



AfricaRice

Responding to the rice crisis

Africa Rice Center (AfricaRice) Annual Report 2008

Africa Rice Center

01 B.P. 2031 Cotonou, Benin

Telephone: (229) 21 35 01 88

Fax: (229) 21 35 05 56

E-mail: AfricaRice@cgiar.org

Nigeria Research Station

c/o International Institute of Tropical

Agriculture (IITA), Oyo Road

PMB 5320, Ibadan, Nigeria

Telephone: (234-2) 241 2626

Fax: (234-2) 241 2221

E-mail: o.j.ajayi-ng@cgiar.org

Sahel Research Station

B.P. 96, St-Louis, Sénégal

Telephone: (221) 33 962 64 41, (221) 33 962 6493

Fax: (221) 33 962 6491

E-mail: AfricaRice-sahel@cgiar.org

Tanzania Research Station

Avocado Street, PO Box 33581

Dar-es-Salaam, Tanzania

Telephone: (255) 222 775 568

Fax: (255) 222 700 092

E-mail: a.luzi-kihupi@cgiar.org

Africa Rice Center Côte d'Ivoire Office**Abidjan Liaison Office**

01 BP 4029, Abidjan 01, Côte d'Ivoire

Telephone: (225) 20 22 01 10

Fax: (225) 20 22 01 33

E-mail: s.diatta@cgiar.org

Bouaké Research Station

01 BP 2551 Bouaké 01, Côte d'Ivoire

Telephone: (225) 31 63 25 78

Fax: (225) 20 22 01 33

E-mail: s.diatta@cgiar.org

© Copyright Africa Rice Center (AfricaRice) 2009

AfricaRice encourages fair use of this material. Proper citation is requested. The designations employed in the presentation of materials in this publication do not imply the expression of any opinion whatsoever on the Africa Rice Center (AfricaRice) concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers and boundaries.

Citation

Africa Rice Center (AfricaRice). 2009. Africa Rice Center (AfricaRice) Annual Report 2008: Responding to the rice crisis. Cotonou, Benin: 60 pp.

ISBN

978-92-9113-332-1 (print)

978-92-9113-333-8 (PDF)

Printing

Pragati Offset Pvt. Ltd., Hyderabad, India.

Photo credits

With the exception of those on pages 9, 10 and 11, all pictures are by staff members of Africa Rice Center (AfricaRice) and networks and consortia convened by the Center. The pictures on pages 9, 10 and 11 are by Dr Jeffery Bentley.

About Africa Rice Center (AfricaRice)

The Africa Rice Center (AfricaRice) is a leading pan-African research organization working to contribute to poverty alleviation and food security in Africa through research, development and partnership activities. It is one of the 15 international agricultural research centers supported by the Consultative Group on International Agricultural Research (CGIAR). It is also an autonomous intergovernmental research association of African member countries.

The Center was created in 1971 by 11 African countries. In 2008, its membership comprised 22 countries, covering West, Central, East and North African regions, namely Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Côte d'Ivoire, Democratic Republic of Congo, Egypt, the Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Republic of Congo, Senegal, Sierra Leone, Togo and Uganda.

AfricaRice temporary headquarters is based in Cotonou, Benin. Research staff are also based in Senegal, Nigeria, Tanzania and Côte d'Ivoire.

For more information visit: www.AfricaRice.org

Contents

Message from the Board Chair and the Director General	2
A wake up call for Africa	4
New research structure	7
Research in brief	9
Tackling weeds in farmers' fields	15
Donor profile – Japan	20
Major events	29
Financial statement	37
Board of Trustees	43
Senior staff and associates	44
Postgraduate trainees	47
Publications	51
Acronyms and abbreviations	59



AfricaRice

Message from the Board Chair and the Director General

Challenge and opportunity are two sides of the same coin. When the global food crisis hit in 2008, and there was severe shortage of rice in Africa, there was a challenge as well as an opportunity. The challenge: to overcome this crisis with minimum damage to the food and livelihood security of the African nations. The opportunity: to capitalize on the need to grow more rice to boost Africa's rice sector.

With our analysis of the international markets, and our understanding of the rice production systems in Africa, we could foresee the crisis even before it hit in 2008. The Director General's report to the Council of Ministers during the meeting held at Abuja, Nigeria, in September 2007, had warned of the impending crisis.

The vulnerability of African nations to the food crisis, the importance of rice imports into the continent and the opportunities to boost Africa's rice sector dominated the news in 2008. AfricaRice researchers intervened numerous times to voice the Center's opinion in interviews with the African and international press.

AfricaRice and partners organized a special workshop in June, attended by representatives from 12 African countries, to formulate a range of short-term emergency initiatives to deal with the immediate challenge of the crisis and medium- and long-term measures to develop Africa's rice sector and thus help prevent such crisis situations in the future.

Major projects to enhance access to seed, mineral fertilizer and rice knowledge for smallholder farmers across the continent will start in 2009.

The initiative taken by the Center in dealing with the food crisis was recognized when the Secretary General of the United Nations invited the AfricaRice Director General to lead a round-table discussion on poverty and hunger. The round-table was held on 25 September 2008 at the UN Headquarters in New York, USA.

In 2008, under the guidance of the new Deputy Director General and Director Research for Development, Dr Marco Wopereis, AfricaRice sharpened the focus and the effectiveness of its research programs. Four new

research programs were created, each equivalent to one MTP project:

- Program 1: Genetic Diversity and Improvement;
- Program 2: Sustainable Productivity Enhancement;
- Program 3: Learning and Innovation Systems; and
- Program 4: Policy and Impact Assessment.

The Inland Valley Consortium was maintained to provide focused attention to intensification and diversification of inland valley systems research. In August 2008, a new unit (RiceTIME) was created within the research division to better coordinate our efforts on Training, Information Management, and linkages with Extension efforts.

AfricaRice and the International Rice Research Institute (IRRI) further aligned their research programs in 2008, resulting in the establishment of a joint East and Southern Africa Rice Program (ESARP).

The Center was also actively involved in the establishment of the Coalition for African Rice Development (CARD) in 2008, a consultative grouping of bilateral and multilateral development partners initiated by the Japan International Cooperation Agency (JICA) and the Alliance for Green Revolution in Africa (AGRA). CARD aims to double rice production in Africa by 2018.

In 2008, AfricaRice scientists and partners produced quality research for development, linked to policy measures, markets, farmers and consumers to increase rice production in Africa. We have highlighted four case studies in the research briefs included in this Report.

Weed infestation in rice fields is like watering plants with a bucket full of holes. Increase in production is negated when weeds compete with rice for limited light, water and nutrient resources. The fourth chapter talks about achievements and future prospects of our weed research.

It gives us great pleasure to profile Japan as a donor in this Annual Report. The Government of Japan has been the most long-standing donor for AfricaRice, and writing about this relationship is akin to writing the history of AfricaRice. Japan continues to provide substantial support through unrestricted and restricted funding;

participates in the Governing Board of the Center; and provides expertise to our work through Japanese scientists, some of them based at our research stations in Cotonou and Ibadan.

Projects supported by Japan are helping AfricaRice to develop new varieties from the crossing of African and Asian rice, deal with the rice yellow mottle virus and improve post-harvest technologies. Japanese support is also helping the development of sustainable rice farming systems in the inland valleys and the African Rice Initiative.

The year 2008 was one of strengthened partnerships. AfricaRice signed an agreement with three of the major French agricultural research institutions – CIRAD, INRA and IRD – to improve sustainable rice production, address climate change related issues, diversify rice-based systems and reduce post-harvest losses. The Center also strengthened its partnership with the Economic Commission of Africa.

It was also a rewarding year for AfricaRice. At the Annual General Meeting of the CGIAR, held at Maputo, Mozambique, in December 2008, the AfricaRice-coordi-

nated West and Central Africa Rice Research Network (ROCARIZ) won the Outstanding Partnership Award. ROCARIZ was commended for “its decentralized, issue-driven task force approach” that has enabled it to successfully foster a high level of national involvement in collaborative research to improve rice productivity in both rainfed and irrigated systems in West and Central Africa.

Three young researchers at AfricaRice were also recognized for their excellent work. Mr Fatogoma Sorho, from Côte d’Ivoire, received the 2007 Christiane Doré prize for his thesis on rice yellow mottle virus (RYMV) in West Africa. AfricaRice scientist, Dr Yacouba Sere, was his research supervisor. Ms Yonelle Dea Moukoumbi, a PhD student from Gabon, working under the supervision of Dr Moussa Sié, was selected for the 2008 UNESCO-L’ORÉAL Fellowship award. Ms Alice Bonou, a trainee from Benin supervised by AfricaRice economist Dr Aliou Diagne, was selected to receive the CODESRIA award for her thesis on the impact of NERICA varieties on the rice biodiversity in Benin.

During the year, Egypt joined AfricaRice as its 22nd member. Egypt is a major rice producing country and is the first member from North Africa.

The ownership of Africa Rice Center by member states from all regions of the continent has made it a unique institution – a pan-African intergovernmental Center affiliated to the CGIAR.

The year 2008 was a year where the Center greatly strengthened its position as the premier research for development institute on rice-based systems in Africa. Boosting Africa’s rice sector will be critical to avoid crises like we witnessed in 2008 in the years to come.



Director General, Dr Papa A Seck (left), with the Chair of the Board of Trustees, Mr Getachew Engida.

Getachew Engida

Papa A Seck

A wake up call for Africa

The year 2008 was particularly marked by the global food crisis. This resulted in staple food prices soaring to levels not seen since 1973. The situation had a strong impact on rice prices in Africa and turned the food crisis in many cases into a rice crisis. The sharp rise in prices adversely impacted the poorest families, who typically spend more than 50% of their income on food. This resulted in violent riots in major capitals across Africa.

There were many reasons for the increase in food prices. The world economy had been booming for a decade. The insatiable need for petroleum products led to a surge in crude oil prices. In their search for finding alternate sources of fuel, countries turned to producing bio-ethanol from food grains. This additional demand for grains increased food prices across the globe. The increase in crude oil prices also meant an increase in fertilizer prices.

Many developing country economies were going through structural transformation and the national governments avoided making interventions to stabilize prices. Decline in the growth in rice productivity in Asian countries and their banning of export also led to the soaring of rice prices. The steady economic growth in emerging Asian economies had been taking away critical resources such as land, water and labor forces from rice production into more remunerative industrial and service sectors.

Adding to all these was the depreciation of the US dollar against other currencies.

A vulnerable continent

Although Africa accounts for only 13% of the world population, the continent imported one-third (9.3 million tons) of the rice available on the international market in 2008. Nearly 40% of the total rice consumption in Africa comes from the international market. Some of the African countries, such as Nigeria, Senegal and Côte d'Ivoire, are among the top 10 importers of rice in the world. This makes the African countries very vulnerable to increases in global price of rice.

Rice is the most rapidly growing food source in Africa. The price and availability of rice are critical determinants of food security and welfare in the poor households. In 2008, the threats of shortage in rice supply and the resulting multiple riots and social unrest that swept across the continent reminded African policy makers about the necessity of increasing domestic production.

They realized that it is essential to turn the crisis into an opportunity and exploit Africa's vast potential for growing rice. Rice is now considered as a strategic commodity and increasing domestic production has become a top priority for Africa. Countries such as Nigeria, Ghana, Togo, Côte d'Ivoire, The Gambia, Senegal and Burkina Faso plan to attain rice self-



In 2008, rice became an expensive commodity in the market.

sufficiency in the medium to long run. After decades of neglect, the 2008 rice crisis triggered strong political will and actual government commitment to the development of the domestic rice sector.

Responding to the rice crisis

Even before the crisis struck in 2008, AfricaRice had been cautioning the member countries against its impending possibility. Addressing the agriculture ministers from AfricaRice member states at the Council of Ministers' meeting held at Abuja, Nigeria, in September 2007, Director General Papa A Seck said that considering the upward trend in international market, the price for this essential food grain could double by 2008.

“African national rice economies will increasingly become exposed to unpredictable external supply and price shocks,” Dr Seck had stated. “The current rise in the prices of cereals and the low level of global reserves could unleash widespread food riots in Africa. The rice crisis is, therefore, not a myth, but a huge threat and SSA should urgently reconsider its rice import policy to avoid the looming crisis.”

When the crisis struck, AfricaRice formulated, advocated and initiated a combination of short-, medium- and long-term measures. AfricaRice communicated to policy makers and public in the affected African countries that rather than being a threat, the increasing rice price provided a unique historical opportunity to use the latent potential for production and break from decades of policy bias against agriculture, which accounts for 35% of the GDP of sub-Saharan Africa (SSA) and 75% of its employment.

Africa's potential for enhanced production are multiple and include availability of modern rice technologies, large tracts of land and underutilized water resources. For instance, the New Rice for Africa (NERICA®) rice varieties combine high yield, short duration, resistance to pests and diseases and have an acceptable taste. AfricaRice studies show that local rice production is competitive in Benin, Guinea, Mali, Nigeria and Senegal. AfricaRice recommended that in the short

term governments should employ well-targeted safety net programs for the poorest urban and rural consumers and vigorously support smallholder rice producers to raise their productivity and market surpluses. To facilitate access to rice for the poorest, there must be temporary reductions in levies on imported rice and governments should procure locally produced rice that can be sold at subsidized prices at selected points to the poorest. Access by Africa's 31 million small rice farmers to proven improved rice varieties such as NERICA could be expanded, along with provision of subsidies on fertilizers and accelerated rehabilitation of existing irrigation schemes.

Governments should also endeavor to coordinate their policy initiatives in favor of locally-produced rice. To stimulate domestic rice production effectively, a common sub-regional or regional strategy is needed.

Further, AfricaRice suggested that governments should quickly sensitize powerful urban groups such as the consumers and rice importers to their long-term best interests in supporting domestic rice production and reducing dependence on imports. Rice importers should be given appropriate tax incentives to foster their investment in domestic rice production capacity, especially in post-harvest rice processing and value-addition activities. Entrepreneurs at all levels need similar encouragement to increase production of quality rice seed.

In the medium to long term, SSA governments should step up investment in water control technologies for lowland rice production; and reduce import duties on low-cost, small-scale machinery for land preparation and harvest and post-harvest activities. Governments and donors must also invest in building rice research and extension capacity.

In the long term, AfricaRice suggested that governments need strategies for sustained investment in new irrigation schemes to raise the share of irrigated rice in domestic production from the current average of less than 10% to more than 50%. Africa urgently needs to build its capacity to train rice scientists, technicians and change

agents from governments, NGOs or the private sector to interact with farmers in technology adaptation and dissemination. More strategic research is needed at the continental level, e.g., to develop rice varieties resistant to major pests and diseases and robust enough to withstand the vagaries of climate change such as erratic drought spells, extreme temperatures and flooding.

Emergency measures

Faced with the food crisis in 2008, AfricaRice initiated an Emergency Rice Initiative to decrease Africa's dependency on imports and boost the domestic rice sector in the short term.

The United Nations Food and Agriculture Organization (FAO) financed the launching of this Emergency Rice Initiative during a program formulation workshop held from 9 to 12 June at AfricaRice in Cotonou, Benin. The initiative – jointly launched by AfricaRice, FAO, IFDC, Catholic Relief Services (CRS) and the International Fund for Agricultural Development (IFAD) – is conducted within the framework of the FAO's Initiative on Soaring Food Prices (ISFP) and seeks to provide urgent assistance to improve farmers' access to:

1. High quality rice seed of improved varieties;
2. Mineral fertilizer;
3. Best-bet rice technologies; and
4. Knowledge on post-harvest and marketing.

At least two representatives from each of the 12 pilot countries (Benin, Burkina Faso, Cameroon, Cote d'Ivoire, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone and Togo) and a representative from the West African farmers' organization (ROPPA) attended the workshop. Other participants included staff members from AfricaRice, the Japan International Cooperation Agency (JICA), FAO, IFDC, CRS, IFAD, IRRI, African Development Bank (AfDB), Sasakawa Global 2000 (SG 2000), the United States Department of Agriculture (USDA), Banque Ouest Africaine de Development (BOAD) and the Alliance for a Green Revolution in Africa (AGRA).

During the four-day workshop, the participants analyzed the potential to produce additional rice for each selected country, including the identification of targeted ecologies, number of farmers and anticipated production gains per major region. They also explored sustainable mechanisms for seed production and distribution as well as for mineral fertilizer procurement, distribution and use efficiency.

The workshop highlighted that in order to achieve sustainable increases in rice production, greater importance should be given to the value chain approach to develop the competitiveness and the market desirability of rice production in Africa. By the end of 2008, IFAD, BOAD, the African Development Bank, USAID and the Government of Japan had pledged their support to this initiative.



African markets are heavily dependent on imported rice.

New research structure

The External Program and Management Review (EPMR) suggested in 2007 a review of the Center's program structure. AfricaRice's research program structure was discussed by all research staff during an in-house meeting in December 2007. A new structure was developed which is simpler and provides a clearer focus on the Center's core research activities:

- Program 1: Genetic Diversity and Improvement
- Program 2: Sustainable Productivity Enhancement
- Program 3: Learning and Innovation Systems
- Program 4: Policy and Impact Assessment

Each of these programs is equivalent to one Medium Term Plan (MTP) project.

Genetic Diversity and Improvement

Program 1 covers the area 'from gene to plant', and aims to enhance genetic diversity and develop improved rice lines adapted to abiotic and biotic stresses and consumer preferences, using conventional breeding, MAS and profiting from farmer knowledge.

Sustainable Productivity Enhancement

Program 2 covers crop and natural resources management research related to intensification and diversification and protection of environmental services, and aims to move research from plot to systems level and to introduce systems thinking in general.

Learning and Innovation Systems

Program 3 covers partnerships, learning and innovation systems and works on improving the link between farmers and input and output markets and value chain development.

Policy and Impact Assessment

Program 4 covers policy and impact work.

The System-Wide Ecoregional Program, the Consortium for the Sustainable Development of Inland Valley Agro-ecosystems in Sub-Saharan Africa (IVC) was maintained.

This new research program structure was endorsed by the DG in January 2008 and approved by the Center's Board in March 2008.

RiceTIME Unit: In August 2008, AfricaRice created a special unit focusing on Training, Information Management and Extension linkages (RiceTIME Unit) to lead the Center's contribution to the Emergency Rice Initiative, and facilitate rice information management and capacity building. RiceTIME hosts a number of regional networks such as the African Rice Initiative (ARI) and the ROCARIZ network.

Collaboration with IRRI: the East and Southern Africa Rice Program (ESARP)

The International Rice Research Institute (IRRI) and AfricaRice joined forces to establish a rice research and development program for East and Southern Africa (ESA). The program will operate through two research hubs in Dar-Es-Salaam, Tanzania, and in Maputo, Mozambique. The objectives of ESARP are:

- Improve rice production through improved varieties, crop management and post-harvest practices;
- Introduce and adapt small-scale machinery to improve timeliness and efficiency of farm operations;
- Enhance germplasm exchange;
- Develop a critical mass of trained scientists and public- and private-sector extension agents;
- Improve rice knowledge sharing; and
- Build efficient partnerships to boost rice production and marketing in ESA.

AfricaRice, IRRI and their partners in ESA will focus their work on four joint research programs to improve rice productivity and marketing in the region:

- Program 1: Rice breeding, varietal release procedures and seed production systems

- Program 2: Crop production and post-harvest practices
- Program 3: Rice value chain and agricultural policy
- Program 4: Improving rice production at the village level

Training is an important component and will cut across all four ESARP programs. Through training the capacity

of key rice scientists, technicians and extension staff to conduct research and to validate and disseminate technologies will be improved. This will be done by providing training opportunities for degree courses overseas, non-degree short-term specialist courses, and rice-related training programs for village groups, extension officers, farmers and private companies.



The DDG of AfricaRice, Dr Marco Wopereis, accompanied by the DDG of IRRI, Dr Achim Dobermann, with the AfricaRice Senegal team at the Saint-Louis Research Station.

Research in brief

Marker Assisted Selection (MAS)

Some of farmers' favorite rice varieties have a flaw or two. African rice farmers often want to keep a variety they have grown for years, but it may be susceptible to a certain disease, or easily damaged by drought or salinity, which cause large losses of rice in Africa.

Geneticists at AfricaRice are using a technique called "marker-assisted selection" (MAS) to improve the resistance of rice varieties to environmental stresses, using conventional plant breeding combined with molecular markers.

MAS is not genetic engineering. Molecular markers are naturally occurring and there are several types, but for rice the preferred ones are simple sequence repeats (SSRs). These are short sections of DNA that repeat themselves over and over. SSRs are abundant in rice so geneticists can use them as landmarks to pinpoint the sections of DNA that affect the desired traits. SSR markers may occur in a gene, or near it. The geneticists plot the interesting genes onto a core map of the rice genome. Often a desired trait is coded by several genes, each one contributing a small part of the trait. MAS helps to find these genes and guide them into a popular variety.

How MAS works. Geneticists cross a popular rice variety with another one with a desired trait (but perhaps few other traits of interest). Then researchers test the offspring of the two varieties in the field to confirm that they have the trait of interest. As they begin backcrossing the offspring with the favorite variety, the trick is to keep as much genetic material as possible from the favorite variety, including only the desired genes from the other variety.

Finding markers that are genetically linked to a trait can help identify superior plants faster. DNA can be extracted from very young rice plants and the marker assay carried out long before the plant expresses the actual traits. MAS helps to develop promising new varieties in fewer generations, saving years of plant breeding.

Tougher rice. AfricaRice geneticist Dr Marie-Noëlle Ndjiondjop is now using MAS to breed a new generation



AfricaRice scientist, Dr Marie-Noëlle Ndjiondjop, works on MAS for developing improved rice varieties.

of improved inter-specific varieties which will be more like their African parents in ways that will help them adapt to local constraints. She has also used MAS to introduce a gene for resistance to rice yellow mottle virus (RYMV) into four popular varieties from Burkina Faso, The Gambia, Guinea and Mali. The new lines were tested in farmers' fields and selected lines are now ready to be field evaluated with farmers using participatory varietal selection (PVS) in national programs in African countries.

Stress tolerant rice. As part of the STRASA project (Stress Tolerant Rice for Africa and South Asia) working in 14 countries in Africa and 3 in South Asia, funded through the International Rice Research Institute (IRRI), AfricaRice now has some interesting lines of rice which are resistant to cold, drought, salinity and iron toxicity.

Dr Khady Nani Drame is working with STRASA to develop solutions to iron toxicity, a major problem in the lowlands. Drame hopes to breed varieties which have acceptable yield, and which also tolerate iron toxicity. She is now using MAS to introduce the genes that confer tolerance to iron toxicity in rice to popular varieties in Guinea, Ghana, Burkina Faso, and Nigeria.

STRASA coordinator for Africa, Dr Baboucarr Manneh, explains that within another year or so, some of these

lines will be ready to test with national programs in Africa using participatory varietal selection (PVS) along with farmers.

Rice processing: the missing link in Benin

Dr Daniel N Dalohoun explains that the diffusion of an innovation depends on more than just having a good technology. The spread of NERICA and other improved varieties in Benin shows that entrepreneurship also matters. Businessmen heard about AfricaRice in 2005 through media reports. One of them, Mr Tundé (Babatundé R Ollofindji), decided not to have his own farms, but to process rice, to sell to Nigeria, where there is a large market and unmet demand for high quality rice.

Tundé realized that processing rice would not be profitable unless he had a lot of paddy, so he came to AfricaRice and also to the national program for research, Institut National des Recherches Agricoles du Bénin (INRAB). He conducted experiments with 40 farmers, to demonstrate that rice is profitable, and to produce seed to sell to other farmers.

To produce rice seed or paddy the farmers will need money to buy the seed, fertilizer and other inputs. There was no bank offering credit to smallholder farmers, so Tundé took his ideas to the BRS (Banque Régionale de Solidarité). If processors would buy paddy from farmers, they would be able to repay their loans, so the bank would be interested in financing them.

Next, Tundé needed to discuss the project with the government, to negotiate better terms to import the processing machinery duty free. If he had to pay the import taxes, the processing would not be profitable. Benin has an investment law which allows this.

Farmers told Tundé that they were keen to get into his project, because threshing rice by hand is tedious, and when farmers process rice on-farm they don't get the quality they need to compete with imported rice. Farmers were happy that somebody would buy paddy, so they could grow as much as they wanted.

Farmers in Benin can produce rice two times a year, or even three if they have irrigation. At first the NGO Songhai had a small processing plant. They were giving seed to farmers and agreeing to buy their paddy. But farmers soon began bringing in more paddy than Songhai could process, because each farmer brought in rice from two or three other farms, simply because there was so much demand for processing.

Dalohoun did his research in 2007, when farmers were just getting interested in growing rice. People in Benin like NERICA1, because it is not sticky, and it is aromatic. Some of it smells so nice that you can smell it in the field.

Dalohoun calls the Benin experience a “self-organizing system of innovation”, where entrepreneurs found a profitable technology, and organized others to produce it.

The rice processing facilities are still inadequate in Benin. There is no large-scale rice processor, although farmers are still interested in growing rice, and consumers want to buy rice; processing remains the missing link. Tundé is still planning his big rice milling industry, but others such as Songhaï, and the Entreprise de Service aux Organisations des Producteurs (ESOP), have taken the lead. Songhaï has expanded from one rice mill to three.



Innovation systems are run by innovative people, like Madam Gogo, one of the rice farmers now growing NERICA1 in Benin.

Through a network of farmers and in collaboration with INRAB, the Ministry of Agriculture, the Chamber of Commerce and Industry of Benin (CCIB), ESOP now has more than six small rice mills across Benin and continues to expand. Government projects are also underway to create some bigger mills in the north (Malanville) where rice production is rapidly expanding.

Take time to learn

When Dr Michael Misiko, AfricaRice anthropologist, began looking at groups of farmers doing participatory varietal selection (PVS) in Guinea, the Democratic Republic of Congo and Sierra Leone, he noticed that there was a pattern to how farmers chose a variety. They would say that they liked new variety A or B because of the taste, the aroma, or because it resisted disease or drought. But when Misiko asked farmers if these varieties had those qualities, the farmers admitted that they were not sure.

When they do the selection perhaps no drought occurs, or no disease breaks out. Also, farmers do not know how the varieties will behave without fertilizer. The PVS uses fertilizer, but farmers rarely use it on their own farms.

It takes years to know and trust a variety. Misiko realized he had to improve the questions about farmer's criteria. So he asked farmers to compare varieties from the PVS (usually NERICA4, 6 or 7) with old varieties which farmers had grown for about 50 years, and with the most popular varieties, which had been grown for at least six years.

Farmers said that they liked the new ones, "but we want to see what will happen four or six years down the road."

Farmers in Guinea also explained that they chose NERICA because it was early-maturing, but later they thought that might not be an advantage, because they have a long rainy season and they try to plant so that the rice ripens near the end of the rain. An early maturing variety ripens when the other varieties need a lot of attention and the rain may spoil the grain. So many birds descend on an early maturing variety that you need many



Farmers selecting rice varieties at a PVS in Makeni, Sierra Leone.

people to scare birds, so it increases or complicates the labor requirements.

Competition with weeds is critical. The old varieties in Guinea compete well with weeds. New varieties are often not as competitive or their competitiveness is unknown (because PVS plots are weeded well). So if farmers delay weeding even by one week, it compromises the yield of many improved varieties. This is not so with the local varieties. If farmers weed it a week later the yields are unchanged. The old varieties may be low-yielding, but their yield was assured or stable.

Small groups. The key finding is that PVS is run by a small group, while most participating farmers only come to the field day, close to harvest. Most of the farmers have not seen the varieties in all their stages. Only a few of the farmers come to the planting session and only they know how the fertilizer was applied and how much.

The most important session is probably that on weeding, since weed resistance is a very important criteria. But it is the most poorly attended session, because farmers don't want to do the extra work, as they are busy weeding their own farms. If they have any time to spare they can work for wages weeding someone else's farm. So even with PVS, farmers (like researchers) take time to learn.

Misiko's findings are helping AfricaRice scientists to further fine-tune the PVS process.

AfricaRice induces policy changes in member countries

Rice is now prominently on the agenda of many countries and they are serious about domestic production, explains AfricaRice economist, Dr Ibrahima Bamba.

In the old days of structural adjustment, policy makers were led to believe that the market would take care of seed, fertilizer and everything else. But *laissez faire* failed Africa. While Asian governments worked to guarantee local production, Africa tried to rely on the global market, and began to import more and more to feed the cities. The reliance on imports exacerbated Africa's exposure to international market shocks. It is not surprising that most of the recent food riots were in Africa.

Before the crisis, the global demand for rice was growing faster than world production. Global rice stocks were low, down to about two to three months of world consumption. AfricaRice noticed that rice prices had been increasing for some time, and warned the member states of the crisis before it happened, speaking directly to the decision makers at meetings such as the Council of Ministers. In 2007, the Director General started touring the countries, saying there might be an imminent crisis in rice and urging decision-makers to invest in farming. The governments appreciated the advance warning. Yet they only made major investments in rice after the 2008 crisis.

The case for investing in domestic agriculture remains strong, as accumulated evidence shows that local rice is competitive. Now more countries are trying to be self-sufficient to avoid being hurt again by another rice crisis.

Policy communication. AfricaRice communicates the results of research for policy makers through several channels including the Council of Ministers' meetings held every two years, the National Experts' Committee meetings, briefs, workshops, the media etc. Since 2008,

member states have increased their annual contribution to AfricaRice ten-fold, which is a clear indicator of the effectiveness of AfricaRice policy communication.

Donors are helping AfricaRice boost seed production. USAID will fund a major seed project in West Africa that will start in 2009. The Japanese Government will support a project to provide vulnerable farmers access to quality seed in 21 countries across the continent.

AfricaRice is reinforcing collaboration with regional institutions such as the Economic Community of West African States (ECOWAS), the network of farmers' and agricultural producers' organizations of West Africa (ROPPA) and others for further opportunities for policy communication and outreach.

What the countries are doing. The policy landscape is changing. In addition to growing more rice, most countries are aware of the need to improve its quality. "Subsidy" used to be a taboo word. Now policy makers are starting to say that governments need to subsidize fertilizer, and seed production. And farmer groups are more vocal in expressing their needs.

During the 2008–09 cropping season in Mali, for instance, the government subsidized fertilizer, seed and helped finance farm machinery such as mini rice mills, rice threshers, and other equipment to improve rice processing. Greater support to local rice production paid dividends. The Sahel harvested a bumper crop of rice in 2008-09: a 44% increase in one year. The increase was over 200% in Burkina Faso, although from a relatively low base. Many countries recorded double digit growth. The weather also helped, with good rainfall.

Many are now talking about irrigation, while before irrigation was regarded as a failure in Africa. With irrigation, rice yields are as high in Africa as they are anywhere in the world.

Though only eight countries have complied with the 2003 Africa Union Maputo decision to allocate at least 10% of their budget for agriculture, national governments are now certainly more interested in investing in the farming sector.



Improved policy support by African governments is resulting in enhanced food security for the poor.



Tackling weeds in farmers' fields

It does not pay to increase the amount of water flowing through the tap if the bucket holding the supply leaks. When it comes to rice production, weeds are the holes in the bucket that reduce yields.

In rice production throughout Africa, the damage caused by weeds is immense. Weed scientists from AfricaRice and IRRI estimate that the annual production loss caused by weeds in rice fields in Africa (excluding Egypt) is around 2.2 million tons and costs the African economies US\$ 1.45 billion. If the production loss is averted, African countries can reduce their rice import burden by half.

Weeds are disastrous for smallholder farmers, who rely largely on hand weeding. Farmers frequently abandon their fields when weed pressure becomes too heavy for them to control.

Where irrigation is available, controlled flooding can be an option for reducing weed pressure. However, close to 90% of the area under rice in Africa is rainfed. In these systems such controlled flooding is not possible.

Using herbicides is another option that is difficult to implement in many parts of Africa. Imperfect markets, high prices and a lack of application equipment and know-how limit the effective use of herbicides for smallholder farmers in Africa.

As the center of excellence for rice research in Africa, the thrust at AfricaRice is on combating weeds through the development, evaluation, and dissemination of integrated weed management options, using insights derived from advanced science as well as local knowledge.

Identifying weed-competitive varieties

Rice is generally a weak competitor against weeds. Identifying and developing superior weed-competitive varieties is a cost-effective approach to sustain rice productivity. AfricaRice scientists have identified rice varieties with superior weed competitiveness for both lowland and upland conditions.

Recent studies in the Guinea Savanna zone in Benin showed that some of the lowland interspecific hybrids, New Rice for Africa (NERICA), developed from crossing African rice (*Oryza glaberima*) and Asian rice (*O. sativa*); and also improved, intraspecific lowland varieties (*O. sativa* × *O. sativa*), had high yield under moderate weed competition levels as well as under weed-free conditions.

For upland varieties of NERICA only scant information is available so far. NERICA 1, 2 and 4 showed to be less weed suppressive than their *O. glaberrima* parent (CG14) and equally high yielding as their *O. sativa* parent WAB56-104. Weed competitiveness of the complete set of upland varieties of NERICA is also still under evaluation at two locations in Ghana representing the Equatorial Forest and the Guinea Savanna zone.

The Center's scientists have also found that some upland *indica* varieties (so-called 'aerobic rice' varieties in



AfricaRice scientist, Dr Jonne Rodenburg, examines weeds in an inland valley in Burkina Faso.

Asia) have strong weed suppressive ability and give high yield under moderate and severe weedy conditions. These findings go against the commonly-held belief in Africa that tropical *japonica* varieties are better adapted to the upland conditions than *indica* varieties. Further evaluation of these varieties is now on-going under farmers' management practices in Central Benin.

AfricaRice scientists have also identified some plant characteristics associated with superior weed competitiveness. At low to moderate weed pressure, there seems to be no trade-off between yield potential and weed competitiveness. However, at higher weed pressure, growth vigor at the vegetative stage becomes more important for maintaining high yields. Higher growth vigor was found to give the crop a stronger ability to suppress weeds.

A study on lowland rice showed that crop growth duration proved to be an important characteristic for maintaining high yields under moderate weed pressure, as it affects yield potential and weed suppressive ability of rice.

Though further studies are required to validate these results, they indicate that a selection based on these characteristics under weed-free conditions will have great potential for developing high-yielding genotypes that could perform well under a wide range of weed infestation levels in Africa.

Dealing with parasitic weeds requires a different strategy. *Rhamphicarpa* and *Striga* spp. are parasitic weeds that cling on to the root of the rice plants to extract nutrients, water and assimilates. AfricaRice scientists are helping farmers to overcome crop failure, by identifying rice varieties with superior resistance against parasitic weeds.

Work in rhizotrons (tools for making nondestructive, repeated observations and measurements of root systems) carried out in collaboration with the University of Sheffield, showed that *O. glaberrima* varieties CG14 and MG12 have post-attachment resistance to *Striga*. The upland NERICA10 and 12 varieties showed effective post-attachment resistance as well. In collaboration with Wageningen University, these varieties are currently

being screened for pre-attachment resistance in the lab. Field expression of these resistance mechanisms will be tested in Tanzania soon.

Though a relatively new and lesser-known problem, *Rhamphicarpa* infestation is such a menace in lowlands that farmers in Benin call it “otcha” meaning “death” in the local language. AfricaRice scientists who recently visited inland valley farmers in Sokponta village in Central Benin observed that rice fields had been abandoned due to heavy infestation by this weed.

Rhamphicarpa is a parasite that can grow independently from a host. Since little is known yet about the biology and ecology of this weed, AfricaRice is working on elucidating some of this basic knowledge. This will provide pointers for the development of integrated management options. Scientists at AfricaRice, in



A farmer displays a noxious weed in an inland valley in Benin.

collaboration with the Université d'Abomey Calavi and INRAB (Benin) found that *Rhaphicarpa* seed production was reduced when this weed was grown without rice. This indicates that the weed has a clear interest in parasitizing rice. However not all rice varieties were equally supportive of parasitism. Some varieties (notably Gambiaka and lowland NERICA-L39) were shown to be able to reduce *Rhaphicarpa* reproduction.

Communicating weed management strategies

AfricaRice and NARS scientists are collaborating to find socially and economically acceptable and effective weed management options for inland valleys, which have high potential of rice production in West Africa. They are studying farmers' knowledge of weed problems and mitigation methods. Using participatory approaches they are also optimizing crop establishment methods with respect to weed suppression and input levels.

Though the scientific results of this work have yet to be analyzed, a direct result of the interventions can already be noted in Bende village in Umuahia region of eastern Nigeria. Here rice farmers have already adopted the practice of line transplanting. This was suggested by AfricaRice to facilitate weed management operations and to reduce weed pressure due to higher planting densities.

An important component of the integrated weed management approach is the use of herbicides. In the past years, the proper use of herbicides, including selection of effective products and application times, was studied as part of an integrated crop management strategy. This has resulted in a set of practical and effective recommendations which are currently being followed by thousands of farmers in the irrigated production schemes in the Sahel.

AfricaRice is training farmers on appropriate herbicide use through the development of modules as part of participatory learning and action research (PLAR). Thousands of rice farmers in eight countries in West Africa and two in East Africa, have been exposed



A woman farmer with Rhaphicarpa in southern Senegal.

to this farmer-participatory approach. More recently these modules have been converted into radio scripts and learning videos that should encourage farmers to improve their weed management strategy.

Establishing communication linkages with farmers is a must when dealing with weeds. It is necessary to know which weeds are emerging, and also to gain insights into farmers' understanding of the problems as well as local management strategies. AfricaRice has been discussing with farmers through field-level meetings, and through PLAR activities. Rice farmers in inland valleys in Benin, Nigeria, Côte d'Ivoire and Burkina Faso have been interviewed on their knowledge on weed biology and control. This information is currently being analyzed and will be used to set priorities and fine-tune future research endeavors.

There are also times when farmers find value for weeds. Many of the wild plant species found in rice fields also have their usefulness. A study by AfricaRice and Wageningen University found that farmers in Benin and Togo distinguish between undisputable weeds and plants which have some value. Farmers let the useful plants stay

during hand weeding. While developing acceptable weed management strategies, AfricaRice intends to address this dual role of wild plants in farmers' fields.

Birds like weeds

To add insult to injury to farmers, it has been reported from Senegal that heavy weed infestation can attract more birds, thereby leading to further yield loss. Senegalese rice farmers linked bird problems to weed management. They indicated that weedy fields are more severely hit by birds than those fields that are better managed.

To verify these observations, AfricaRice initiated controlled experiments with different combinations of bird and weed control. The outcomes, though preliminary, are stunning.

Bird damage in weedy conditions is higher than in weed-free conditions. Hence weeding not only positively affects rice yields through reduced weed competition but also by reducing bird pressure. Many birds are attracted by the weeds as they provide food (seeds), shelter and roosts from where they attack rice.

Assessing new water-saving rice production systems

AfricaRice scientists are also studying weed management issues in the context of cropping systems, particularly those related to new production systems that use less water. Many recently developed systems that use less water are gaining momentum – most notably aerobic rice systems and alternate wetting and drying (AWD) systems. There is much interest in these systems since according to different climate change scenarios water will become a scarce resource in the future.

However, the impact of these systems on weeds needs to be studied. Since in these systems there is no water layer to suppress weed growth during the different rice growing stages they may be subject to more severe weed infestations than irrigated flooded lowlands.

In collaboration with the University of California (Santa-Cruz) and Wageningen University, AfricaRice is assessing the impact of alternate wetting and drying, as part of a conventional production system and as part of a system where certain elements of System of Rice Intensification (SRI) are adopted, on weed infestation and rice productivity in Senegal.

Although alternative wetting and drying resulted in water savings from 19% to 36% (depending on season), weed pressure and weed-inflicted yield losses were much greater than in the conventional recommended practice including permanent flooding. This is partly due to the fact that plant density used was wider than the recommended practice (25×25 compared to 20×20 cm), resulting in slow canopy development.

When only water management was changed from permanent flooding to alternate wetting and drying, the recommended herbicide doses and timings were sufficient to keep weeds at manageable levels, attaining comparable yields while still reducing water use from 4% to 47% (depending on season) compared to conventional rice production systems.



AfricaRice scientist, Dr Kazuki Saito, assesses a trial plot to study weeds.

Partnerships

AfricaRice's work on weed management is done in partnership with many organizations. They include the national agricultural research systems of Senegal, Benin, Burkina Faso, Ghana, Côte d'Ivoire, Nigeria and Tanzania. AfricaRice also collaborates with local and international universities – Université d'Abomey Calavi, Benin; University of Development Studies, Ghana; Michael Okpara University of Agriculture, Nigeria; Wageningen-UR, the Netherlands; University of Sheffield, the Natural Resources Institute of the UK; and the University of California-Santa Cruz, USA.

IRRI, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the International Institute for Tropical Agriculture (IITA) are the centers of the Consultative Group on International Agricultural Research (CGIAR) with whom AfricaRice is working on weed research.

The outlook for the future

Though AfricaRice has achieved much progress on weed research in the recent years, there are still many challenges remaining for the future. First, the number of professionals with expertise and experience in research on weed management is limited within the national agricultural research systems in Africa. The Center will need to help enhancing the capacity through training of weed scientists.

Second, farmers in Africa need a wider range of options to manage weeds more effectively. At present the most frequently applied weed management option is hand weeding which easily consumes about 30% of the total time required for rice cropping.

In many farm households, weeding is the primary responsibility of women seconded by children. Through development, evaluation, and dissemination of improved weed management options, AfricaRice envisages improvement in the livelihood of women and schooling rates for children.

Third, the future effectiveness of weed management will depend greatly on how the rice growing environment will be altered along projected climate change. One of the future activities planned by AfricaRice is to investigate the likely impacts of future climate change on the spread of weeds to develop mitigation strategies.

AfricaRice scientists will continue to develop strong, sustainable, affordable and socially acceptable strategies on weed management with farmers in rice production ecosystems.



Weeds and rice plants compete in a trial plot.

Donor profile – Japan

More than three decades ago, Japan and the AfricaRice Center (AfricaRice) laid the foundation of a collaboration that has grown from strength to strength and garnered an impressive array of achievements, most notably – but not limited to – the New Rice for Africa (NERICA) varieties. The collaboration was built on the shared vision of rice as an engine of economic growth and political stability that can impact on poverty and hunger in sub-Saharan Africa.

Japan has a long tradition of rice production and consumption and possesses a wealth of experience and knowledge about rice cultivation. For Africa, rice has increasingly become a strategic crop. There is, therefore considerable scope for sharing experiences and knowledge that can benefit smallholder rice farmers in sub-Saharan Africa.

An enduring partnership

Japan has historically been the most important donor of AfricaRice and has played a significant role in its

development. The Japan International Cooperation Agency (JICA) and the Japan International Research Center for Agricultural Sciences (JIRCAS) have provided experts as required.

Over the years, highly respected Japanese scientists have been actively involved in the Center's governance as members of the Center's Board of Trustees.

Japanese scientists, mainly from JICA, JIRCAS and Japanese universities, have been working at AfricaRice since 1978. They have been actively involved in defining and implementing high-priority research areas in partnership with AfricaRice and have greatly contributed to the Center's publication record on rice research for Africa. Currently, Japanese experts account for the highest percentage (14%) of the internationally recruited staff (IRS) at AfricaRice. This is the highest percentage of Japanese experts in any CGIAR Center.



Prof. Kenji Iiyama, President of JIRCAS, with Drs Papa A Seck and Marco Wopereis at the CGIAR Annual General Meeting in Maputo, Mozambique, 2008.

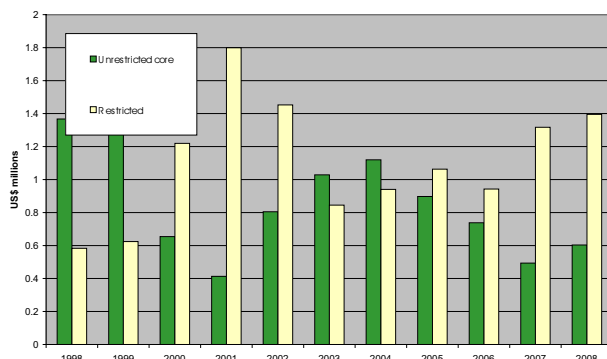
Japanese Board members at AfricaRice

T Takeda	Professor Emeritus at the Kyushu University, Japan	1989–1994
R Ishii	Professor of University at the Tokyo, Japan	1995–2001
T Horie	President of the National Agriculture and Food Research Organization (NARO), Japan	2001–2007
K Maruyama	Vice President, NARO	2007 to date

Japanese scientists at AfricaRice

Name	Position	Period
K Furugori	Rice-processing/ Grain Quality Expert, Collaborating Scientist, JICA	1978–1980
T Akutsu	"	1978–1980
M Kita	"	1979/80–1981
H Miyaishi	"	1982–1987
M Takeda	"	1988–1993
H Watanabe	"	1996–2000
K Futakuchi	Ecophysicologist, AfricaRice	1997 to present
S Tobita	Physiologist/Molecular Biologist, Collaborating Scientist, JIRCAS	1998–2001
T Sakurai	Agricultural Economist, Collaborating Scientist, JIRCAS	1999– 2002/2003
H Tsunematsu	Geneticist, Collaborating Scientist, JIRCAS	2001–2002 and 2004–to present
R Ikeda	African Rice Initiative (ARI) Seed Specialist, Collaborating Scientist, JICA	2005–to present
Y Sokei	ARI Agronomist, Collaborating Scientist, JICA	2005 to present
K Saito	Agro-physicologist, Africa Rice Center	2005 to present
S Abe	Soil Scientist, Africa Rice Center	2008 to present

Japan's financial support to AfricaRice, 1998–2008



Japan earmarked projects

Japan and AfricaRice have been implementing a series of inter-related research projects that have been developed to build synergies among themselves. Operating under the umbrella of “Japan earmarked (attributed) funding”, these projects have evolved over the years and passed through several phases in response to research priorities.

Interspecific Hybridization Project (IHP): Among the Japan-AfricaRice joint projects, the most significant is the IHP, which was launched in 1997 with support from the Government of Japan, the United Nations Development Programme/Technical Cooperation among Developing Countries (UNDP/TCDC) and the Rockefeller Foundation. Several Japanese rice experts within and outside the Center have been involved in IHP, which is now in its fourth phase.

IHP is considered a successful partnership model which has involved partners from advanced and sister research institutes (JIRCAS, IRD, YAAS, IRRI and CIAT), Universities (Cornell, Tokyo and Kyoto Universities), and the national programs and farmers in African countries under the overall coordination of AfricaRice.

Although IHP is a comprehensive project involving various research disciplines, the use of *Oryza glaberrima* (a rice species indigenous to West Africa) for interspecific breeding with *O. sativa* (Asian rice species) is firmly at the heart of the project. The project seeks to create low-management plant types for resource-poor farmers, combining *O. glaberrima*'s adaptability to the local environment and *O. sativa*'s high-yielding ability. The fruit of this effort were the family of NERICA varieties.

IHP has played a pivotal role in the development and dissemination of a number of promising NERICA varieties across SSA. As of now, 18 upland NERICA varieties have been named and characterized by the Center and its partners and more than 300,000 ha (conservative estimate) are under upland NERICA production in Africa.

As part of IHP, a farmer participatory approach known as participatory varietal selection (PVS) was used to develop rice varieties that respond to farmers' preferences. PVS has now been adopted for rice varietal selection throughout West Africa and has spread to central and eastern Africa.

AfricaRice scientist, Dr Ryoichi Ikeda, at a seed handling training program.



Drought stress has been recognized as one of the most important rice production constraints in SSA as it severely reduces rice yield in the rainfed ecology, especially in upland environments. The Japan-Africa Rice Center collaboration is identifying sources of drought tolerance in *O. glaberrima*. It seeks to map and develop molecular markers associated with drought tolerance to more efficiently develop drought-tolerant and high-yielding rice varieties through conventional breeding.

In addition to drought stress, the improved varieties have been evaluated for diseases and insect pests; as well as their responses to plant density, nitrogen and phosphorus applications; and weed management. Useful information has been collected for integrated crop management (ICM) to improve rice yield under poor soil conditions. Integrated pest management (IPM) options for major rice pests have also been developed.

Extending interspecific hybridization research to lowlands: The Japan-AfricaRice collaboration first focused on farmers who grow rice in upland ecology, which accounts for about 40% of the total rice cultivation area in the sub-region. However, since *O. glaberrima* also showed promise for use in lowland breeding programs – because of its resistance to important lowland constraints – the Center started to develop interspecific *O. sativa* and *O. glaberrima* varieties adapted to lowland conditions in 2003.

The lowland ecology has higher yield potential than the upland ecology and in SSA, vast stretches of productive lowlands are still available for sustainable rice cultivation. This project seeks to incorporate genes into improved rice varieties for high yield potential and resistance/tolerance to major lowland stresses, such as rice yellow mottle virus (RYMV), African rice gall midge (AfRGM), iron toxicity, blast, acidity, drought and weeds.

One of the major selection criteria is to develop varieties with adaptability to a wide range of hydrological conditions (from flooding to drought). Lines with highly stable yield over a range of soil water conditions have

been identified. Lowland NERICA varieties have been developed and tested through the Center's research networks, and have recently been released in several countries in the sub-region.

High-yield potential: A joint project was introduced in 2005 to seek high yielding *O. sativa* varieties and identify ideal plant types to develop high-yielding rice varieties for African smallholders. For lowlands, high-yielding varieties have been identified and are under evaluation and for upland conditions, promising, early-duration varieties, identified in 2007, are being tested.

This project confirms that the leaf area index (LAI) can have importance in many areas of agronomy and crop production through its influence on light interception, crop growth, and crop-weed competition. Plant types which result in high yield and possessing several important traits responsible for weed competitiveness were identified and are being validated.

The project has also shown that the yield potential of *O. sativa* parents of current upland NERICA, which are tropical japonica types, is inferior to that of high-yielding *O. sativa* of an *indica* type. It is possible to develop new rice varieties that would be better than the current upland NERICA varieties in terms of yield potential and stability.

Rice yellow mottle virus (RYMV): RYMV has become Africa's most rapidly spreading disease of rice since it was first discovered in Kenya in 1966. Unique to Africa, it has the potential to devastate lowland and irrigated rice anywhere in the continent, contributing to food scarcity in areas where rice is an important staple food.

A joint project on RYMV was launched in 2000 to develop an integrated management strategy. Considerable effort has been made to identify new varieties resistant to RYMV as part of an integrated management strategy. *O. glaberrima* and lowland interspecific varieties have been identified to be resistant to specific RYMV isolates.

Information on the current status of RYMV in farmers' fields in some African countries is now available. Research is continuing to identify donors for durable

resistance trait and characterize the level of resistance of lowland and irrigated breeding lines to RYMV.

An insect vector cultivar screening method for durable resistance to RYMV has been developed. This is as effective and reliable as the mechanical inoculation method and represents the natural field viral transmission condition.

Physiology and genetics: Better understanding of characteristics associated with physiological and genetic aspects could lead to the introduction of additional selection criteria to increase the effectiveness and efficiency of breeding. Therefore, a project on the genetic and physiological mechanisms of rice was launched in 2007.

Oryza glaberrima lines and NERICA possessing useful agronomic characteristics, identified through IHP, are being evaluated to understand their physiological and morphological mechanisms, which in turn will help identify some key processes that make breeding more efficient. To further enhance selection with those key processes, related quantitative trait loci (QTL) will be determined.

Post-harvest technologies: Right from the beginning of the collaboration, Japan has contributed greatly to the areas of rice post-harvest processing and grain quality. JICA helped establish the Grain Quality Laboratory at the Center's permanent headquarters in Côte d'Ivoire. JICA post-harvest processing and grain quality experts were seconded to the Center almost continuously from 1978 until 2000. More than 200 national scientists and extension agents in SSA were trained in rice post-harvest technology and grain quality management during that period.

In 2003, a joint project was initiated to increase the competitiveness of locally produced rice in SSA through the promotion of good harvest, post-harvest and processing practices and technologies. Although most of these practices are already known by grain quality experts, the information is not yet available to most farmers.

Farmers were trained in improved parboiling techniques, which significantly enhance the quality of both uncooked and cooked rice. Farmer-learning videos on post-harvest techniques, including improved parboiling, were produced by the AfricaRice and its partners and disseminated across many African countries. More than 8700 people have watched the videos, of which 58% were women. A study on the impact of the video on parboiling techniques in Benin showed that 54% of the women surveyed had adopted the improved parboiler in 2007.

Sustainable rice farming systems for inland valleys: AfricaRice scientists and their partners have found that the inland valleys in SSA offer a huge potential for intensified and sustainable land use, especially for small-scale irrigated rice cultivation in the valley bottoms, because of higher availability of nutrient-rich water and enhanced soil fertility compared with adjacent



Prof. Takeshi Horie in an African rice field.

uplands. However, less than 15% of the total area of inland valleys is being cultivated because of lack of appropriate techniques. A three year project was started in 2008 to evaluate improved technologies, for intensive and sustainable use of the inland valleys.

Support to the African Rice Initiative (ARI)

As the NERICA varieties have been considered a successful symbol of Asia-Africa partnership, the Tokyo International Conference on African Development (TICAD), has emphasized their large-scale promotion in SSA. In response to the TICAD 3 and 4 action plans, JICA has actively facilitated dissemination of NERICA varieties across SSA.

The African Rice Initiative (ARI) was launched by the Africa Rice Center in 2002 with support from Japan, UNDP and Rockefeller Foundation to scale up the dissemination of improved technologies, including NERICA, throughout SSA. ARI is coordinating a \$35 million, five-year project, covering seven pilot countries – Benin, The Gambia, Ghana, Guinea, Mali, Nigeria and Sierra Leone – with support from the African Development Bank (AfDB). To help ARI, JICA has posted two rice experts – one for breeding and another for agronomy, who are assisting ARI to address priority constraints in these two important areas.

Capacity building

Capacity building of national partners is central to the partnership. Every year, scientists and technicians selected from African national programs have greatly benefited from the Japan Capacity Building Program for African Agricultural Researchers.

The program focuses on hands-on training on rice research such as the fundamentals of field experiments on rice, such as experimental design, calculation of fertilizer and seed, field management, data collection and statistical analysis. The program is supported by the Ministry of Agriculture, Forestry and Fisheries (MAFF),

Government of Japan. JICA has also supported hands-on training on the fundamentals of field experiments on rice.

JICA and ARI have helped enhance the capacity of national African technicians and extension agents in quality seed production. The program includes the principles of seed multiplication, rice morphology characters and growth stages, post-harvest operations, PVS and community-based seed system (CBSS) and common insect pests and diseases of rice.

Several degree candidates (PhD, MS, and others) and non-degree trainees from the region have studied under the supervision of AfricaRice scientists and their partners. The Center has also benefited from Japan's Young Scientist Fellowship Program, which supports Japanese scientists to work at CGIAR Centers.



Dr Yoshimi Sokei handling the problem analysis matrix at a JICA-funded seed multiplication training course.

Impact

As part of the overall effort on new rice technologies, IHP and the complementary projects have shown tangible impact. NERICA varieties, which are products of the IHP, have shown clear impact on rice production and farmers' livelihood. In Benin, for example, impact studies have shown that adoption of NERICA varieties resulted in a 6% increase in school attendance, 14% increase in the gender parity index, and an increase of 11,400 FCFA (about \$20) in school expenditure per child.

According to FAO, paddy production in Africa reached 21.6 million tons in 2006 – 6% above 2005 – and NERICA varieties were identified as a major factor in this growth. FAO has also stated that in 2008, Africa registered an 18 percent increase in rice production, compared to 2007 with Burkina Faso showing an astounding 241% increase in rice production, thanks to government support that ensured access to high quality certified rice seed, including NERICA rice varieties. Uganda was also highlighted by FAO because of its 11% increase in rice production in 2007, largely thanks to the re-introduction of a 75% import duty and the dissemination of NERICA varieties.

Awards

The technologies developed through the joint projects particularly the NERICA varieties through IHP, have been widely acclaimed and have won several awards for the Center and its staff.

New initiatives

CARD: The Coalition for African Rice Development (CARD) is a joint initiative of JICA and the Alliance for a Green Revolution in Africa (AGRA). The aim of CARD, which was launched in 2008 at TICAD 4, is to double rice production over the coming 10 years. CARD serves as a facilitating and coordinating mechanism and is complementary to ARI. AfricaRice is an active steering committee member of CARD and has been closely involved in facilitating the development of national rice development strategies in selected countries.

Awards to the Center and staff for work relating to Japan-funded projects

Name of the award	Year
CGIAR King Baudouin Award for NERICA varieties to the Center	2000
World Food Prize for developing NERICA varieties to Dr M Jones	2004
Fukui International Koshihikari Rice Prize of Japan to Dr M Sie for his significant contributions to rice production in SSA, particularly the development of lowland NERICA varieties	2006
Burkina Faso Presidential Award to Dr M Sie and his collaborators in INERA (national program) for lowland NERICA varieties	2006
United Nations Award for South-South Triangular Partnership to the Center for the success of IHP, especially NERICA varieties	2006

Japan-funded Emergency Rice Project: In June 2008, AfricaRice initiated an Emergency Rice Initiative for Africa under the framework of the FAO Soaring Food Prices Initiative to provide urgent assistance to rice-growing countries in the continent in four major areas: seed, fertilizer, best-bet technologies, and post-harvest and marketing. Japan has pledged funding for an emergency rice initiative project focusing on seed production and on obtaining improved rice statistics across the continent.

Sawah, Market Access and Rice Technologies for Inland Valleys (SMART-IVs): In SSA, a promising and largely unexploited land resource is the estimated 200 million ha of inland valleys. The prerequisite for enhanced rice productivity in inland valley systems is improved water control. The Asian Sawah system that helps water control and facilitates soil fertility management offers a low cost opportunity for sustainable rice intensification in about 10% of the 200 million ha of inland valleys in SSA.

The SMART-IVs project will be launched in 2009 with the support of MAFF, Japan, as a joint project of the Inland Valley Consortium (IVC), which is convened by the Africa Rice Center. The aim of the project is to explore the potential of the Sawah system for increasing rice productivity in inland valleys of IVC member countries, while improving farmer access to markets and rice technologies.

Future outlook of the partnership

Increased food security through sustainable development of agriculture, particularly rice, continues to be a very high priority on the agenda of Japan as confirmed by the 2008 TICAD 4 declaration.

Japan also intends to contribute \$20 million over five years for the sustainable development of the next generation of productive rice varieties for Africa and South-East Asia in response to new challenges such as climate change to be coordinated jointly by the Africa Rice Center and the International Rice Research Institute (IRRI).

“We continue to look forward to a sustained, multifaceted, and fruitful partnership with Japan. The expanded joint research effort as well as the financial support of Japan will be central to ensuring food security for millions of poor in SSA,” says Dr Papa Abdoulaye Seck, AfricaRice Director General.

Director General, Dr Papa Seck, discusses with AfricaRice ecophysiologicalist Dr Koichi Futakuchi.





Major events

January

International awards. Three of AfricaRice visiting fellows and trainees were selected for international awards:

Mr Fatogoma Sorho, from Côte d'Ivoire, received the 2007 Christiane Doré prize for his thesis on rice yellow mottle virus (RYMV) in West Africa, which was unanimously selected by the jury for the excellent quality of research work. AfricaRice scientist, Dr Yacouba Sere, was his research supervisor. The Christiane Doré prize is a highly acclaimed annual award instituted by the *Institut de recherches pour le développement* (IRD), France. The prize is given for excellence in research (thesis, scientific article, invention or patent).

Ms Yonelle Dea Moukoumbi, a PhD student from Gabon, working under the supervision of Dr Moussa Sié, was selected for the 2008 UNESCO-L'ORÉAL Fellowship award. The UNESCO-L'OREAL Fellowship for Young Women in Life Sciences, supports women in science and allows the laureates to pursue research on life sciences in world-renowned institutes.

Ms Alice Bonou, a trainee from Benin supervised by AfricaRice economist Dr Aliou Diagne, was selected to receive the CODESRIA award for her thesis on the impact of NERICA varieties on the rice biodiversity in Benin. She did this thesis as part of her Ingenieur Agronome studies. The Council for the Development of Social Science Research in Africa (CODESRIA), headquartered in Senegal, is a pioneer among African social research organizations, and provides small grants for thesis writing.

DG pays courtesy visit to Senegal Agricultural Minister. The Director General of AfricaRice, Dr Papa A Seck, paid a courtesy visit to His Excellency Hamath Sall, Minister of Agriculture and Animal Husbandry, Government of Senegal, on 22 January. Dr Seck was accompanied by Dr Macoumba Diouf, Director General of the Institut sénégalais de recherches agricoles (ISRA); Dr Marco Wopereis, AfricaRice Deputy Director General; and Dr Vincent Bado, AfricaRice Representative in Senegal.



Mr Fatogoma Sorho with Dr Yacouba Sere.

February

AfricaRice's unique rice collection sent to the global seed vault. More than 2000 rice varieties drawn from AfricaRice's collection of rice seed were shipped to the Svalbard Global Seed Vault (SGSV), located in the Norwegian island of Spitsbergen near the Arctic Circle. These seeds were the first batch of the entire collection of more than 20,000 AfricaRice germplasm to be shipped to the SGSV.

The SGSV was opened on 26 February. The SGSV was built by the Norwegian Government as a service to the global community, in close consultation with the Global Crop Diversity Trust, which will fund the facility's operations. Also called the Doomsday Vault, the SGSV aims to preserve the world's genetic heritage in a genebank built under permanent ice conditions.

Branding and marketing of NERICA. What is AfricaRice's vision for NERICA in terms of product development, distribution, use, promotion, trademark, business model and future development? This question was discussed at the meeting on Branding and Marketing of NERICA, held at Cotonou on 4 and 5 February. The meeting was organized by AfricaRice and the CGIAR Central Advisory Service on Intellectual Property (CAS-IP). CAS-IP helps CGIAR Centers effectively manage their intellectual assets as public goods.

March

Board of Trustees Meeting. The 2008 AfricaRice Board Meeting was held from 9 to 14 March, at Cotonou. The new research structure of AfricaRice was approved by the Board.

STRASA project launched: The project, *Stress-tolerant rice for poor farmers in Africa and South Asia (STRASA)*, was launched at Cotonou at a meeting held between 5 and 7 March. The meeting was inaugurated by His Excellency Roger Dovonou, Minister of Agriculture, Animal Husbandry and Fisheries, Government of Benin. The Directors General of AfricaRice, Dr Papa A Seck, and IRRI, Dr Robert Zeigler, participated in the meeting.

The STRASA project is being implemented in collaboration with IRRI and has financial support from the Bill and Melinda Gates Foundation.

The project targets resource-poor rice farmers in Africa and Asia, who produce their crop under rainfed conditions, in which drought, flooding, and salinity reduce yields and harm their livelihoods.

The project aims to make available to such farmers improved, stress-tolerant rice varieties. This, together with improved management practices, is expected to bring about a 50% increase in yield in farmers' fields within the next 10 years.

The project member countries in Africa comprise Benin, Burkina Faso, The Gambia, Ghana, Guinea, Mali, Nigeria and Senegal in West Africa as well as Ethiopia, Madagascar, Mozambique, Rwanda, Tanzania and Uganda in eastern and southern Africa.

Activities under AfricaRice-IRRI programmatic alignment. As part of activities undertaken under the framework of AfricaRice-IRRI programmatic alignment, a training course on seed production was held from 10 to 20 March at Songhai Center, Benin. Fifteen participants from nine countries (Ghana, Gambia, Liberia, Nigeria, Ethiopia, Tanzania, Uganda, Zambia and Kenya) attended the course.

AfricaRice scientists gave seminars on seed production and characteristics of NERICA, plant breeding strategy,



Ms Yonelle Dea Moukoumbi was selected for the 2008 UNESCO-L'ORÉAL Fellowship Award.

seed systems, seed health, crop nutrition, integrated pest management, phytosanitary and SMTA protocol and the rice research networks of Africa (ROCARIZ and ECARRN). IRRI scientists covered rice business and seed systems, the use of the Rice Knowledge Bank, crop establishment, water management and post-harvest technologies.

Rice Guide launched for extension and farmer learning. Focusing on capacity building and farmer learning as part of a comprehensive strategy to manage the rice crisis, AfricaRice launched a one-stop online information source for extension and farmer learning tools on rice cultivation in Africa called the Rice-Guide (<http://www.africarice.org/warda/guide-rice.asp>).

The Rice-Guide contains a series of videos on seed health and post-harvest technologies in various African

languages. In addition, the online source has practical field guides on rice production for various ecologies, integrated pest management as well as the NERICA Compendium, which contains information on NERICA ranging from planting to agro-processing. Tips on rice recipes are also available.

UNDP project confirms importance of participatory approach for technology dissemination. Rice experts from seven West African countries attending a workshop held in Accra, Ghana, from 25 to 27 March, confirmed that participatory varietal selection-extension (PVS-E) not only facilitates the introduction of multiple improved varieties in a shorter period of time, but also has the potential to reach a greater number of farmers.

Participants found that PVS-E increased farmers' access to high-quality upland and lowland varieties in all the project countries. They also noted that the success of any PVS activity largely depends on seed availability and therefore community based seed systems (CBSS) should be an integral part of the PVS exercise.

Helping Africa develop crop adaptation strategies to climate change. Climate change is a major threat to sustainable growth and development in Africa, particularly because of the continent's high dependence on rainfed agriculture. To cope, adaptation strategies will be required, both in terms of varietal development and crop management.

To address this challenge, national and international experts met on 31 March and 1 April, in St. Louis, Senegal, to launch a project called *Developing rice and sorghum crop adaptation strategies for climate change in vulnerable environments in Africa (RISOCAS)*.

The project focuses on three major cereal cropping systems of sub-Saharan Africa: irrigated rice, upland (dryland) rice and sorghum. Studies will be conducted in selected sites in Senegal for irrigated rice, Madagascar for upland rice and Mali for sorghum.

About 20 participants representing the project partners attended the launching workshop and developed work plans for the first year.



Ms Kae Yanagisawa of UNDP with the NERICA Compendium.

Irrigated NERICA performs well in Gambia. The Gambia is well known for the popularity of upland NERICA. The good performance of irrigated NERICA varieties – WAS161-B-9-2 (SAMBOU MANO) and WAS127-B-5-2 – were making news. These varieties were introduced in the country by the AfricaRice St Louis Station.

May

JICA Senior Vice President visits AfricaRice. A high-profile delegation led by Mr Kenzo Oshima, Senior Vice President, Japan International Cooperation Agency (JICA) visited AfricaRice at Cotonou, Benin, on 5 May to discuss a new rice initiative for Africa – the Coalition for African Rice Development (CARD) – prior to its launching at TICAD 4.

“AfricaRice will be an important factor in this initiative and JICA is proud to work with the Center,” said Mr Oshima, highlighting the special relationship between JICA and the Africa Rice Center. “Given the importance of rice as an African food staple and the recent success stories of NERICA in countries such as Uganda, we believe that rice will also play a key role in Africa’s development.”

CARD links the national programs, JICA, AfricaRice and the International Rice Research Institute with strong support from the Alliance for a Green Revolution in Africa (AGRA) and the New Partnership for Africa’s Development (NEPAD).

June

MoU signed with three French Institutions (CIRAD, INRA and IRD). AfricaRice signed an agreement of great significance for Africa’s rice sector with three French agricultural research organizations to help improve sustainable rice production, address climatic change-related issues, diversify rice-based systems and reduce post-harvest losses in the continent.

The four partners will carry out joint research in fields of common interest to improve the impact of research, training and information dissemination on rice-based production systems in Africa. This work will be carried out in collaboration with national and regional research and development programs.

The agreement, which will be valid for five years, was signed by Dr Gérard Matheron, Director General of the Centre de coopération internationale en recherche agronomique pour le développement (CIRAD); Dr Marion Guillou, President and Director General of the Institut national de la recherche agricole (INRA); Dr Michel Laurent, Director General of the Institut de Recherche pour le Développement (IRD); and Dr Papa Abdoulaye Seck, Director General of AfricaRice.

The signing ceremony was held on 2 June, in Paris, in the presence of Dr Ren Wang, Director of the Consultative Group on International Agricultural Research (CGIAR). As part of this agreement, scientists from the French

research organizations will be posted at AfricaRice research stations to work on specific constraints to rice production in Africa. Already joint research proposals have been developed and submitted to donors.

National experts present rice overviews. National experts from the member countries of AfricaRice presented an overview of the rice production in their respective countries, which will help AfricaRice to have a comprehensive understanding of the current rice situation in Africa.

These presentations were a special part of the 6th National Experts Committee (NEC) Meeting, held from 23 to 25 June, in Cotonou, Benin. The biennial NEC meetings provide a regular forum for interaction between AfricaRice and the directors general of the national programs of AfricaRice member countries.

The 6th NEC meeting was held under the Chairmanship of Dr Comlan Agbobli, Director General of the Togo Institute of Agricultural Research (ITRA). The meeting was inaugurated by the Minister of Agriculture, Benin. The President of Benin granted audience to the NEC Chair and AfricaRice Director General.

During the meeting, it was announced that Egypt’s application to join AfricaRice was approved by the member countries.

Innovation and integration: key for effective international agricultural research. AfricaRice Director General, Dr Papa A Seck, participated and led the first session on *Ecology and innovation* at an Open Science Network Meeting focusing on the themes of partnerships, innovation & agriculture, organized by the French institutions INRA and CIRAD on 3 June in Paris, France.

The purpose of this meeting was to initiate future collaborations and provide an opportunity for French agricultural research organizations and their partners to highlight their expertise and establish new partnerships.

AfricaRice hosts CORAF meeting on Staple Crops Program. CORAF/WECARD organized a survey validation and planning workshop relating to the

Staple Crops Program, from 26 to 28 June, within the framework of the Comprehensive Africa Agriculture Development Program (CAADP) Pillar 4.

The three-day workshop brought together 33 representatives from key private and public sector organizations, national and international research centers, development partners and CORAF/WECARD Secretariat to validate the findings of a survey conducted to set priorities for implementing the Staple Crops Program and to plan immediate activities.

AfricaRice hosted the meeting in Cotonou, Benin, and AfricaRice Rice Pathologist Dr Yacouba Sere represented the Center.

Strengthening partnership with ECA. At the invitation of the Economic Commission for Africa (ECA) – West Africa Bureau, AfricaRice designated Dr Sitapha Diatta, its Country Representative in Cote d’Ivoire to attend an annual meeting of the Intergovernmental Committee of Experts, from 24 to 26 June, at Niamey, Niger. The meeting commemorated the 50th anniversary of ECA.

The Emergency Rice Initiative for Africa. As an immediate follow-up to the Rome World Food Summit, an Emergency Rice Initiative for Africa was launched, at a meeting held from 9 to 12 June, in Cotonou, Benin. The Initiative aimed at providing urgent assistance to rice-growing countries in the continent in four major areas: seed, fertilizer, best-bet technologies, and post-harvest technologies and marketing.

Launched jointly by the AfricaRice, FAO, IFDC, CRS and IFAD, the Emergency Rice Initiative operates under the framework of the FAO Soaring Food Prices Initiative.

Initially, 12 countries were selected for the Emergency Rice Initiative: Benin, Burkina Faso, Cameroon, Côte d’Ivoire, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone and Togo. It is expected that more countries will be brought in, depending on the funding availability.

AfricaRice participates in the 8th General Assembly of CORAF/WECARD. An Agricultural Science Week on *Producers and end users of agricultural research*

development was held in conjunction with the 8th General Assembly of CORAF / WECARD, from 9 to 13 June, in Yaounde, Cameroun. AfricaRice Director General, Dr Papa A Seck, represented the CGIAR at this meeting.

BMZ-funded project on rice bacterial blight takes off. A launching meeting of the BMZ-funded project on *Characterization of the pathogen population structure of Bacterial leaf blight (BLB) of rice in West Africa* was organized on 17 and 18 June, in Cotonou, Benin. The project aims to fill the knowledge gap hampering the development of an effective control strategy and to establish a strong research team on rice bacterial blight in West Africa.

Project partners comprising scientists from AfricaRice, Hanover University and the national programs of project countries – Burkina Faso, Benin, Mali, Niger, Senegal, and Togo – attended the meeting to plan activities for the first year of the project.

CFC-funded rice R&D project for Central Africa launched. An important AfricaRice project, funded by the Common Fund for Commodities (CFC) to improve food security and rural incomes and to reduce dependency on rice imports in Cameroon, Chad and the Central African Republic was launched at a meeting from 24 to 26 June, in Yaoundé, Cameroun.

About 300 participants representing AfricaRice, CFC and the national programs and government officials of the project countries attended.

July

AfricaRice and AWARD: Promoting women in science. With several leading women rice scientists within its research division, AfricaRice has been actively following the developments of African Women in Agricultural Research and Development (AWARD) program.

The AWARD program, which is operating under the CGIAR Gender & Diversity Program with support from the Bill & Melinda Gates Foundation and USAID, offers

a series of competitive two-year fellowships designed to fast-track the careers of African women in agricultural R&D in sub-Saharan Africa.

Ms Vickie Wilde, Leader of the CGIAR G&D Program visited AfricaRice, from 14 to 16 July, to speak about G&D activities, particularly the AWARD Program. A special part of her visit was devoted to meetings with women scientists from AfricaRice and IITA-Cotonou.

August

Towards an African Green Revolution. The third African Green Revolution Conference was convened in Oslo in August 2008, on the theme of *Alliance for action*. Around 250 participants from 40 countries, including the President of Malawi, attended.

The Africa Rice Center (AfricaRice) Board Chair Mr Engida Getachew presented AfricaRice's research and achievements at this conference. He was accompanied by the Advisor to the Director General, Dr Shellemiah Keya.

The main issues raised at the conference included food security and growth partnerships, markets for the smallholder, financing the green revolution, new models of engagement, and empowering the African entrepreneur.



Dr Robert Zeigler, DG of IRRI, and Dr Papa A Seck, DG of AfricaRice, with His Excellency Roger Dovonou, Agriculture Minister of Benin, at the launch of STRASA project in March.

RiceTIME Unit established. To lead AfricaRice's contribution to the Emergency Rice Initiative and to ensure that the efforts made with respect to capacity building and rice information exchange are effective and sustainable, the Center established a new RiceTIME Facility, where TIME stands for Training, Information Management and Extension linkages.

The first two building blocks of this new RiceTIME Unit are the rice R&D networks convened by AfricaRice – the Rice Research and Development Network for West and Central Africa (ROCARIZ) and the African Rice Initiative (ARI).

September

DG invited by the UN Secretary General to a high-level meeting on MDG. The United Nations Secretary General invited AfricaRice Director General, Dr Papa A Seck, to lead a round-table discussion on poverty and hunger on 25 September 2008 at the UN Headquarters in New York, USA.

The round-table discussion was held as part of a high-level event on the Millennium Development Goals (MDGs), which is being convened by the President of the General Assembly and the UN Secretary General.

This high-level event was of particular significance given that since 2000 the MDGs have provided a global framework to tackle the world's most urgent developments challenges by 2015. It will be a forum for world leaders to review progress, identify gaps, and commit to concrete efforts, resources and mechanisms to bridge the gaps.

AfricaRice hosts the first technical meeting of CARD. Twenty participants from AGRA, JICA, JIRCAS, World Bank, WFP, AfDB, IFAD, FARA, FAO, IRRI and AfricaRice met for a two-day technical workshop of the Coalition for African Rice Development (CARD), on 25 and 26 September, in Cotonou, Benin.

CARD was launched in May 2008 as a consultative grouping of participating bilateral and multilateral development partners and African and international

institutions to double rice production in Africa by around 2017. CARD has strong links to the existing structures, programs and networks such as AfricaRice, FARA and the African Rice Initiative (ARI).

IVC Annual Workshop 2008. About 32 participants assembled in Cotonou, Benin, for the Inland Valley Consortium (IVC) Annual Workshop, from 22 to 24 September. Participants included representatives of three CGIAR-supported centers (AfricaRice, IITA and IWMI), 12 national research organizations and four regional and international institutions (CORAF, CIRAD, Wageningen UR and United Nations University).

A major focus of the workshop was to report on the CFC-funded project on *Sustainable productivity improvement for rice in inland valleys of West Africa (SPIRIVWA)* activities.

Work plans were developed for new projects – Realizing the agricultural potential of inland valley lowlands (RAP), and Sawah, Market Access and Rice Technologies for Inland Valleys (SMART-IV).

October and November

Ethiopia recognizes AfricaRice's contribution. On the occasion of the Ethiopian Millennium and the 40th Anniversary of the Ethiopian Institute of Agricultural Research (EIAR), AfricaRice was awarded a Certificate of Appreciation for its “invaluable cooperation and support” to the country's rice research and development activities.

Ethiopia is emerging as an important rice growing country in Eastern Africa. The area under rice production in Ethiopia is estimated to have increased from 49,000 ha in 2007 to about 90,000 ha in 2008. It is projected to reach 400,000 ha by 2010.

Between 2005 and 2007, four upland NERICA varieties from AfricaRice were released to Ethiopian farmers. Ethiopia is part of the new initiative on stress-tolerant rice varieties led by IRRI and AfricaRice with financial support from the Bill & Melinda Gates Foundation.

Research Days mark significant changes for Africa's rice research. New research thrust areas were introduced at the Research Days in 2008. These included: building on the NERICA success with a clear focus on the development of the next generation varieties for Africa along with partners; improving linkages with the village level organizations to enhance rice productivity; increased emphasis on the lowland ecology for rice expansion and diversification; introduction of rice value chain research; and capacity building and information exchange.

December

DDG speaks about rice cultivation at the ETH North-South Food Security Summit at Zurich: AfricaRice Deputy Director General Marco Wopereis presented a keynote paper on rice production providing income generation for small farmers and food security for consumers at the Food Security Conference organized by the ETH North-South Center at Zurich, Switzerland, on 12 December. His presentation covered the importance of rice in sub-Saharan Africa, the current scenario and the ways in which production can be increased.

AfricaRice participates in the CGIAR Annual General Meeting in Maputo: Hosted by the Government of Mozambique, the CGIAR Annual General Meeting (AGM08) was held in Maputo, Mozambique, from 1 to 5 December 2008, under the theme *A Changing World – A Changing CGIAR*. The meeting opened with keynote speeches and a Ministerial Roundtable of Ministers of Agriculture and Science and Technology from Africa to which the Chair of the AfricaRice Council of Ministers was invited. Members and Center representatives had the opportunity to engage in discussions and take part in the Field Day organized by the Institute of Agricultural Research of Mozambique.

AfricaRice participated in the AGM08 exhibition and the President of Mozambique His Excellency Armando Emilio Guebuza visited the Center's booth. He was accompanied by the former President of Nigeria. After discussing with the AfricaRice Director General, the

President of Mozambique instructed his Minister of Agriculture to discuss the modalities for becoming a member of AfricaRice.

As part of the AGM08 side event, a meeting to boost national capacity for rice R&D in Africa with possible support from Japan was organized by the CGIAR Secretariat and AfricaRice. Representatives from regional and sub-regional organizations, national and international research institutes and donor communities attended.

A highlight of the AGM08 was the CGIAR Science Awards ceremony. The AfricaRice-coordinated West

and Central Africa Rice Research Network (known as ROCARIZ) won the Outstanding Partnership Award at this event. The award was jointly received by the ROCARIZ Chair and Coordinator.

ROCARIZ was singled out for “its decentralized, issue-driven task force approach” that has enabled it to successfully foster a high level of national involvement in collaborative research to improve rice productivity in both rainfed and irrigated systems in West and Central Africa. It has enhanced resource-use efficiencies and facilitated rapid technology dissemination to end-users.

Dr Papa A Seck greets the President of Mozambique, His Excellency Armando Emilio Guebuza, at the CGIAR AGM. Also seen in the picture are the former President of Nigeria, His Excellency Olusegun Obasanjo, and the Director of CGIAR, Dr Ren Wang.



Financial statement

Position for the year ended 2008

ASSETS	2008 (US \$)	2007 (US \$)
Current Assets		
Cash and Cash Equivalent	4,435,284	4,327,667
Accounts Receivable:		
Donors	4,016,102	2,858,076
Employees	255,151	186,659
Others	930,598	351,378
Inventories	437,780	435,825
Prepaid Expenses	255,673	172,258
Total Current Assets	10,330,588	8,331,863
Property and Equipment		
Property and Equipment	8,231,407	8,053,504
Less: Accumulated Depreciation	(7,518,141)	(7,056,849)
Total Property and Equipment – Net	713,266	996,655
TOTAL ASSETS	11,043,854	9,328,518

LIABILITIES AND NET ASSETS	2008 (US \$)	2007 (US \$)
Current Liabilities		
Accounts Payable:		
Donors	2,479,114	3,009,870
Employees	306,699	190,745
Others	486,514	593,074
Employees Investment Account	214,000	214,000
Provisions and Accruals	1,590,273	1,248,600
Total Current Liabilities	5,076,600	5,256,289
TOTAL LIABILITIES	5,076,600	5,256,289
Net Assets		
Unrestricted Net Assets:		
Undesignated	5,253,988	3,075,574
Designated	713,266	996,655
TOTAL NET ASSETS	5,967,254	4,072,229
TOTAL LIABILITIES & NET ASSETS	11,043,854	9,328,518

Statement of activities

REVENUES, GAINS AND OTHER SUPPORT

	Unrestricted	Restricted		Total	
		Temporarily Restricted	Challenge Programs	2008	2007
	US \$	US \$	US \$	US \$	US \$
Grants	4,521,219	6,151,744	227,209	10,900,172	10,384,612
Member States-Operating Income	1,894,367			1,894,367	39,476
Member States-Capital Development Income					16,907
Other Income	314,835			314,835	243,201
Total Revenue, Gains and Other Support	6,730,421	6,151,744	227,209	13,109,374	10,684,196

EXPENSES AND LOSSES

Program Related Expenses	2,655,444	5,658,017	227,209	8,540,670	7,815,822
Management and General Expenses	3,740,807	493,727	-	4,234,534	3,653,655
Sub-Total Expenses and Losses	6,396,251	6,151,744	227,209	12,775,204	11,469,477
Indirect Cost Recovery	(1,560,854)			(1,560,854)	(951,204)
Total Expenses and Losses	4,835,397	6,151,744	227,209	11,214,350	10,518,272
Change in Net Assets:					
Net Surplus / (Deficit)	1,895,024			1,895,024	165,924

Total Expenses-by Natural Classification	Unrestricted	Restricted		Total	
		Temporarily Restricted	Challenge Programs	2008	2007
	US \$	US \$	US \$	US \$	US \$
Personnel Costs	4,106,294	1,370,269	48,214	5,524,778	5,428,943
Supplies & Services	1,729,154	2,902,725	159,166	4,791,044	3,972,185
Supplies & Services- Collaborators and Partnerships Costs	3,203	1,157,142		1,160,345	797,915
Operational Travel	257,684	424,380	19,829	701,893	623,786
Depreciation	299,916	297,228		597,144	646,647
Sub-Total Expenses and Losses	6,396,251	6,151,744	227,209	12,775,204	11,469,477
Indirect Cost Recovery	(1,560,854)			(1,560,854)	(951,204)
Total Expenses and Losses	4,835,397	6,151,744	227,209	11,214,350	10,518,272

GRANTS

	Grant Period	Funds		Total (US \$)		
		Received	Receivable	2008	2007	
UNRESTRICTED						
Belgium	Jan '08–Dec '08	497,194	--	497,194	439,067	
Canada	Jan '08–Dec '08	165,191	537,466	702,657	543,886	
France	Jan '08–Dec '08	239,051	--	239,051	144,756	
Germany	Jan '08–Dec '08	230,329		230,329	57,095	
Japan	Jan '08–Dec '08	--	603,478	603,478	493,330	
Sweden	Jan '08–Dec '08	458,664	--	458,664	495,459	
United Kingdom	Jan '08–Dec '08	820,875	--	820,875	985,650	
USAID	Jan '08–Dec '08	187,172	62,828	250,000	250,000	
World Bank	Jan '08–Dec '08	710,000	--	710,000	1,150,000	
Côte d'Ivoire	Jan '08–Dec '08	8,971		8,971	--	
Total Unrestricted Grants		3,317,447	1,203,772	4,521,220	4,659,243	
TEMPORARILY RESTRICTED						
	AfDB I (NERICA Dissemination Project)	Jan '04–Dec '09	475,413	--	475,413	379,319
	CANADA Fund for Africa (CFA)	2003–2007	(1,385)	--	(1,385)	208,272
1/	New CANADA Fund for SWIHA	2006–2008	24,460	--	24,460	107,871
	WCA/MTP-Regional Coll.Act.Plan	Jan '07–Dec '07		--		50,000
	CANADA Linkage Fund-Mc Gill University	Apr '08–Mar '11	7,607	--	7,607	--
	CFC/FAO-Spirivwa Project	Jan '00–Dec '09	247,107	--	247,107	174,801
	CFC-FAO-NERICA Dissemination in Central Africa Project	Jan '08–Dec '11	472,863	--	472,863	--
	Conservation Food & Health Foundation	Jul '06–Jun '09	19,342	--	19,342	19,789
	DFID16-Striga Project-University of Sheffield	May '08–Dec '11	6,346	--	6,346	--
1/	European Union (Rice Policy & Techn. Impact on Food Security)	Jan '07–Dec '09	518,519	--	518,519	1,203,184
	European Union (Eastern and Central Africa Rice Research Networks)	Mar '05–Sept '07		--	--	94,468
	FAO-Liberia Seed Production Project	Aug '08–June '09	19,957	--	19,957	--
	Nigeria Seed Multiplication Project	2006–2007	53,706	--	53,706	148,402
	GTZ-RISOCAS-University of Hohenheim Project	Mar '08–Feb '11	137,373	--	137,373	--
	GTZ - Characterization of Bacterial Leaf Blight	May '08–Apr '10	49,822	--	49,822	--
	IBRD - Genebank Upgrade Project	2003–2008	6,145	--	6,145	189,258
	IBRD - WCA-Regional MTP Project	Jan '05–Dec '07		--	--	32,588
1/	IBRD - World Bank Contribution to SWEP-IVC	Jan '06–Mar '08	28,054	--	28,054	84,105

	IBRD - Genebank Upgrade Project (GPG-Phase 2)	Jan '07–Dec '09	101,487	--	101,487	109,597
	IBRD - IITA / WARDA Corporate Services Alignment Project	Jan '07–Dec '08	487,015	--	487,015	112,985
	IFAD - NERICA Seeds Access-West and Central Africa Project	Dec '07–Sept '12	191,573	--	191,573	--
	IFAD (PADS Project)	Mar '05–Mar '08	36,841	--	36,841	188,184
	IFAD - HIV/AIDS and Rural Poverty Project	Jan '07–Jun '08	77,375	--	77,375	67,669
	IRRI/AfricaRice Abiotic Stress Project	Jan '08–Dec '10	1,527,925	--	1,527,925	--
	UNDP/TCDC-IHP PHASE 2	Jan '07–Dec '09	149,912	--	149,912	192,331
	Japan (Interspecific Hybridization Project)	Jan '00–Mar '09	387,240	--	387,240	430,124
1/	Japan (RYMV Project)	Jan '00–Mar '09	102,508	--	102,508	128,916
1/	Japan (Increasing Quality and Competitiveness of Local Rice Project)	Jan '03–Mar '09	107,920	--	107,920	111,192
1/	Japan (Developing Interspecific OG&OS Progenies)	Jan '03–Mar '09	131,670	--	131,670	62,135
1/	Japan (High Yield Varieties - Humid Zones)	Dec '05–Mar '09	91,916	--	91,916	89,787
1/	Japan (Physiological and Genetic Investigation of NERICAs Project)	Jan '07–Mar '09	95,977	--	95,977	100,000
1/	Japan (Development of Sustainable Rice Farming Systems Project)	Jan '08–Mar '09	51,945	--	51,945	--
	JICA/AfricaRice - Collaboration Project	Apr'04–Open	233,095	--	233,095	164,035
	JIRCAS/AfricaRice - Drought Project	Apr'05–Open	43,090	--	43,090	38,211
	Netherlands (APO/JPO Project)	2004–2007	(1,235)	--	(1,235)	289,320
	PDIM/AfricaRice/SONADER Collaborative Project	Jan '06–Dec '07		--		48,218
	Rockefeller (Drought Tolerance Project)	Mar '04–Dec '07	(663)	--	(663)	218,544
	UNDP - Liberia Seed Production Project	Oct '08–Jun '11	985	--	985	
	UNDP - New PVS Extension Project	Jun '06–Apr '08	64,124	--	64,124	132,140
	UNDP - Enhancing Capacity-NERICA	Jun '06–Dec '08	135,643	--	135,643	140,964
	USAID - RYMV Project	Oct '06–Dec '09	74,064	--	74,064	131,155
	USAID - INSAH1-ROCARIZ Networks Project	Sept '06–Dec '07		--		130,026
	USAID - INSAH2-Rice-Maize Stratification Project	Sept'06–Dec '07	(3,993)	--	(3,993)	147,782
			--	--	--	--
	Sub-Total Temporarily Restricted Grants		6,151,744	--	6,151,744	5,725,370

CHALLENGE PROGRAMS:						
				--	--	--
	Harvest Plus			--		--
	CIAT - Agreement No. 5021	Nov '05–Dec '09	15,833	--	15,833	--
	Water and Food			--		--
	WorldFish-Project M439	Apr '05–Mar '10	81	--	81	--
	Generation Challenge Program			--		--
	CIMMYT-GCP-Project SP1-G4008-05	Jan '08–Dec '08	8,982	--	8,982	--
	CIMMYT-GCP-Project SP3-G4007-08	Aug '07–Jul '09	134,471	--	134,471	--
	CIAT-Agreement No. C-119-06	Jan '05–Dec '08	10,826	--	10,826	--
	GCP-I-Bridges-WARDA/IRD	Aug '07–Dec '09	57,016	--	57,016	--
	Sub-Total Challenge Program Grants		227,209	--	227,209	--
	Total Grant Revenue		9,696,400	1,203,772	10,900,172	10,384,612

1/ The use of these Grants has been restricted towards selected projects in CGIAR Approved Agenda for AfricaRice.

Board of Trustees

(As on 31 March 2009)

Chair Getachew Engida (United Kingdom)

Vice-Chair Adama Traoré (Mali)

Members Barbara Becker (Germany)
Kiyooki Maruyama (Japan)
Emmanuel Owusu-Bennoah (Ghana)
Gaston Grenier (Canada)
Fatouma Seyni (Niger)
Momodou Ceesay (The Gambia)
Yo Tiemoko (Côte d'Ivoire)
Henri Carsalade (France)

Ex officio Papa A Seck (Senegal)
Director General
Africa Rice Center (AfricaRice)

AfricaRice Board of Trustees and senior management.



Office of the Director General

Papa Abdoulaye Seck	Director General
Shelleemiah Keya	Advisor to the Director General
Sam Bruce-Oliver	Executive Officer
Savitri Mohapatra	Communication Officer
Abdou Mohamed Mouhidiny	Internal Auditor

Corporate Services

Koen Geerts††	Assistant Director General - Corporate Services
Aguibou Tall*	Director of Administration and Finance
Kolade Olatifede	Planning and Budget Manager
George Maina	Head of Finance
Korotoumou Ouattara	Senior Accountant
Imourana Abdoulaye	Senior Accountant
Tosse Francois	Senior Accountant
Heather Grey	HR Manager
Josselyne Anani	Personnel Officer
Zéphirin Amoussou	Purchase Officer
Safiatou Yabre	Travel & Administrative Assistant
Nurdin S Katuli	Head of Operations
Gaston Sangaré	Farm Operations Manager
Klana Dagnogo	Mechanical Maintenance Manager
R Raman	Webmaster

Research Division

Marco Wopereis*	Deputy Director General, Research for Development
Aline Lisette-Vidal	Head of TILS
David Millar††	Science Writer
Maimouna Diatta*	French Editor
Fassouma Sanogo	Translator
Kossi August††	Translator
Bila Belemgoabga	Administrative Assistant
Cyrille Adda	Program Assistant
Emmanuel Onasanya	Desktop Publishing Assistant
Thomas Adigun	Librarian

Program 1: Genetic Diversity and Improvement

Moussa Sié	Program Leader and Lowland Rice Breeder
Ousmane Youm††	Program Leader 1
Marie-Noëlle Ndjiondjop	Molecular Biologist
Koichi Futakuchi	Ecophysiologicalist
Ines Sanchez	Head of Genetic Resources Unit
Mandé Semon	Upland Rice Breeder
Baboucar Manneh	Post Doctoral Fellow – Biotechnologist

Karim Traoré	Post Doctoral Fellow – Irrigated Rice Breeder (St. Louis)
Dramé N Khady*	Post Doctoral Fellow – Iron Toxicity
Kayodé Sanni†	Post Doctoral Fellow
Negussi Zenna	Post Doctoral Fellow (Tanzania)
Kazuki Saito	Post Doctoral Fellow – Agronomy
Bosedé Popoola*	Research Associate (Ibadan)
Gbenga Akinwale	Research Associate (Ibadan)
Daniel Tia Dro	Research Assistant
Fatimata Bachabi	Research Assistant
Fofana Mamadou	Research Assistant
Ayoni Ogunbayo	Research Assistant
Kolade Fisayo*	Research Assistant
Mamadou Cissoko††	Research Assistant
Martin E Ndomondo*	Research Assistant (Tanzania)
Oyin Oladimeji	Senior Research Supervisor (Ibadan)
Seleman R Kaoneka	Research Assistant (Tanzania)
Philomena P J Chundu	Administrative Assistant (Tanzania)

Program 2: Sustainable Productivity Enhancement

Paul Kiepe	Program Leader and Scientific Coordinator, IVC
Sylvester Oikeh††	Soil Fertility Agronomy
Yacouba Séré	Pathologist
Francis Nwilene	Entomologist
Jonne Rodenburg	Inland Valley Agronomist
Attiogbevi-Somado Eklou	PDF Genetics Resources
Susumu Abe	Post Doctoral Fellow – Soil Scientist
Tolulope Agunbiade	Research Associate (Ibadan)
Koffi Akator	Research Assistant
Koné Brahim	Research Assistant
Abibou Niang	Research Assistant
Abou Togola	Research Assistant
Amadou Touré	Research Assistant
Amos Onasanya	Research Assistant

Program 3: Learning and Innovation Systems

Paul Van Mele	Program Leader and Technology Transfer Agronomist
Jonas Wanvoeke	Research Assistant

Program 4: Policy and Impact Assessment

Aliou Diagne	Program Leader and Impact Assessment Economist
Demont Matty	Production Economist
Franklin Simtowe	Post Doctoral Fellow– Impact Assessment
Ibrahima Bamba	Post Doctoral Fellow – Economist
Ali A Touré	Research Assistant
Akhoua N'cho	Research Assistant

RiceTIME: Training, Information Management and Extension linkages

Inoussa Akintayo	Head of RiceTime Unit and Coordinator, Africa Rice Initiative
Boubié V Bado	Head of Sahel Regional Station & Sahel Agronomist (St. Louis)
Ajayi Olupomi	Nigeria, AfricaRice Coordinator
Ashura Luzi-Kihupi	ECARRN Coordinator
Lawrence Narteh††	ROCARIZ Coordinator
Rita Afiavi Agboh-Noameshie*	CFC Project Manager
Abdoulaye Sow	Research Assistant (St. Louis)
Alassane AW	Research Assistant (St. Louis)
Boubacary Cissé	Program Assistant
Maïmouna Ndour	Research Assistant (St. Louis)
Mandiaye Diagne	Research Assistant (St. Louis)
Souleymane Gaye	Research Assistant (St. Louis)

Collaborating Scientists

Glenn Gregorio	Rice Breeder (IRRI)
Hiroshi Tsunematsu	Associate Upland Breeder (JIRCAS)
Horoaki Samejima	Post Doctoral Fellow (JIRCAS)
Ryoichi Ikeda	Plant Breeder (JICA)
Yoshimi Sokei	Agronomist (JICA)

* Joined in 2008

† Changed job title in 2008

†† Left in 2008

AfricaRice team members and partners meet at Cotonou, Benin, for the Research Days, 2008.



Postgraduate trainees

Name and Thesis Topic/Subject	Institution /University	Country of origin	Gender	Sponsor	Degree
Abiodun, Joseph The effectiveness of insect screening technique for developing durable resistant rice cultivars to rice yellow mottle virus based on vector short-range migration	Federal University of Technology, Akure, Nigeria	Nigeria	M	Japan	PhD
Adamou, Basso Bacterial leaf blight isolates pathotyping and epidemiology in Niger	University Abdou Moumouni, Niamey, Niger	Niger	M	GTZ	PhD
Agnoun, Gbeto Yves <i>Caractérisation agro morphologique et moléculaire des interspécifiques de riz de bas-fonds</i>	University of Abomey Calavi, Benin	Benin	M	AfricaRice	DEA
Basso, Adamou <i>Caractérisation des souches de Xanthomonas oryzae pv oryzae prélevés au Niger</i>	Agronomic and Veterinary Institutes HASSAB II (IAV), Kingdom of Morocco	Niger	M	AfricaRice	PhD
Bleoussi, Roseline <i>Etude de l'influence des modes de conservation sur le taux de germination et les qualités organoleptiques du NERICA produit au Bénin</i>	University of Abomey Calavi, Benin	Benin	F	Japan	Maîtrise
Cissoko, Mamadou The molecular genetic basis of resistance in rice to the parasitic weed <i>Striga</i>	University of Sheffield, United Kingdom	Côte d'Ivoire	M	BBSRC-DFID	PhD
Dago, Faustin Effect of fertilizers on RYMV epidemic	University of Cocody Abidjan, Côte d'Ivoire	Côte d'Ivoire	M	AfricaRice	PhD
De Mey, Yann Impact of bird control in the Senegal river Valley	University of K U Leuven	Belgium	M	VLIR-UOS	MSc
De Vries, Michel Rice in Sahel and Savannah zones of West-Africa: How to increase production efficiency at different spatial and temporal scales ?	Wageningen University	The Netherlands	M	DGIS/Wageningen university/AfricaRice	PhD
Diatta, Moussa <i>Effets des niveaux de fertilisation minérale et de la date de semis sur l'infestation des foreurs de tiges dans l'association riz-maïs</i>	University Gaston Berger of St. Louis, Senegal	Senegal	M	AfricaRice/Gaston Berger University	MSc
Dillen, Koen Optimal investment in rice value chains to enhance food security in sub-Saharan Africa	University of K U Leuven	Belgium	M	VLIR-UOS	PhD
Djedatin, Gustave Identification and mapping of resistance genes to bacterial leaf blight in rice	University of Abomey, Calavi, Benin	Benin	M	USAID/AfricaRice	PhD

Name and Thesis Topic/Subject	Institution /University	Country of origin	Gender	Sponsor	Degree
Issaka, Souley RYMV isolates pathotyping, serotyping and epidemiology in Niger	Université of Cocody, Abidjan, Côte d'Ivoire	Niger	M	Japan	PhD
Kam, Honore Marker-assisted selection for improvement of rice varieties resistant to RYMV for West Africa	University of Kwazulu-Natal, South Africa	Burkina Faso	M	USAID	PhD
Kossou, Gloria <i>Impact de l'apprentissage par vidéo sur la technique améliorée d'étuvage du riz sur les connaissances et les pratiques des femmes dans les départements des Collines, Bénin</i>	University of Abomey-Calavi, Benin	Benin	F	AfricaRice	DIA
Koudamilo, Augustin <i>Effet des niveaux de fertilisation minérale et de la date de semis sur l'infestation des foreurs de tiges dans l'association riz-maïs</i>	University of Abomey-Calavi, Benin	Benin	M	AfricaRice	MSc
Montcho, David <i>Diversité et bases génétiques des traits liés à la vigueur végétative et à l'adaptation du riz africain aux différentes conditions hydrologiques</i>	University of Abomey-Calavi, Benin	Benin	M	Bill and Melinda Gates Foundation	PhD
Moukoumbi, Yonnelle <i>Diversité génétique et valorisation des NERICA de bas-fond</i>	University of Abomey-Calavi, Benin	Gabon	F	UNESCO/AfricaRice	PhD
Odjo, Theophile <i>Analyse de la diversité génétique de Magnaporthe grisea, agent de la pyriculariose, au Bénin</i>	University of Abomey-Calavi, Benin	Benin	M	Japan	DEA
Oshumare, Césaire <i>Effet de l'étuvage sur les paramètres physiques et culinaires du riz (Oryza sp.)</i>	University of Abomey-Calavi, Benin	Benin	M	CRBL UNDP	DIA
Rutsaert, Pieter Determinants of consumer preferences for broken rice in Senegal	University of K U Leuven	Belgium	M	VLIR-UOS	MSc
Santos, Carline <i>Évaluation de la susceptibilité des NERICA et de leurs parents à Sitophilus spp et Sitotroga cerealela</i>	University of Abomey-Calavi, Benin	Benin	F	AfricaRice	MSc
Sikirou, Mouritala <i>Caractérisation agro-morphologique d'une collection d'Oryza de bas-fonds pour la tolérance à la toxicité</i>	University of Abomey-Calavi, Benin	Benin	M	Japan	DEA

Name and Thesis Topic/Subject	Institution /University	Country of origin	Gender	Sponsor	Degree
El Hassimi Sow, Mounirou <i>Criblage d'une collection du riz du Niger pour la résistance au virus de la panachure jaune (RYMV) et étude de la diversité génétique</i>	University of Kwazulu-Natal, South Africa	Niger	M	USAID/ AfricaRice	PhD
Timothy, Krupnik Agroecological and socioeconomic evaluation of the performance of the System of Rice Intensification in the Senegal River Valley	University of California-Santa Cruz, USA	USA	M	Fulbright	PhD
Vodouhe, Espérance <i>Innovations organisationnelles, méthodologiques et technologiques déclenchées par la vidéo éducative : cas du processus amélioré d'étuvage du riz au centre du Bénin</i>	University of Abomey-Calavi, Benin	Benin	F	AfricaRice/ Japan	MSc
Wiger, Beima Quantifying rice yield losses due to the facultative parasitic weed, <i>Rhamphicarpa fistulosa</i> in inland valleys in Benin and side projects in <i>Striga</i> research	Wageningen University, The Netherlands	The Netherlands	M	University of Wageningen/ AfricaRice	MSc
Yao, Nasser Marker-assisted selection for improvement of rice varieties resistant to RYMV for West Africa	University of Kwazulu-Natal, South Africa	Côte d'Ivoire	M	USAID/ AfricaRice	PhD
Yergo Alfred Gain more applied policy analysis skills by providing support for statistical analysis / Perform relevant applied policy analysis tools and econometric models	University of Abomey-Calavi, Benin	Benin	M	European Union	Maîtrise
Zossou Norliette <i>Rôle des NERICA et autres riz de bas fonds associés à la fumure minérale dans le contrôle intégré de Ranphicarpa pistilosa</i>	University of Abomey-Calavi, Benin	Benin	F	Japan	DEA



Publications

Papers published in peer-reviewed journals*

Bado BV, De Vries M, Haefele SM, **Wopereis MCS** and Ndiaye MK. 2008. Critical limit of extractable phosphorous in a Gleysol for rice production in the Senegal River valley of West Africa. *Communications in Soil Science and Plant Analysis*, 39: 202–206.

Bamba I, Reed M and Saghaian S. 2008. Monetary impacts on coffee and cocoa prices. *Journal of International Agricultural Trade and Development*, vol. 4, issue 2: 275–291.

Barry MB, **Diagne A**, Sogbossi MJ, Pham JL, Diawara S and Ahmadi N. 2008. Recent changes in varietal diversity of rice in Guinea. *Plant Genetic Resources-Characterization and Utilization* (2008); 1–9 DOI:10.1017/S1479262108060930.

Barry MB, **Diagne A**, Pham JL, Ahmadi N. 2008. Évolution récente de la diversité génétique des riz cultivés (*Oryza sativa* et *O. glaberrima*) en Guinée. *Cahiers d'études et de recherches francophones / Agricultures*, vol. 17, no. 2, 122–7, March-April 2008, ISSN: 1166–7699.

Camara M, **Kébé M**, and **Miézan MK**. 2008. Intensification de la riziculture de bas-fonds dans le Sine-Saloum (Sénégal). *Cahiers Agricultures*, vol. 17, no. 5, pp. 451–455.

Demont M, Daems W, Dillen K, Mathijs E, Sausse C and Tollens E. 2008. Regulating coexistence in Europe: Beware of the domino-effect! *Ecological Economics*, 64(4): 683–689.

Demont M, Cerovska M, Daems W, Dillen K, Fogarasi F, Mathijs E, Muska F, Soukup J and Tollens E. 2008. Ex ante impact assessment under imperfect information: Biotechnology in new member states of the EU. *Journal of Agricultural Economics* (59(3):463–486).

Demont M and Devos Y. 2008. Regulating coexistence of GM and non-GM crops without jeopardizing economic incentives. *Trends in Biotechnology*, 26(7): 353–358.

Demont M and Dillen K. 2008. Herbicide tolerant sugar beet: The most promising first-generation GM crop? *International Sugar Journal*, 110(1318): 613–617.

Devos Y, **Demont M** and Sanvido O. Coexistence in the EU – Return of the moratorium on GM crops? *Nature Biotechnology*, 26(11): 1223–1225.

Dillen K, **Demont M** and Tollens E. 2008. European sugar policy reform and agricultural innovation. *Canadian Journal of Agricultural Economics*, 56: 533–553.

Fargette D, Pinel A, Rakotomalala M, Sangu E, Traore O, Sereme D, Sorho F, Issaka S, Hébrard E, **Séré Y**, Kanyeka Z. and Konate G. 2008. Rice yellow mottle virus, an RNA plant virus, evolves as rapidly as most RNA animal viruses. *Journal of Virology*, 82(7): 3584–3589.

Fofana B, **Wopereis MCS**, Bationo A, Breman H and Mando A. 2008. Millet nutrient use efficiency as affected by natural soil fertility, mineral fertilizer use and rainfall in the West African Sahel. *Nutrient Cycling in Agroecosystems* 81: 25–36.

* The names of Africa Rice Center (AfricaRice) authors are shown in bold.

Futakuchi K, Fofana M and **Sie M**. 2008. Varietal differences in lodging resistance of African rice (*Oryza glaberrima* Steud.). *Asian Journal of Plant Science*, 7(6): 569–573.

Futakuchi K, Watanabe H and Jones MP. 2008. Relationship of grain protein content to other grain quality traits in interspecific *Oryza sativa* L. x *Oryza glaberrima* Steud. progenies. *Agricultural Journal*, 3: 50–57.

Futakuchi K. 2008. Achievement and outlook in rice research in Africa with special reference to WARDA's activities. JIRCAS Working Report (57): 121–135.

Gonzalez C, Szurek B, Manceau C, Mathieu T, **Séré Y** and Verdier V. 2007. Molecular and pathotypic characterization of new *Xanthomonas oryzae* strains from West Africa. *Molecular Plant-Microbe Interactions*, 20(5): 534–546.

Houngnandan Pascal, Yemadje RGH, **Oikeh SO**, Djidohokpin CF, Pascal Boeckx and Oswald Van Cleemput. 2008. Improved estimation of biological nitrogen fixation of soybean cultivars (*Glycine max* L. Merrill) using N¹⁵ Natural Abundance Technique. *Biology and Fertility of Soils*. (Available online: DOI 10.1007/s00374-008-0311-5).

Inoue Y, Qi J, Olioso A, Kiyono Y, Horie T, Asai H, **Saito K**, Ochiai Y, Shiraiwa T, Dounagsavanh L. (2008). Reflectance characteristics of major land surfaces in slash-and-burn ecosystems in Laos. *International Journal of Remote Sensing*, 29: 2011–2019.

Kinkingninhou-Médagbé Florent M, **Diagne A**, **Franklin Simtowe**, **Afiavi R. Agboh-Noameshie** and Patrice Y Adégbola. 2008. Gender discrimination and its impact on income, productivity, and technical efficiency: Evidence from Benin. *Agriculture and Human Values* DOI 10.1007/s10460-008-9170-9.

Koné B, Ettien JB, Amadji G and **Diatta S**. 2008. Caractérisation de la tolérance de NERICA à la sécheresse de mi-saison en riziculture pluviale. *African Crop Science Journal*, vol. 16, no. 2, pp. 133–145.

Koné B, Assa A. 2008. Utilisation des données pour l'évaluation de l'hétérogénéité des sols ferrallitiques par la couleur selon le code Munsell. *Agronomie Africaine*, 20(2): 179–190.

Lompo F, Bonzi M, **Bado BV**, Gnankambary Z, Ouedraogo N, Sedogo MP, Assa A 2008. Influence à long terme des modes de gestion de la fertilité sur les états, les formes, les fractions et le bilan du phosphore d'un Lixisol du Burkina en culture continue de sorgho. *International Journal of Biological and Chemical Sciences*, Vol 2(2): 175–84.

Luzi-Kihupi Ashura, Shao-Mwalyego AF, Zakayo JA and Mkuya M. 2008. Mwangaza – A new early maturing, RYMV resistant rice mutant released in the United Republic of Tanzania. *Plant Mutations Reports*, 2(1):13–15.

Ndjiondjop MN, Semagn K, Sie M, Cissoko, Fatondji B, and Jones M. (2008). Molecular profiling of interspecific lowland rice population derived from IR64 (*O. sativa*) and Tog5681 (*O. glaberrima*). *African Journal of Biotechnology*, 7(23): 4219–4229. ISSN 1684–5315.

Nutsugah SK, Twumasi JK, Chipilli J, **Séré Y** and Sreenivasaprasad S. 2008 Diversity of the rice blast pathogen population in Ghana and strategies for resistance management. *Plant Pathology Journal*, 7(1) 109–113.

Nwilene FE, Agunbiade TA, Togola A, Youm O, Ajayi O, **Oikeh SO**, Ofodile S and Falola OO. 2008. Efficacy of traditional practices and botanicals for the control of termites on rice at Ikenne, Nigeria. *International Journal of Tropical Insect Science*, 28(1): 37–44.

Nwilene FE, Togola A, Agunbiade TA, Ogah EA, Ukwungwu MN, Hamadoun A, Kamara SI and Dakouo D. 2008. Parasitoid biodiversity conservation for sustainable management of the African rice gall midge, *Orseolia oryzivora* (Diptera: Cecidomyiidae) in lowland rice. *Biocontrol Science and Technology*, 18(10): 1075-1081. ISSN: 0958-3157.

- Nwilene FE, Nwanze KF** and Youdeowei A. 2008. Impact of integrated pest management on food and horticultural crops in Africa. *Entomologia Experimentalis et Applicata*, 128: 355–363, 2008.
- Oikeh SO, Somado EA**, Sahrawat KL, Toure A, **Diatta S**. 2008. Rice yields enhanced through integrated management of cover crops and phosphate rock in P-deficient Ultisols in West Africa. *Communications in Soil Science and Plant Analysis*, 39: 2894–2919 (DOI: 10.1080/00103620802432816).
- Oikeh SO, Nwilene FE, Diatta S**, Osiname, **Toure A** and Okeleye. 2008. Response of Upland NERICA Rice to nitrogen and phosphorus in forest agroecosystems. *Agronomy Journal*, 100(3): 735–741.
- Oikeh SO, Touré A**, Sidibé B, Mariko M, **Niang A, Semon M, Sokei Y**. 2008. Responses of upland NERICA rice varieties to nitrogen and plant density. *Archives of Agronomy and Soil Science*, 55(3): 301–314.
- Oikeh SO**, Houngnandan P, Abaidoo, Rahimou, Toure A, Niang A, and Akintayo I. 2008. Integrated soil fertility management involving promiscuous dual-purpose soybean and upland NERICA enhanced rice productivity in the savannas. Nutrient cycling in agroecosystems. On-line journal.
- Onasanya A, Ekperigin MM, **Sere Y, Nwilene FE**, and Ajele JO. 2008 Enzyme polymorphisms and genetic diversity in *Xanthomonas oryzae* pv. *oryzae* causing rice bacterial leaf blight disease in West Africa. *International Journal of Agricultural Research*, 3(3): 227–236.
- Rodenburg J**. Book review: Non-chemical weed management – Principles, concepts and technology. By Upadhyaya MK and Blackshaw RE (Eds.). *Experimental Agriculture*, (2008) vol. 44, issue 4, p. 573.
- Rodenburg J**. Book review: Weedy rices – Origin, biology, ecology and control. By Delouche JC, Burgos NR, Gealy DR, Zorrilla de San Martín G and Labrada R. *Experimental Agriculture* (2008) Vol. 44, Issue 2, p. 276.
- Rodenburg J**, Bastiaans L, Schapendonk HCM, van der Putten P, van Ast A, Dingemanse NJ, and Haussmann BIG. 2008. CO₂-assimilation and chlorophyll fluorescence as indirect selection criteria for host tolerance against *Striga*. *Euphytica*, 160: 75–87.
- Saito K**, Linqvist B, Johnson DE, Phengchanh S, Shiraiwa T and Horie T. 2008. Planted legume fallows reduce weeds and increase soil N and P contents but not upland rice yields. *Agroforestry Systems*, (2008)74: 63–72.
- Salahuddin, Ahmad, **Van Mele Paul** and Magor, Noel P. 2008. Pro-poor values in agricultural research management: PETRRA experiences in practice, *Development in Practice*, 18:(4) 619–626.
- Sanni KA**, Fawole I, Guei RG, Ojo DK, **Somado EA**, Tia DD, Ogunbayo SA and **Sanchez I**. 2008. Geographical patterns of phenotypic diversity in *Oryza sativa* landraces of Côte d’Ivoire. *Euphytica*, 160: 389–400.
- Séré Y**, Sorho F, **Onasanya A**, Jobe L, Darboe S, Bojang Y, Touray ML, Pinel-Galzi and Fargette D. 2008. First Report of in Rice in The Gambia Rice Yellow Mottle Virus. *Plant Disease*, 93(2): 316.
- Séré Y, Onasanya A, Nwilene FE**, Abo EM and Akator K. 2008. Potential of insect vector screening method for development of durable resistant cultivars to rice yellow mottle virus disease. *International Journal of Virology*, 4(2): 41-47. ISSN 1816-4900.
- Sie M, Séré Y**, Sanyang S, **Narteh LT**, Dogbe S, Coulibaly MM, Sido A, Cissé F, Drammeh E, Ogunbayo SA, Zadjji L, Ndri B, Toulou B. 2008. Regional yield evaluation of the interspecific hybrids (*O. glaberrima* x *O. sativa*) and intraspecific (*O. sativa* x *O. sativa*) lowland rice. *Asian Journal of Plant Sciences*, 7(2): 130–139.

Sinzogan AAC, **Van Mele P** and Vayssieres JF. 2008. Implications of on-farm research for local knowledge related to fruit flies and the weaver ant *Oecophylla longinoda* in mango production, *International Journal of Pest Management*, 54(3): 241–246.

Traore PCS, Bostick WM, Jones JW, Koo J, Goita K, **Bado BV**. 2008. A simple soil organic model for biomass data assimilation in community-level carbon contracts. *Ecological Application* 18(3): 624–636.

Van Mele P. 2008. A historical review of research on the weaver ant *Oecophylla* in biological control. *Agricultural and Forest Entomology*, 10(1): 1–10.

Van Mele P. 2008. Zooming-in, zooming-out: Developing farmer-education videos to scale up sustainable technologies. *Rural Development News*, vol. 1/2008: 49–55.

Van Mele P. 2008. Multiple approaches to enhance communication between rice farmers, service providers and scientists. *Outlooks on Pest Management*, 19(6): 260–263.

Van Mele P. 2008. Weaver ants in biological control: Bringing history up to date. *Biocontrol, News and Information*, 29 (1), 4–5.

Van Mele P. 2008. Biological control with the weaver ant *Oecophylla longinoda* in Africa: A review of research and development efforts to link farmers to organic markets. *Outlooks on Pest Management*, 19(4): 180–183.

Van Mele P. 2008. The role of international agricultural research centres in strengthening rural extension. Website Farmer First Revisited, IDS, UK.

Van Mele P. 2008. The importance of ecological and socio-technological literacy in R&D priority setting: The case of a fruit innovation system in Guinea, West Africa. *International Journal of Agricultural Sustainability*, 6(3) 2008: 183–194.

Wopereis MCS, Diagne A, Rodenburg J, Sié M and Somado EA. 2008. Why NERICA is a successful innovation for African farmers: a response to Orr et al. from the Africa Rice Center. *Outlook on Agriculture*, 37(3): 169–176.

Yanoria MJT, Imbe T, Kato H, **Tsunematsu H**, Ebron LA, VeraCruz CM, Kobayashi N and Fukuta Y. 2008. A set of standard differential blast isolates (*Magnaporthe grisea* (Hebert) Barr.) from the Philippines for rice (*Oryza sativa* L.) resistance. *Japanese Agricultural Research Quarterly JARQ*, 42: 23–34.

Book and Book Chapters

Bado BV, Bationo A, Lompo F, Sedogo MP, Cescas MP, Sawadogo A and Thio B. 2008. Rôle des légumineuses sur la fertilité des sols et la productivité des systèmes de culture. In : A. Bationo et al (eds), *Synthesis of soil, water and nutrients managements research in the Volta Basin*. Academy Science Publishers Nairobi, Kenya: 125–139.

Diagne A. 2008. NERICA impact and adoption in sub-Saharan Africa. Module 14, pp. 121–126. In: Somado EA, Guei RG and Keya SO. (eds). *NERICA®: the New Rice for Africa - a Compendium*.

Demont M, Dillen K and Tollens E. 2008. Economics of spatial coexistence: Isolation distances versus pollen barriers. *Implications of GM-crop cultivation at large spatial scales*. Breckling B, Reuter H and Verhoeven R. (eds), pp. 159–162. Frankfurt, Germany: Peter Lang, Europäischer Verlag der Wissenschaften.

Defoer T and **Wopereis MCS**. 2008. Apprendre pour changer : exemple de la culture du riz pluvial dans les bas-fonds. In: Gafsi M, Brossier J, Dugué P and Jamin JY (eds). Exploitations agricoles familiales en Afrique de l'ouest et du centre : définition, enjeux, perspectives, Paris, France : Edition Quae.

Futakuchi K, Berhe T and **Akintayo I**. 2008. Grain and nutritional quality of NERICA varieties. PP. 116–119. In: Somado EA, Guei RG and Keya SO (eds). *NERICA®: the New Rice for Africa – a Compendium*.

Guei R, **Somado EA** and Larinde M. 2008. Improving the seed delivery system in sub-Saharan Africa. Module 10, pp. 98–105. In: Somado EA, Guei RG and Keya SO (eds). *NERICA®: the New Rice for Africa – a Compendium*.

Guei R, **Somado EA** and **Akintayo I**. 2008. Improving NERICA seed availability to end-user farmers. Module 11. pp. 106–110. In: Somado EA, Guei RG and Keya SO (eds). *NERICA®: the New Rice for Africa – a Compendium*. pp. 195.

Manneh B and **Ndjiondjop MN**. 2008. Drought screening of upland NERICA varieties. PP. 62–64. In: Somado EA, Guei RG and Keya SO (eds). *NERICA®: the New Rice for Africa – a Compendium*.

Ndjiondjop MN, **Manneh B**, **Dramé KN**, Cisse F, Andrew E, Kassa S, Tsunematsu H, Gregorio G, Cissoko M, Djedatin G, Yao N, Sow M, Kam H, Fatondji B, Bocco R and Montcho D. 2008. Molecular breeding for the development of drought tolerant and rice yellow mottle virus resistant varieties for the resource-poor farmers in Africa. Proceedings of the 1st Africa Biotechnology Congress - September 22 to 26, Nairobi, Kenya.

Ndjiondjop MN, Semagn K, Cissoko M, Jones MP and McCouch S. (2008). Molecular characterisation of NERICA lines. PP. 49–61. In: Somado EA, Guei RG and Keya SO. (eds). *NERICA®: the New Rice for Africa – a Compendium*.

AfricaRice publications and DVDs on display.



Nwilene FE, Jones MP, Brar DS, **Youm O**, **Togola A**, Kehinde A, Ukwungwu MN, Kamara SI and Hamadoun A. 2008. Integrated pest management for NERICA varieties, Module 8, pp. 83–94. In: Somado EA, Guei R.G and Keya SO. (eds). *NERICA®: the New Rice for Africa – a Compendium*.

Nwilene FE, Sanyang S, Traore AK, **Togola A**, Goergen G and Agunbiade TA. 2008. *Rice stem borers: Biology, ecology and control – Field Guide and Technical Manual*. Africa Rice Center (WARDA), Cotonou, Benin, pp. 28.

Oikeh SO, **Nwilene FE**, Agunbiade Oladimeji, **Ajayi O**, **Semon M**, **Tsunematsu H**, **Samejima**. 2008. Growing Upland Rice in Nigeria: A production handbook. Africa Rice Center (WARDA), Cotonou, Benin, pp. 40.

Oikeh SO, **Diatta S**, Tsuboi and Berhe T. 2008. NERICA crop management. Module 6, pp. 65–74. In: Somado EA, Guei RG and Keya SO (eds). *NERICA®: the New Rice for Africa – a Compendium*.

Oikeh SO, **Diatta S** and Tsuboi. 2008. Soil fertilization and NERICA crop nutrition. Module 7, pp. 75–82. In: *NERICA®: the New Rice for Africa – a Compendium*.

Sere Y, Akator K and Onasanya A. 2008. Major rice diseases and control. Module 9, pp. 95–97. In: Somado EA, Guei RG and Keya SO (eds). *NERICA®: the New Rice for Africa – a Compendium*.

Sié M, Hema D, Ouédraogo M, Sanon MJ, Traore S, Bado L, Sanou A, Ouattara Z and Ogunbayo SA. 2008. Participatory rice varietal selection in rainfed lowland in West Africa with reference to Burkina Faso. In: *Participatory plant breeding and knowledge management for strengthening rural livelihoods: Papers presented in an international symposium held at M.S. Swaminathan Research Foundation Chennai, India. Edited by V. Arunachalam, M.S.Swaminathan Research Foundation, Chennai, India, pp: 41–47*.

Sié M. 2008. NERICA for the high potential irrigated and rainfed lowlands. Module 2, pp. 19–30. In: Somado EA, Guei RG and Keya SO (eds). *NERICA®: the New Rice for Africa – a Compendium*.

Somado EA, Guei RG, and Keya SO. 2008. The New Rice for Africa – a Compendium. Africa Rice Center, 2031 BP Cotonou, Benin, pp. 195.

Somado, EA, and Berhe T. 2008. Harvest and post-harvest operations. Module 12, pp. 111–115. In: Somado EA, Guei RG and Keya SO (eds). *NERICA®: the New Rice for Africa – a Compendium*.

Van Mele P and Cuc NTT. 2008. Nos amies les fourmis: Améliorons la qualité de nos arbres fruitiers avec les fourmis tisserandes. ADRAO and CABI, pp. 68.

Edited proceedings, abstracts and projects reports

Abo M E, Danbaba N and **Nwilene FE**. 2008. HIV/AIDS and RYMV infection complex in agriculture: implication to nutrition and rice production, 584-590. In Ezike KNN, Osakwe II, Ekwu LG, Utobo E and Mbah CN (eds.) *Proceedings of the 42nd Annual Conference of the Agricultural Society of Nigeria under the theme: Agricultural development in Nigeria: Issues and challenges*, Ebonyi State University, Abakaliki, Nigeria, 19–23 October 2008.

Demont M, Rodenburg J, Diagne M and Diallo S. Value of herbicide tolerance for irrigated rice farmers in the Sahel. First All Africa Congress on Biotechnology, Nairobi, Kenya, 22–26 September 2008.

Demont M, Dillen K and Tollens E. Are EU Spatial *ex ante* coexistence regulations proportional? EAAE Contributed Session: Economic analysis of coexistence regulations of GM, conventional and organic crops in the European Union – Simulation modelling and empirical case studies, 12th EAAE (European Association of Agricultural Economists) Congress, Ghent, Belgium, 26–29 August 2008.

Demont M, Daems W, Dillen K, Mathijs E, Sausse C and Tollens E. Economics of spatial coexistence of genetically modified and conventional crops: Oilseed rape in central France. 12th EAAE (European Association of Agricultural Economists) Congress, Ghent, Belgium, 26–29 August 2008.

Dillen K, **Demont M** and Tollens E. Modelling heterogeneity to estimate the *ex ante* value of biotechnology innovations. 12th EAAE (European Association of Agricultural Economists) Congress, Ghent, Belgium, 26–29 August 2008.

Dillen K, **Demont M** and Tollens E. The global welfare effect of GM sugar beets under changing sugar policies. 12th EAAE (European Association of Agricultural Economists) Congress, Ghent, Belgium, 26–29 August 2008.

Bezlepkina I, Jongeneel R, Brouwer F, Dillen K, Meister A, Winsten J, de Roest K and **Demont M**. Costs of compliance with EU regulations and competitiveness of the EU dairy sector. 12th EAAE (European Association of Agricultural Economists) Congress, Ghent, Belgium, 26–29 August 2008.

Dillen K, **Demont M** and Tollens E. EAAE Contributed Session: The future of the European sugar market. 12th EAAE (European Association of Agricultural Economists) Congress, Ghent, Belgium, 26–29 August 2008.

Demont M, Daems W, Dillen K, Mathijs E, Sausse C and Tollens E. Economics of spatial coexistence of transgenic and conventional crops: Oilseed rape in central France. ICABR 12th International Conference, Ravello, Italy, 12–14 June 2008.

Dillen K, **Demont M** and Tollens E. Global welfare effects of transgenic sugar beet. ICABR 12th International Conference, Ravello, Italy, 12–14 June 2008.

Dillen K, **Demont M** and Tollens E. Modelling heterogeneity to estimate the *ex ante* value of biotechnology innovations. ICABR 12th International Conference, Ravello, Italy, 12–14 June 2008.

Demont M, Dillen K and Tollens E. Economics of spatial coexistence: Isolation distances versus pollen barriers. GMLS – International Conference on Implications of GM Crop Cultivation at Large Spatial Scales, Bremen, Germany, 2–4 April 2008.

Dramé KN, Le paysan africain n’aura plus à déplorer de grandes pertes de rendement en période de sécheresse. Planète Science Vol. 6, No. 2, avril-juin 2008.

Futakuchi K and **Sié M**. 2008. Au delà du NERICA : Meilleure exploitation du riz africain (*Oryza glaberrima* Steud). Paper presented at Atelier Scientifique National 2008, 2–5 December 2008, Abomey-Calavi, Benin.

Idinoba PA, Maat H and **Van Mele, P**. 2008. Socio-technical networks and the shaping of ASI rice thresher in West African irrigated rice systems. ESSS Conference.

Ndjiondjop MN, **Manneh B**, **Dramé KN**, Cisse F, Semagn K, Sow M, Glenn G, Cissoko M, Djedatin G, Fatondji B, Bocco R and Montcho D. 2008. Molecular breeding for the development of drought tolerant and rice yellow mottle virus resistant varieties for the resource-poor farmers in Africa. Proceedings of the 1st Africa Biotechnology Congress, 22–26 September 2008, Nairobi, Kenya.

Ogah EO, Odebiyi JA and **Nwilene FE**. 2008. Influence of biodiversity in the bio-control of African rice gall midge, *Orseolia oryzivora* H & G (Diptera: Cecidomyiidae). The 23rd International Congress of Entomology, Durban, South Africa, 6–12 July 2008.

Sié M, Dramé KN, Dakouo D, Traoré K, Dogbe SY, Somado EA, Ogunbayo SA, Semon M, Bamba I, Futakuchi K, Manneh B and Ndjiondjop MN. 2008. Biodiversité et amélioration du riz en Afrique Sub Saharienne. Proceedings of the miniforum Biodiversité et amélioration des plantes en Afrique sub-saharienne, IRD-COPED initiative - 6, 7 October 2008, Montpellier, France.

Tsunematsu H. 2008. Development of drought-tolerant rice varieties for Africa. JIRCAS Newsletter, (2008) 52:3.

Vayssières JF and **Van Mele P**. 2008. Effects of *Oecophylla longinoda* in controlling mango fruit flies in Benin. First Meeting of TEAM. Palma of Mallorca. 7–8 April 2008. Symposium: Current trends in the biological control of fruit flies, p.5.

Acronyms and abbreviations

AfDB	African Development Bank
AfRGM	African rice gall midge
AfricaRice	Africa Rice Center
AGRA	Alliance for a Green Revolution in Africa
ARI	African Rice Initiative
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
AU	African Union
AWARD	African Women in Agricultural Research and Development
AWD	alternate wetting and drying
BLB	bacterial leaf blight
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung
BOAD	Banque Ouest Africaine de développement
BRS	Banqué Regionale de Solidarité
CAADP	Comprehensive Africa Agriculture Development Programme (of NEPAD)
CARD	Coalition for African Rice Development
CAS-IP	Central Advisory Service on Intellectual Property
CBSS	community-based seed systems
CCER	Center-Commissioned External Review
CCIB	Chamber of Commerce and Industry of Benin
CFC	Common Fund for Commodities
CGIAR	Consultative Group on International Agricultural Research
CIAT	Centro Internacional de Agricultura Tropical
CIMMYT	Centro Internacional de Mejoramiento de Maiz y Trigo
CIRAD	Centre de coopération internationale en recherche agronomique pour le développement
CODESRIA	Council for the Development of Social Science Research in Africa
CRS	Catholic Relief Services
DFID	Department for International Development
DNA	deoxyribonucleic acid
ECOWAS	Economic Community of West African States
ECSA	Eastern, Central & Southern Africa
ECA	Economic Commission of Africa
ECA	East and Central Africa
ECARRN	East and Central Africa Rice Research Network
EIAR	Ethiopian Institute of Agricultural Research
ESARP	East and Southern Africa Rice Program
ESOP	Enterprise de Service aux Organisations des Producteurs
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FARA	Forum for Agricultural Research in Africa
GIS	geographical information systems
GSS	General Support Service Staff
ICARDA	International Center for Agricultural Research in the Dry Areas
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ICM	integrated crop management
ICT-KM	Information and Communications Technology-Knowledge Management
IER	Institut d'économie rurale (Mali)
IFAD	International Fund for Agricultural Development
IFDC	International Center for Soil Fertility and Agricultural Development
IHP	Interspecific Hybridization Project
IFPRI	International Food Policy Research Institute
IITA	International Institute of Tropical Agriculture
INERA	Institut de l'environnement et des recherches agricoles
INGER	International Network for Genetic Evaluation of Rice
INRA	Institut national de la recherche agronomique
INRAB	Institut national de la recherche agronomique du Bénin

INRM	Integrated Natural Resources Management
IPM	integrated pest management
IRD	Institut de recherche pour le développement
IRRI	International Rice Research Institute
ISFM	integrated soil fertility management
ISFP	Initiative on Soaring Food Prices
ISRA	Institut sénégalais de recherches agricoles
ITRA	Institut Togolais de reserche agronomique
IVC	Inland Valley Consortium
IWMI	International Water Management Institute
JICA	Japan International Cooperation Agency
JIRCAS	Japan International Research Center for Agricultural Sciences
MAS	Marker Assisted Selection
MTP	Medium Term Plan
MDG	Millennium Development Goals
NARES	national agricultural research and extension systems
NARI	National Agricultural Research Institute
NARS	national agricultural research systems
NEC	National Experts Committee
NEPAD	New Partnership for Africa's Development
NERICA	New Rice for Africa
NGOs	non-governmental organizations
NRM	natural resources management
PLAR	participatory learning and action research
PVS	participatory varietal selection
PVS-E	Extension-led participatory variety selection
QTL	quantitative trait locus (loci)
R&D	research and development
RAP	Realizing the agricultural potential of inland valley lowlands
ROCARIZ	Réseau ouest et centre africain du riz
ROPPA	West African farmers' organization
RYMV	rice yellow mottle virus
SC	Science Council of the CGIAR
SG2000	Sasakawa-Global 2000 Programme
SMART-IV	Sawah, Market Access and Rice Technologies for Inland Valleys
SPIRIVWA	Sustainable Productivity Improvement for Rice in Inland Valleys of West Africa
SRI	System of Rice Intensification
SSA	sub-Saharan Africa
STRASA	Stress Tolerant Rice for Africa and South Asia
TICAD	Tokyo International Conference on African Development
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
WAIVIS	West African Inland Valley Information System
WCA	West and Central Africa
WECARD	West and Central African Council for Agricultural Research and Development/Conseil ouest et centre africain pour la recherche et le développement (CORAF)
WFP	World Food Programme of the United Nations
WUR	Wageningen University and Research Centre
YAAS	Yunnan Academy of Agricultural Sciences

About the Consultative Group on International Agricultural Research (CGIAR)

The Consultative Group on International Agricultural Research (CGIAR) is a strategic alliance of countries, international and regional organizations and private foundations supporting 15 international agricultural research centers that work with national agricultural research systems and civil society organizations including the private sector. The alliance mobilizes agricultural science to reduce poverty, foster human well-being, promote agricultural growth and protect the environment. The CGIAR generates global public goods that are available to all.

In a world where 75 percent of poor people depend on agriculture to survive, poverty cannot be reduced without investment in agriculture. Many of the countries with the strongest agricultural sectors have a record of sustained investment in agricultural science and technology. The evidence is clear; research for development generates agricultural growth and reduces poverty.

Agricultural research for development has a record of delivering results. The science that made possible the Green Revolution of the 1960s and 1970s was largely the work of CGIAR Centers and their national agricultural research partners. The scientists' work not only increased incomes for small farmers, it enabled the preservation of millions of hectares of forest and grasslands, conserving biodiversity and reducing carbon releases into the atmosphere. CGIAR's research agenda is dynamic, flexible and responsive to emerging development challenges. The research portfolio has evolved from the original focus on increasing productivity in individual critical food crops. Today's approach recognizes that biodiversity and environment research are also key components in the drive to enhance sustainable agricultural productivity. Our belief in the fundamentals remains as strong as ever: agricultural growth and increased farm productivity in developing countries creates wealth, reduces poverty and hunger and protects the environment.

CGIAR Centers

Africa Rice Center (Cotonou, Benin)

Centro Internacional de Agricultura Tropical (Cali, Colombia)

Center for International Forestry Research (Bogor, Indonesia)

Centro Internacional de Mejoramiento de Maiz y Trigo (Mexico, DF, Mexico)

Centro Internacional de la Papa (Lima, Peru)

International Center for Agricultural Research in the Dry Areas (Aleppo, Syria)

WorldFish Center (Penang, Malaysia)

World Agroforestry Centre (Nairobi, Kenya)

International Crops Research Institute for the Semi-Arid Tropics (Patancheru, India)

International Food Policy Research Institute (Washington, DC, USA)

International Institute of Tropical Agriculture (Ibadan, Nigeria)

International Livestock Research Institute (Nairobi, Kenya)

Bioversity International (Rome, Italy)

International Rice Research Institute (Los Baños, Philippines)

International Water Management Institute (Colombo, Sri Lanka)



AfricaRice

Africa Rice Center (AfricaRice)

01 B.P. 2031 Cotonou, Benin

Tel: (229) 21 35 01 88 Fax: (229) 21 35 05 56 E-mail: AfricaRice@cgiar.org

www.AfricaRice.org