITA headquarters in Ibadan, Nigeria, from 1981 to 1989, and then at the IITA station in Kano, where he serves today as officer in charge, Dr. Singh has seen farmers escape the cycle of poverty in as little as 2 years.

"We started working with 11 farmers in Kano in 1998," he reports. "Now, more than 3,000 farmers are directly involved and over 100,000 indirectly." Noting that his lifelong heroine is Indira Gandhi, Dr. Singh speaks with pride of the benefits to women — including improvements in health, nutrition, pre- and post-natal care, education and family relations — arising from their involvement in the cowpea program. Women in the northern Nigerian region of Hausaland traditionally stay at home, but Dr. Singh has drawn more than 1,000 of them out to participate in improved cowpea cultivation. The women now grow cowpea to enhance their family nutrition, earn income from snacks made from the crop, and fatten their goats on its nutritious straw.

"I see joy in the eyes of farm women," he says. "This gives me immense satisfaction."

As his May 2006 retirement date approaches, Dr. Singh looks ahead to remaining active at G.B. Pant University and internationally — and, in particular, to his dream of integrating 60-day cowpea into India's system of rice-wheat rotation. Wheat and rice have pushed food legumes onto marginal lands, causing shortages of pulses for India's vegetarian masses. Growing 60-day cowpeas in the interval after wheat and before rice promises to improve farmers' income and bring millions of additional tons of cowpea to market.

Dr. Singh expects regrets. "Being a small station, we've always worked at IITA like a family," he says. "I'll miss my large cowpea breeding fields with their diverse plant types and colors. And I'll miss my many friends and the warm hospitality of the people of Kano."



## Strength from Common Roots

**MARIA ANDRADE SHARES THE HOPES, DREAMS AND NEEDS OF POOR AFRICAN FARMWOMEN AS SHE DELIVERS THE RESULTS OF SWEET POTATO AND CASSAVA RESEARCH THAT PROMISE BETTER NUTRITION FOR THEIR FAMILIES**



Sweet potatoes and stories — some sweet, some not so sweet — are Maria Andrade's stock in trade. The sweet potatoes link the southern African women with whom Dr. Andrade works to regional food security and nutrition. The stories, the common thread that promotes trust and nourishes friendships, link the women to one another.

Dr. Andrade, an agronomist and breeder of sweet potato and cassava, often sees herself in the women of Mozambique. She tells her story in Portuguese, the language they share, and listens to their stories told in Portuguese and countless other languages. The trust that ensues buttresses the impact that her work has had on child nutrition and poor farmers' income across southern Africa.

Born on the island of Fogo in the former Portuguese colony of Cape Verde, Maria knew at a early age that she would work in agriculture far from home. As a small child, she would stand at the door of her house, looking out at the sunset and longing to go to a faraway land.

“When you live on a small island, it can be like that,” she explains. “The ‘beyond’ attracts you. I was only 5 years old when I told my mother that I would go off to Angola to work, helping people to grow coffee.”

The town where Maria grew up as the seventh of ten children was, she recalls, more urban than rural. She neither came from an agricultural family nor endured poverty. Although she certainly saw poverty on the small volcanic island, her father, a businessman, always managed to provide adequate food for his large family. For his daughter with “the dream,” he also provided encouragement and motivation.

“My father would often say, ‘Maria, no man is better than you,’” she recalls. “Study hard and do what you want. I will be here to help you.”

Young Maria did just that. After traveling to the United States to complete a BS degree in agronomy and an MS in agronomy and plant genetics, both at the University of Arizona, she became Dr. Andrade upon earning a PhD in horticulture, with a specialization in breeding and root crop physiology, from North Carolina State University. She clearly remembers writing an essay, while working on her PhD, that expressed her wish to work with the Food and Agriculture Organization of the United Nations back in Cape Verde for a few years, and then go on to work in Mozambique. Pondering the way things have worked out, she says, “I believe there was a reason why this was written down. This was something that would come to pass.”

Dr. Andrade feels blessed to be living her dream and having an positive impact on food security, income generation and nutrition in southern Africa. Hired by the International Institute of Tropical Agriculture initially as an agronomist for the Mozambique-based Southern Africa Root Crops Research Network, she worked to improve the productivity of root crops and facilitate the effective transfer of technology to farmers. In the process, Dr. Andrade successfully revived the Mozambican national root crops program. She also acted as a catalyst bringing together several nongovernmental organizations and national institutions to plan disaster relief for Mozambicans affected by El Niño and the floods of 2000.

Today Dr. Andrade is responsible for coordinating a US\$4.5 million project that aims to accelerate the multiplication and distribution of healthy planting materials of high-yielding varieties of cassava and sweet potato. The project has developed a network of partners and distributed sweet potato and

cassava planting materials to over 1.3 million families. Dr. Andrade is especially hopeful about the recent introduction of orange-fleshed sweet potatoes into Mozambique. The country's myriad nutritional problems prompted the massive multiplication and distribution of sweet potato varieties rich in beta carotene, which the body converts to vitamin A.

“Women have been cultivating white sweet potatoes for years, so the crop is in the system as a cheap and sustainable means of food security,” says Dr. Andrade, adding that this makes potatoes an efficient and reliable delivery system for micronutrients.

Using her experience in technology transfer, Dr. Andrade pursues the goals of encouraging and enabling poor farmers to persevere and achieve agricultural self-sufficiency, while at the same time raising their nutritional awareness to combat vitamin deficiencies. Her success stems from marrying expertise in rigorous scientific research with people skills that help her navigate the most effective local pathways for introducing and integrating new crop varieties and technologies.

“We take it step by step along the chain, introducing, producing and processing the crop to make juice, flour, and then bread and cake,” she explains. “I feel that my job is facilitated by being a woman. I specialize in a women’s crop and work primarily with women. We share a common ground. Their stories are my stories, so their needs are my needs.”

Dr. Andrade is pleased that she has been able to contribute to the welfare of women in Mozambique and other countries of southern Africa. And she is thankful for what she has received in return. She has adopted Mozambique as her second home and draws strength from the realization that, as she says, “your country is where your heart is.” The songs the women sing in the fields while harvesting nutrient-rich roots and leaves now reside in Dr. Andrade’s heart and fuel her continuing efforts to achieve the greatest possible impact from collaborative efforts invested in breeding nutritious crops.

“We still have so far to go in Africa,” she insists. “Hope lies in good nutrition for pregnant women and children.”

Recognizing the importance of capacity building in Africa, Dr. Andrade finds time to teach about agriculture at secondary schools, often using stories to set the mood and reach students.

“My mother still reminds me of my unfulfilled dream to work on coffee in Angola,” she observes. “But I know that what I’ve been doing is my mission. How rewarding it is to feel useful and see smiles on women’s faces!”



## Steinbeck and a Calling

**NOEL MAGOR'S FOCUS ON MARGINAL FARMERS IN BANGLADESH DERIVES FROM HIS CHILDHOOD ON A MODEST AUSTRALIAN FARM, HIS EXPERIENCE OF FAMINE IN ETHIOPIA, AND A CLASSIC TALE OF DUST BOWL AMERICA**



Growing up on his father's almond and poultry farm in Australia, Noel Magor knew from early childhood that he would pursue a career in agriculture. His father, one of 10 children, had grown up on the modest 3 hectare farm that his grandfather had struggled to keep. Yet, with the conviction that fair play and hard work leads to success, Noel's father succeeded in expanding the family farm to 12 hectares. What Dr. Magor remembers most clearly today is how his father repeatedly won competitions with his chickens and produced beautiful almonds using green manure and irrigation.

What young Noel probably did not realize in his early childhood was that other influences would set him on a particular career path leading to distant lands. From his secondary school days, he felt an awareness of social issues brewing within him. John Steinbeck's novel *The Grapes of Wrath* profoundly affected his thinking. Reading at the age of 16 about indebted farmers in the American Midwest losing their land, and of the hardships suffered by migrant farm laborers, sparked in him an interest in social justice — an interest that later became a commitment.

Proof of that commitment began in 1974. Upon completing a bachelor's degree in agricultural science at Adelaide University, Noel set off to Wollo Province in northern Ethiopia, where a devastating famine had struck the year before. As a volunteer, he assessed how the famine affected village families and sought ways to rehabilitate the most destitute by providing grain through food-for-work projects and by distributing seed.

Twelve months of living and working under primitive conditions left Noel determined to alleviate hunger and poverty. It also brought alive Steinbeck's narrative on the struggles of the working class. "Some things affect you inside," he recalls. "I believe that my reflections on *The Grapes of Wrath*, and my growing awareness of social justice issues, prompted me to move into development work."

Measured by his achievements, Dr. Magor's decision was an answer to a calling. In 1977, simultaneously serving as agricultural service head, extension coordinator and acting project director of the Kamalganj Project of HEED Bangladesh, a nongovernmental organization (NGO), he started working to empower marginal farmers. Never expecting to pursue graduate studies or maintain a long-term connection with Bangladesh, he did both to support his commitment to alleviating their plight. He returned briefly to Australia to earn a master's degree in tropical agronomy from Sydney University and a PhD in politics from Adelaide University.

Dr. Magor explains why he chose to enhance his scientific and agricultural background with a degree in politics: "I was interested in the importance of agriculture for poverty reduction. I needed to know what was happening to marginal farmers, as they seemed to be a group missed by NGOs, who keep their focus on small farmers, and by government, who concentrate on bigger farmers. The politics department of the university provided the best perspective for exploring that."

Choosing marginal farmers in Bangladesh as his thesis topic, he demonstrated that marginal farm households — those able to grow enough rice to feed themselves for only 3-5 months of the year — were rapidly becoming landless. On the other hand, small farm households — those able to provision themselves with rice for 6-8 months of the year — were very resilient and incrementally increased their landholdings. Establishing eight key principles for success in creating an environment for uplifting and empowering poor households, he pioneered a shift in research focus toward the farming systems of marginal farmers.

Dr. Magor's inclusive approach toward alleviating poverty found eloquent expression in the project Poverty Elimination through Rice Research Assistance (PETRRA), which he set up and managed for the International Rice Research Institute (IRRI), a Future Harvest Center of the Consultative Group on International Agricultural Research (CGIAR). Funded by the United Kingdom's Department for International Development, PETRRA greatly enhanced IRRI's working partnership with the Bangladesh Rice Research Institute, the Ministry of Agriculture, and poor farm households in Bangladesh. The project also exemplified a philosophy that Dr. Magor had nurtured over the years that combines a poverty focus, gender equity, participation and partnership in a regional, in-country framework.

On top of developing appropriate technologies endorsed by farmers and new methods of extension and knowledge delivery, Dr. Magor has found time to learn Bangla to facilitate his immersion in the world of Bangladeshi farmers. That the PETRRA website and newsletter appear in both English and Bangla reflects his determination to develop more effective means of communication and so spread awareness of agricultural development's contribution to poverty reduction.

"With a strong enough will, we can relieve hunger by mobilizing science, social organizations, governments and farmers," he says. "I credit the CGIAR System with helping to focus science and technology on marshalling the efforts of different organizations to achieve poverty reduction. But we'll never really know the full extent of what we've contributed."



## Third Time Lucky

OSMAN ABDALLA LEADS A SEEMINGLY CHARMED LIFE AS A WHEAT BREEDER AND PATHOLOGIST WHO HAS SO FAR ENJOYED A WARM WELCOME IN THE LOCAL COMMUNITIES OF THREE CONTINENTS



Osman Abdalla's four and a half years in Ethiopia as East African regional wheat breeder and pathologist for the International Maize and Wheat Improvement Center (CIMMYT) provided him with plenty of opportunities to savor the country's fine tradition of hospitality, in particular through its elaborate coffee ceremony. One might even attribute the scientist's success over the years in enhancing wheat's yield potential, drought tolerance and disease resistance to the blessings that each third cup of coffee is believed to bestow upon the drinker.

Born into a farm family in the central Sudanese town of Singa, on the Blue Nile, where hospitality is paramount to the culture, Dr. Abdalla already knew the Sudanese counterpart to the Ethiopian coffee ceremony. However, he was surprised to learn that this and other traditions are so strikingly similar in the neighboring country to the east.

“Borders are artificial,” he observes. “We think we are different, but aspects of human culture link us far more than we would like to believe.” Interaction and sharing across cultures are what Dr. Abdalla has appreciated most about his 21 years in the Consultative Group on International Agricultural Research (CGIAR), the parent organization of CIMMYT and 14 other Future Harvest Centers distributed around the world.

Having contributed to the breeding and release in developing countries of 37 varieties of bread wheat, 24 varieties of durum wheat and 15 varieties of triticale (a wheat-rye hybrid), Dr. Abdalla has received special recognition for his contribution to breeding the variety Jupare C-2001, which significantly boosted wheat production in Mexico.

Young Osman grew up with his extended family on a parcel of land owned by his grandfather. Subsistence farming secured their daily needs and fed the animals that provided milk and meat. In a country whose economy is dominated by agriculture and trading, Osman had no difficulty choosing an occupation. His first job after graduating from the University of Khartoum with honors in 1973 was with the Ministry of Agriculture, where he served for more than a decade as a seed production and certification officer.

Upon completion of graduate studies at Oregon State University, Corvallis, USA, and with a PhD in cereal breeding and genetics in hand, Dr. Abdalla joined the CGIAR System as a CIMMYT post-doctoral fellow in the wheat program at the Center’s headquarters in Mexico. From the start, he liked best collaborating with national programs and interacting with farmers — as he puts it, “feeling the warmth of the people by becoming a part of their community.”

In his current office in the melting pot of Aleppo, Syria, Dr. Abdalla looks back over his career in the CGIAR and reflects on what he has gained and what he has contributed to the alleviation of hunger and poverty. He is pleased that the perspective he gained through working with farmers and sharing cultures has nurtured in him a more interdisciplinary approach to work.

“One must value the input of social scientists,” he says, adding that their work helps bridge the gap between the sometimes rarified world of plant science and the local communities in which he and his colleagues strive to have impact. He also stresses the importance of learning the local language and methods.

“I like reading social science books in my spare time,” he reveals. “As scientists, we must study human society, and the relationships of individuals in society, to understand how farmers decide whether or not to pick up the innovations that we recommend. When their reaction is positive, it’s a wonderful accomplishment. My strong links with farmers over the years have made me very mindful of their recognition of our work.”

Dr. Abdalla’s commitment and skill in bridging the gap are demonstrated by the ease with which he conducts in-service training and coordinates research and technology-transfer networks involving multinational and multidisciplinary teams and national partners from various continents.

In his native Sudan, decades of political instability and civil war have taken their toll on farming, particularly in the south. Dr. Abdalla believes that model farming has the potential to increase land use in a country where more than 90 percent of the total land area is left unproductive. Sudan’s staple crops are cereals, in particular sorghum, which accounts for 60 percent of the total. With urbanization, however, wheat consumption is rising. Dr. Abdalla intends to use his expertise in wheat breeding to help improve the national economy. In addition, he looks forward to rejoining his brothers and sisters on an extended-family farm like the one on which he grew up.

“I have land in the south of Singa and have already started my retirement project,” he says. “With model farming, I will set an example and hope that the neighbors will see and copy. I intend to focus my breeding efforts in heat-stressed areas, where higher productivity can save some of the hard currency that Sudan now spends on importing wheat. My goal is to see wheat grown widely as a cash crop in Sudan.”



## Dr. Cassava and the Women

**MORE THAN A CASSAVA BREEDER AND GENETICIST, ALFRED DIXON IS A TIRELESS CHAMPION OF AFRICA'S NUMBER 1 CROP FOR FIGHTING POVERTY—AND OF THE WOMEN WHO MAKE IT SO**



His parents were naturally delighted at the birth of Alfred G. Olunjubeh Dixon — too much so, to his mind. The third of six surviving children, Alfred was the firstborn male. In the Sierra Leone of the 1950s, his arrival eclipsed the interests of his older sisters. This to the extent that one gave up her secondary education to allow him to attend a boarding school 16 kilometers from their home outside Freetown. The silver lining for the girls and others like them is that Alfred's boyhood privilege put him on the path to becoming an accomplished cassava breeder and geneticist determined to serve farmers, processors and consumers of this essential crop.

“Because of what happened then, I have always argued for the empowerment of women through a strong commitment to training,” Dr. Dixon explains. “And I have always been mindful of the needs of the ultimate beneficiaries of my cassava research. Women are responsible for much of the production of cassava and for almost all of its postharvest processing and marketing.”

Friday evenings often find Dr. Dixon on a terrace snack bar at the International Institute of Tropical Agriculture (IITA) headquarters in Ibadan, Nigeria, relaxing with a beer and a plate of grilled, peppery meat called *suya*. Sociable by nature, he chats with fellow scientists, technicians, students and local vendors. Trade dusk for daylight, and Dr. Dixon could be out in the field, where he rolls up his sleeves and feels as much at home with the farmers as he does with his colleagues.

Known as “Dr. Cassava” for his commitment to cassava research and development both during and outside of office hours, Dr. Dixon considers himself a preacher and marketer of cassava as well as a scientist. Cassava, after all, has been a part of his life since infancy.

“I began on *foufou pap*,” he says, referring to traditional porridge. “There was nothing much in the market in the Freetown suburb where I was born. Certainly no *Cerelac* [a commercial cereal for infants].”

From *foufou pap*, he moved on to cassava leaves as soon as he had teeth to chew. Dr. Dixon is now quick to extol the virtues of this vegetable as a major source of vitamins, minerals and protein for Sierra Leoneans. Both the leaves and roots of the drought-tolerant perennial, which Dr. Dixon calls “Africa’s food insurance,” were indispensable to Sierra Leoneans during the country’s recent civil war.

“If not for cassava as a fallback, Sierra Leoneans would have all paled during the 10 years of war.” Dr. Dixon maintains. “Our emphasis on increasing the productivity of cassava is a matter of equity building. I’m pleased that many national programs are taking on the challenge of promoting the production and utilization of cassava. We do research for development, and that means every researcher must engage partners to help them reach grassroots communities.”

Since he began working at IITA in 1989, Dr. Dixon has pioneered the genetic improvement of the crop. Often grown on marginal land by poor farmers,

many of whom are women, cassava provides over 200 million people in sub-Saharan Africa with more than half of their calories, making it the continent’s second staple after maize in terms of calories consumed. The focus of cassava research by Dr. Dixon and others at IITA is to increase and sustain cassava production and utilization throughout sub-Saharan Africa.

“Food security is about not only putting food on the table, but also money into pockets,” he explains. “It’s about generating income to improve livelihoods, which improves in turn education, nutrition and health. The African Union’s New Partnership for Africa’s Development rightly adopted cassava as the Number 1 crop for fighting poverty.”

Dr. Dixon’s laboratory research has helped identify sources of the crop’s resistance to diseases and pests. In collaboration with national partners, he has developed over 400 disease-resistant cassava lines used to breed cultivars that produce over 13 million tons of dry cassava per year, enough to meet the needs of 65 million people. This research is done with close attention to the practical needs of women who process and market the crop. One goal of breeding is to develop plants with uniform tubers to facilitate harvesting and peeling. Another is to produce more low-cyanide, boil-and-eat varieties.

In 2004, the Nigerian Cassava Growers Association conferred on Dr. Dixon the honorary chieftaincy *Balogun Agbe*, or Field Marshal of Farmers. Dr. Dixon expects the title to inspire him to stay active in farming and interactive with farmers.

“My father was an artisan agriculturalist,” Dr. Dixon says. “He did mixed farming after retiring from his job in accounting. This type of thing, along with a possible involvement in real estate, will suit me in my retirement back in Sierra Leone.”

Remembering how he valued his mentors in his early days of cassava research, Dr. Dixon intends to continue mentoring others. And, modestly acknowledging the respect with which the international community regards his efforts to alleviate hunger and poverty, he reminds us, “Behind every successful man is a woman.”



## Learning by Heart

**WOUDYALEW MULATU'S SUCCESS IN FOSTERING CLOSE COOPERATION BETWEEN RESEARCHERS AND FARMERS TO CONTROL CATTLE DISEASE IN ETHIOPIA'S GHIBE VALLEY OFFERS LESSONS FOR THE REST OF AFRICA BESET BY TSETSE-BORNE PARASITES**



Woudyalew Mulatu vowed to become a veterinarian when, while still a young boy, he watched his father lose 80 head of oxen to disease. Growing up in rural Tangilla, 480 kilometers north of the Ethiopian capital of Addis Ababa, young Woudyalew learned at an early age the consequences of livestock diseases, as well as what he calls “the language of farmers.” This intimate understanding has helped guide the successful efforts of the International Livestock Research Institute (ILRI) to reclaim the Ghibe Valley in southwestern Ethiopia from trypanosomosis, a deadly cattle disease spread by tsetse flies.

Woudyalew's parents — illiterate farmers raising cattle, sheep, goats and donkeys — insisted that the boys among their 20 or so children should attend school. Woudyalew and

three older brothers walked 25 kilometers to the church school, where they remained from Monday to Friday before walking back home again. The boys carried with them beans and teff flour with which to make a week's worth of the flatbread injera, and a healthy respect for their teachers.

"I remember clearly the monk who taught me Amharic," Dr. Mulatu recalls. "I was a sensitive boy and feared him so much I had no choice but to succeed. The desire to make my parents happy and proud also drove me."

Having completed his PhD in veterinary medicine at the All Union Institute of Experimental Veterinary Medicine in Moscow, Dr. Mulatu joined ILRI as a nationally recruited scientist in 1985. His knack for wedding scientific excellence with a deep understanding of farmers' problems has helped the veterinary scientist identify research products appropriate for local conditions, as well as open the eyes of other scientists, students and government officials. When he talks with farmers, they see that he values their participation and ideas and is therefore worthy of their trust.

Dr. Mulatu's work in the Ghibe Valley exemplifies what he calls "research with the community and for the community." He urged that the research be conducted on livestock owned by the community rather than on animals kept by ILRI, and this unusual approach contributed to the project's remarkable success. The strategy of alleviating trypanosomosis by controlling tsetse flies with insecticides has reduced its prevalence by 63 percent, halved the number of curative treatments required per animal, and eased the rate of calf abortion and mortality by 62 percent. The ratio of calves to cows has increased by 37 percent.

"When I began work on the Ghibe project, there were very few people or animals in the valley because of tsetse flies and trypanosomosis," he recalls. "Today the Ghibe Valley is repopulated and highly productive. Whereas a few farmers might each have owned two or three head of cattle before the intervention, now each farmer has 30 to 50 head."

Dr. Mulatu notes that local farmers are quickly emerging as the main source of information about trypanosomosis, having become conversant on the advantages and disadvantages of various control techniques.

"It's great to see the project gradually being taken over by the community," he observes. "My main goal is to see farmers here no longer needing me or ILRI."

Dr. Mulatu's farmer-education methods make good use of cultural institutions. As coffee and church ceremonies are important daily gatherings

in Ethiopia, he uses them to disseminate his message. "We distribute leaflets where there is someone literate to read them to the others," he explains. "Slides and photos are best, though. Farmers believe what they see, not what you say. What they see stays in their hearts."

Many farmers join Dr. Mulatu in relating their experiences in the Ghibe Valley to visitors from other areas of Ethiopia and abroad, and so guide interventions against tsetse and trypanosomosis across Africa. That Dr. Mulatu and his colleagues have tackled the problem in such an integrated and thorough way has earned their Ghibe research a reputation for being the most comprehensive assessment of tsetse and trypanosomosis on the continent.

"Tsetse is not yet controlled in most of Ethiopia," Dr. Mulatu observes. "If control in Ghibe proves sustainable, we hope to extend its success to other parts of the country and beyond."

Always eager to learn new things, Dr. Mulatu has recently taken a keen interest in the area of animal health called ethnoveterinary medicine, which is the traditional healing of animals. He has started collecting information, studying herbs and learning from the same farmers that he educates about trypanosomosis, many of whom are traditional healers. Such information is often passed from generation to generation only within a family of healers, so Dr. Mulatu feels privileged to have received a place in their hearts that gives him leave to evaluate their traditional knowledge scientifically.

"Education is a two-way street," he says. "My giving value to what farmers do empowers them to give value to my message and bring success to the Ghibe project. Now it's my turn to give recognition to the farmers for the herbs."



## Chance to Make a Difference

**PREFERRING RELEVANCE TO THE IVORY TOWER OF ACADEMIA, DAVID ROHRBACH RESEARCHES AGRICULTURAL ECONOMICS ON THE GROUND AND ADVOCATES A LIVELY MARKET OF IDEAS TO GENERATE OPTIONS FOR FARMERS**



David Rohrbach puts much of his life story down to chance — including his success in finding a profession that is both rewarding and relevant. “Relevance” was a watchword of the 1970s, when David enrolled in Colgate University. Having grown up surrounded by the economics and international affairs journalism that his father edited for a living, he had already formed an interest in social justice and poverty.

When his father later became a university administrator, student protests for civil rights in the US and against the war in Vietnam wove themselves into the fabric of David’s life. He knew that he wanted to investigate issues of development and be an agent for change.

Today, in line with the activism of his formative years in the 1960s and 70s, Dr. Rohrbach advocates dynamic processes, not least for the Consultative Group on International Agricultural Research (CGIAR).

“Science progresses and contributes through a process of debate,” he argues. “Hypotheses are put up and tested, and they evolve. And sometimes they break down. All of this leads to improvement. There should be an ongoing process of debate for finding solutions. The CGIAR System must, therefore, constantly encourage critical debate and never become too preoccupied with funding or public relations.

“And,” he continues, “we must promote institutional change so that we seek a basket of technology options, not ‘ideal’ solutions.”

Although he grew up in rural Connecticut, young David knew nothing about agriculture or the farming life. “The agricultural part of my profession came by chance,” he admits. “I realized that development had to be linked to agriculture, so I needed to learn more in that area to have a larger impact on the poor.”

In the newly established (and consciously relevant) independent study program at Colgate University, David studied theories of development. Perceiving this quest for relevance from a student’s ivory tower, one of his professors helped him to win a grant to conduct his senior thesis research in Kenya. David chose as his topic the political economy of agricultural credit programs.

After designing a global project on farming systems research for the US Agency for International Development, the young agricultural economist landed a 6 month internship with the International Maize and Wheat Improvement Center, a Future Harvest Center of the CGIAR in Mexico. There he prepared a background paper on trends in maize production and consumption.

“I clearly remember a reference to the CGIAR System and its role in fighting world poverty back when I was in my first-year ethics course at Colgate University,” Dr. Rohrbach recalls. “Little did I know then that I would end up working in the System.”

Research for his PhD dissertation took him to Zimbabwe to study the reasons behind the rapid growth in maize production in the first 5 years of that country’s independence. After defending his dissertation at Michigan State University in 1988, the newly minted doctor of agricultural economics returned to Zimbabwe, where he remains today as principal scientist in economics for the International Crops Research Institute for the Semi-Arid Tropics, another CGIAR Center. After nearly 20 years of research and residence in southern Africa, Dr.

Rohrbach reflects on his career in the CGIAR as one that he hopes is making a difference by improving incomes and food security.

“As an agricultural economist, I have the advantage of being able to work across a broad range of problem areas and disciplines, and I think that crop breeding is one of the strengths of the CGIAR System,” he observes. “It is, though, quite a challenge to make progress in semi-arid and dry regions, where one works with the poorest farmers, little fertilizer and limited resources.”

Through the years, Dr. Rohrbach’s research, collaborative studies and training have ranged over many areas, including agricultural credit systems, strategies for market development and commercialization and for developing input markets, farm-management economics, impact assessment, and effective monitoring and evaluation. In the last few years, he has focused primarily on seed policy research and how to link agricultural relief with development.

In the area of seed policy research, Dr. Rohrbach personifies much of the CGIAR’s support for the efforts of the Southern African Development Community to harmonize seed regulations in the region. One focus is to make seed relief programs more cost-effective as they help the most vulnerable households gain access to new varieties, while also spurring the development of the seed trade.

Committed to making humanitarian relief programs enhance development more efficiently, and cognizant of the opportunity they offer to promote widespread adoption of well-tested techniques, Dr. Rohrbach has launched education programs and contributed to monthly dialogues with nongovernmental organizations and donors on micro-dosing with nitrogen fertilizer. He sees opportunities in this technology and readily cites its successes, while emphasizing the need for choice.

“It’s better to provide farmers with a range of technology options rather than one blanket recommendation,” he argues. “And fertilizer companies must forget their all-or-nothing mentality when they build markets. They should package fertilizer in smaller bags and encourage farmers to use only a bit. Micro-dosing with nitrogen has a high payoff in large areas of Africa where the lack of this nutrient is most limiting.”

Although Dr. Rohrbach is pleased with the gains that he and his colleagues in related fields have achieved toward alleviating hunger and poverty, he points out that per capita food production is declining in Africa, with southern Africa being the least productive. He insists on being proactive and accountable regarding progress. This in the belief that, unlike much in his life, development issues must not be left to chance.



## Peace and Potatoes

MOHINDER KADIAN LED THE EARLY EFFORT TO REINTRODUCE HEALTHY POTATO SEED STOCK TO AFGHANISTAN AND RESTORE PRODUCTIVITY IN WHAT IS TRADITIONALLY ONE OF CENTRAL ASIA'S LARGEST POTATO PRODUCERS



Mohinder Kadian spent 2 hard years as a principal player of the Consultative Group on International Agricultural Research (CGIAR) efforts to rehabilitate the farming economy of Afghanistan. An agronomist with the International Potato Center (CIP), a Future Harvest Center of the CGIAR, Dr. Kadian led a project funded by the United States Agency for International Development to reintroduce into Afghanistan fresh supplies of certified potato seed and provide training to local agricultural technicians on how to multiply and store it.

Dr. Kadian worked within the Future Harvest Consortium to Rebuild Agriculture in Afghanistan, which was launched in the Central Asian country in the aftermath of the US-

led invasion of late 2001. The Consortium is led by the International Center for Agricultural Research in the Dry Areas, a CGIAR Center headquartered in Syria. An Indian national, Dr. Kadian worked with hundreds of Afghani farmers in different parts of the country. The result was improved crop management and an average increase in potato yield from less than 17 tons per hectare to more than 20.

“Farmers were fascinated that a scientist had come from India to train them,” Dr. Kadian recalls. “I, in turn, was impressed by their hospitality. They always invited me into their homes and shared what little they had. I felt happy and safe in their company.”

Dr. Kadian’s frequent trips to Afghanistan between 2002 and 2004 nevertheless caused understandable concern among his family and friends. He recalls the usual questions: “Why are you going there? Are you crazy?” Yet Dr. Kadian was buoyed by the understanding and encouragement of his wife. Aware of her husband’s commitment to improving the wellbeing of impoverished farmers, she gave full support to his determined effort to help Afghani farmers after decades of war, upheaval and deprivation. Yet even she must have been frustrated the time when Dr. Kadian spent 3 days at the airport in Kabul waiting for a flight back to Delhi — the delay caused by lack of aviation fuel.

Also keeping Dr. Kadian going through this difficult time was the hospitality of Afghani farmers and villagers. He expresses delight that his scientific endeavors both placed him in a position to enjoy their warm welcome and empowered him to return the favor by giving them the means to improve their lives and livelihoods.

With military helicopters clattering overhead, Dr. Kadian worked directly with farmers in their fields. He was able to convince them of the importance of adopting new technologies as his sensitivity to their concerns earned him their trust. Notably, on the plain of Jalalabad, flanking the Afghani approach to the Khyber Pass, Dr. Kadian persuaded farmers to plant an autumn potato crop.

“Farmers were not used to growing potatoes in that season,” Dr. Kadian recalls. “It was quite difficult to convince them to plant seed potatoes instead of tubers. I told them we would reimburse them for their investment if the crop wasn’t successful.”

The relatively mild climate around Jalalabad makes possible two potato crops per year if farmers plant the second crop early and irrigated it to allow

harvest before the first frost. The new practice enhanced rural incomes by generating employment for landless farm laborers and giving farmers more produce to sell. It also accelerated the in-country production of virus-free potato seed, which is an exacting and arduous process that can be accomplished only by skilled farmers. Even then, it produces only eight seeds from every tuber planted.

Using shuttle seed production, seed harvested in the second season around Jalalabad was taken to the highlands for spring replanting. Dr. Kadian recalls the day-long drive under heavy snowfall up into the Hindu Kush to town of Bamiyan, where the seed harvested in Jalalabad would be replanted. Bamiyan made headlines in 2001 when Taliban zealots dynamited and shelled two colossal images of Buddha that had stood carved in a cliff face for nearly 2 millennia.

By 2004, Afghani farmers had managed to produce about 800 tons of high-quality potato seed through shuttle breeding and other improved technologies. During his 2 years in Afghanistan, Dr. Kadian helped train more than 900 people on various aspects of potato production and seed marketing.

The success of the Afghanistan potato program owes much to Dr. Kadian’s ability to work easily with farmers. This ability arose in part from his own rural background in the northern Indian state of Haryana. After completing his PhD in botany at Himachal Pradesh University in Shimla, he began working in 1982 with farmers in several Asian countries, including the poorest areas of India, Bangladesh and Pakistan.

Dr. Kadian has worked mainly in the areas of crop diversification; seed production, maintenance and storage; and resource management. In Bangladesh, he has coordinated since 1998 a potato seed development project with partners in the national agricultural research system. He has trained extension workers from nongovernmental organizations and national partners in Bangladesh and Sri Lanka, as well as farmers themselves, on improved techniques for producing high-quality seed on ordinary farms. The result of Dr. Kadian’s work has been substantially improved incomes for farmers in South, West and Central Asia.

“I’m proud to work with CIP and pleased with the impact we’ve enjoyed through our work on potato,” he says. “The interaction with farmers is what has been most gratifying for me. I’ve learned a lot from them over all these years of work and extensive travels.”



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