



Report of the 6th Biennial Meeting of the National  
Experts Committee (NEC VI)  
Cotonou, Republic of Benin  
23–25 June 2008

## **Strengthening Rice Research in Africa**

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### **Collaboration between Africa Rice Center (AfricaRice) and the National Agricultural Research Systems (NARS) of AfricaRice Member Countries**

Biennial Africa Rice Center and NARS  
Experts Committee Meeting Report No. 6

## 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. Today its membership comprises 24 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, Gabon, the Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Madagascar, Mali, Mauritania, Niger, Nigeria, Republic of Congo, Senegal, Sierra Leone, Togo and Uganda.*

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

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# **Report of the 6th Biennial Meeting of the National Experts Committee (NEC VI) Cotonou, Republic of Benin 23–25 June 2008**

## **1 Introduction**

The 6th Biennial Meeting of the National Experts Committee (NEC VI) was organized from 23 to 25 June 2008 in Cotonou, Benin.

The Directors General from the national agricultural research systems (NARS) of the following countries or their representatives were present: Benin, Burkina Faso, Cameroon, Central African Republic (CAR), Chad, Congo Brazzaville, Côte d'Ivoire (Rapporteur), Gambia (Rapporteur), Guinea, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo (NEC Chairman) and Uganda.

### **Absent:**

- Democratic Republic of Congo
- Ghana
- Guinea Bissau

### **Observers:**

- Egypt
- West and Central African Council for Agricultural Research and Development (CORAF/WECARD)
- Forum for Agricultural Research in Africa (FARA)
- Dr Baba Abubakar representing the Executive Committee of the Consultative Group on International Agricultural Research (CGIAR)
- ROPPA (a network of West Africa agricultural producers and farmers associations)

## **2 Synthesis report, main conclusions and recommendations**

### **2.1 Opening Ceremony**

The NEC Chairman, Dr Comlan Agbobli, welcomed the participants to the meeting. The opening speech was delivered by His Excellency Dr Roger Dovonou, Minister of Agriculture, Livestock and Fisheries, Government of Benin. After officially declaring the meeting open,

the Minister expressed his satisfaction about the collaboration between AfricaRice and the host country Benin and called for its continuation. He also mentioned a number of measures taken by his government to deal with the food and rice crisis.

Dr Monty Jones, Executive Director of the Forum for Agricultural Research in Africa (FARA), congratulated AfricaRice for its achievements and personally addressed a message of encouragement to the Director General of AfricaRice for his achievements over such a short period.

Dr Baba Abubakar, Permanent Secretary, Ministry of Agriculture, Nigeria, and Representative of Africa to the Executive Committee of the CGIAR, addressed a message of congratulations on behalf of Nigeria. He also reiterated the support of his country to the Center and its initiatives.

## **2.2 Report of the Director General of AfricaRice (Oct 2007-May 2008)**

Dr Papa A Seck presented the developments at AfricaRice since the last NEC meeting. He highlighted the following:

- The External Program and Management Review Panel evaluated AfricaRice positively. The review report was appreciated at the CGIAR Annual General Meeting.
- AfricaRice has a good financial health with more than 90 days of reserve funds.
- The geographical mandate of AfricaRice now covers all of Africa making it a pan-African institution.
- The merger of corporate services between IITA and AfricaRice and the programmatic alliance between AfricaRice and IRRI is resulting in the joint implementation of new programs.
- Stronger links with regional economic communities (RECs).
- AfricaRice participated in the TICAD IV meeting in March 2008 at Tokyo, and this opened new avenues for the Centre.
- A Post-Masters Program will be initiated soon.
- The Center developed an Emergency Initiative Plan in response to the food crisis.
- A new Strategic Plan and a new research structure has been developed.
- AfricaRice is preparing for the Presidential Initiative of His Excellency Dr Thomas Yayi Boni, President of Benin, through which the Center will be able to strengthen and deepen its advocacy on increasing rice production.

### **Summary of discussions**

- NEC congratulated AfricaRice DG for his impressive performance over such a short period.
- NEC found it essential for the ministers of agriculture of member countries to have strong links with the ministers of finance to ensure the payment of dues to AfricaRice.
- NEC hailed the increase in the number of member countries to 22 in 2008.

### **2.3 Decisions and recommendations of NEC V, Resolutions of the 26th COM**

Conclusions, motion and resolutions of the 26<sup>th</sup> COM were presented by AfricaRice. The main decisions were listed. Issues related to the programmatic alignment with IRRI and CIAT were discussed as well as the need to strengthen rice research in Africa.

### **2.4 The reports of the member states**

The following countries made their presentations: Benin, Burkina Faso, Cameroon, Egypt, Chad, Uganda, Congo, Togo, Côte d'Ivoire Central African Republic, Guinea, Liberia, Gambia, Chad, Mali, Mauritania, Niger, Nigeria, Senegal and Sierra Leone. There was also a presentation from the representative of the Japanese NGO, Sasakawa.

The presentations focused on the following areas:

- General situation
- 2007-2008 status
- Research funding
- Size and structure of the research team
- Priority research thrusts (2008-2010)
- Research priorities (2010-2020)
- Impact of partnership with AfricaRice
- Priority constraints
- Roles expected from AfricaRice
- Major varieties released
- Incentive policies to boost national production
- Major constraints to face the present food crisis
- Concrete measures taken

The sessions noted the following observations in most of the member countries:

- Poor research capacities of NARS, ageing research staff and gender imbalance (under representation of women researchers).
- The NARS expect AfricaRice to develop improved varieties and also strengthen research and institutional capacity.



- Most of the research thrusts relate to biophysical aspects and less to socioeconomics.
- Egypt exports more than 1 million tonnes of white rice. The other African countries should be encouraged to draw benefits from Egypt's expertise.
- The countries in post-conflict situations have experienced a drastic drop in their production due to the destruction of their installations and equipments. It is vital to rehabilitate the rice sector in these countries.
- The major constraints highlighted relate to lack of seed and labor and poor mechanization in rice growing areas.
- Rice statistics, which are important decision-support tools, are unreliable.
- Strengthening the information and communication technologies at research institutions with the support of AfricaRice, CORAF and FARA.
- The representative from Sasakawa made a presentation on their activities and approaches which may be summarized in two points:
  - An integrated approach from the plant to the dish of the consumer through appropriate processing and post-harvest techniques; and
  - Partnerships at all levels with NARS, universities, farmer associations and CG centers.

### **Summary of discussions**

- Regarding agronomic aspects, significant yield gaps have been recorded between different countries and even within the same country. For example, Egypt records a mean yield of 9.8 tons per hectare and Senegal, 5 tons per ha (due to the fact that the majority of farmers harvest 2 tons per hectare, whereas yields can reach up to 9 tons per hectare for some exceptional producers).
- It was proposed to identify the correlation between technological packages and yields in order to retain the best techniques and disseminate them to increase the yield of small-scale farmers.
- The poor funding allocated to rice programs was highlighted. Very often, the national budgets are devoted to a set of cereals and commodities and the share for rice remains low
- Like Egypt which is a rice exporting country, AfricaRice member states should adopt an integrated approach to rice production. Aspects relating to weed science, pathology, crop calendar monitoring and post-harvest technologies should be taken into account.
- The issue of the shortage of human resources in national services was discussed. Even when funding is available for emergency initiatives, there is no adequate staff strength and actions cannot be appropriately carried out, resulting in no impact.
- The role of the private sector was hardly mentioned, though it remains an essential stakeholder especially in processing rice and thereby adding value. Even when it is possible to produce more, a poor quality product will not be sold in the market.

- Water control has been identified as a priority without which it will be impossible to produce rice in sufficient quantity.
- The information provided by member countries would be taken into account in the AfricaRice Strategic Plan and will serve as a basis to obtain more funding from Japan in particular.
- It was recommended that post-conflict countries should benefit from the strong donor support to revamp their rice production.
- A good South-South exchange strategy should be put in place between NARS DGs and researchers through AfricaRice facilitation.
- Variability of rice research policies was noted as a problem. There is a need to harmonize these policies. Some of the regional economic cooperation units such as CILSS, ECOWAS and UEMOA, have initiated measures to standardize policies. The Presidential Initiative by HE Dr Thomas Yayi Boni aims at harmonizing investment and marketing policies in the rice sector.

## **2.5 Research and development**

### ***2.5.1. Strategic Plan for 2010-2020***

The AfricaRice 2010-2020 preliminary Strategic Plan was presented by the Dr Marco Wopereis, Deputy Director General and Director for Research and Development (DDG-DR4D) of AfricaRice. It was stated that the points from the NEC meeting will be taken into account in the development of the Plan (research directions).

Participants made relevant proposals for the strategic plan and it was decided that amendments would be made in the next ten days. The points related to agronomic and socioeconomics aspects and also information and training (AfricaRice networks).

### **2.6. Reports of networks (ARI, IVC, INGER-Africa, ECARNN)**

The research networks – the African Rice Initiative (ARI), Inland Valley Consortium (IVC), the West and Central Africa Rice Research and Development Network (ROCARIZ), the International Network for Genetic Evaluation of Rice (INGER-Africa), and the East and Central Africa Rice Research Network (ECARNN) – made presentations on their activities for the past two years and their achievements and perspectives. It was suggested that AfricaRice and the national systems should be more dynamic in the sharing of information.

## **2.7 Strategic issues**

### ***AfricaRice headquarters***

The site at M'bé is in a good condition and the equipments are operational. Côte d'Ivoire, in spite of the crisis, has made great efforts to preserve the structure. It was proposed to thank the government and people of Côte d'Ivoire for the maintenance of the infrastructure. The government of Benin was also thanked for hosting and facilitating the activities of AfricaRice.

### ***Contribution of member states***

It is necessary for the DGs of the NARS to follow up on the contributions from their member countries. The contribution of member countries is an act of ownership which helps to justify that AfricaRice is not only a CGIAR center but also an African Center. It has been suggested that this issue be placed before the African Union by underlining the importance of AfricaRice for these countries.

Some means to advocate before national parliaments were proposed. AfricaRice should go beyond the simple reminders for contributions payment and underline the following elements:

- The commitment of the Council of Ministers;
- The link between AfricaRice, the New Partnership for Africa's Development (NEPAD) and the African Union (AU); and
- The importance of taking ownership for the attainment of food security.

### ***Post-Master Program***

The Post-Master Program is a component of the new vision of AfricaRice. It aims to provide students with some experience by recruiting them for 2 years and to compensate for the ageing of researchers. Seven positions will be filled in the first instance and recruitments will be from Benin and Nigeria in the test phase.

### ***Rice trends in Africa***

Rice statistics are unreliable in the member countries. This has led to the organization of a consultation workshop on the exchange of rice statistical information and data. It emerged that countries should find a sustainable source (national budget) for funding data collection and treatment, which is a vital element for this on-going initiative. The proposal of an AfricaRice and NARS joint publication titled 'Rice Trends in Africa' has been made.

## **2.8. Decisions and recommendations**

NEC is impressed with the major achievements recorded by AfricaRice DG within a relatively short period of time in office, especially on the geographic expansion, increase in joint project proposals with NARS, developing an Emergency Initiative as a reaction to the current global food crisis, launching of a Post-Master Program, strong advocacy for member countries and AfricaRice at international and local fora, the extremely excellent financial health of the Center. It recommends that the Director General and members of his staff are congratulated for this achievement especially considering the short time since the ascendancy of the DG to the highest leadership position of the Center.

NEC notes with satisfaction the steps taken by AfricaRice to develop a new program structure, and fashion out a new ten year Strategic Plan, and recommends that the interactions with all partners be strengthened and all the necessary support be provided for this important exercise.

NEC appreciates the steps taken by the Center in forging an alignment with IITA to the extent that AfricaRice currently manages the corporate services at the Cotonou Station, and further impressed by the bold steps taken by AfricaRice in achieving a programmatic alignment with IRRI and CIAT. It recommends that the initiatives be durable and that AfricaRice involves as much as possible NARS from members states in the implementation of the joint projects.

NEC is satisfied with AfricaRice on its desire to make the Center a truly pan-African one with the increase in the number of new member countries, and recommends that AfricaRice manages this expansion well and consider membership from southern African countries and should actively explore the possibilities of becoming a center of excellence of the African Union while remaining a CGIAR Center.

NEC congratulates Egypt for its recent membership to AfricaRice and recommends that AfricaRice encourage and actively engage the counterparts from Egypt so as to bring into fruition this desire, and that AfricaRice and Egypt mutually explore all possible synergies that are achievable for a win-win arrangement.

NEC is concerned about the continually low and eroding levels of human capacity in the national programs for high quality rice research and technology transfer activities, and notes further the steps taken by the Center to start the Post-Masters Program, and recommends that:

- AfricaRice analyzes data to identify the training needs and target donors for an accelerated human capacity development for rice research in Africa.

- AfricaRice makes the necessary efforts to establish a Rice Information Gateway (RIGA), an action that will be translated by an improvement of information sharing and communication between rice research stakeholders and development communities.

NEC notes the wide disparity in the yield levels of rice in the member countries, and recommends that AfricaRice carefully analyse the reason for the yield gaps, and share the information why such discrepancies occur and subsequently take proactive steps to rectify them.

Post harvest handling and the systematic involvement of the private sector in rice will continue to be a major constraint for production in Africa. NEC recommends AfricaRice to aggressively develop with NARS a long-term strategy to confront this constraint.

NEC is encouraged by AfricaRice decision to deepen policy dialogue (related to rice) with the major policy makers and recommends that AfricaRice be supportive of the Presidential Initiative to be launched by His Excellency Dr Thomas Yayi Boni (President of the Republic of Benin), while deepening dialogue with the regional economic communities (RECs) and farmer groups in Africa

NEC noted the relevance and the diversity of assets related to rice research based on the country reports. It invites AfricaRice to document these assets in the Synthesis Report to make them more visible and for a mutual sharing of information between NARS.

NEC recognizes the major efforts being made by member countries especially those coming out of conflicts to re-establish rice production to normalcy and recommends that special attention be given to post conflict countries in the framework of AfricaRice activities.

Seed quality being a major concern for all member states, NEC recommends that trainings given to member states on seed at AfricaRice be supported and urges AfricaRice to mobilize funds to sustain an increased production of foundation seed and seed for NARS and farmers who will multiply them.

NEC admits that the future of rice production in Africa lay in the massive use of lowlands. It therefore recommends that AfricaRice strengthens the research efforts on rice improvement in that ecology through water, soil fertility management and taking into account socio-economical aspects.

NEC notes that payment of contributions by member states put AfricaRice in a favorable position to negotiate when mobilizing funds with donors. NEC urges member states to get ownership of AfricaRice by the annual update of their contributions.

NEC is satisfied with the immense hospitality of the government and the good people of the Republic of Benin, and thanks them for their kind hospitality and further thanks them for hosting the Center while it goes through its period of difficulty. A motion of thanks is also addressed to the Ivorian government for keeping intact the M'bé headquarters despite the crisis.

### **3. Closing ceremony**

The closing speech was delivered by Dr Papa A Seck, DG of AfricaRice, who thanked all the DGs for taking part into this meeting despite the crisis. The DG thanked the Chairman of NEC, all the country representatives, and wished them a safe journey back to their countries. He also thanked the Nigerian representative to the Executive Committee of CGIAR. Finally, Dr Agbobli thanked the DG of AfricaRice for the new approach in conducting NEC meetings and declared the sixth meeting of the National Experts Committee officially closed.

# **ANNEX I**

## **Report of the Director General Oct 2007 to May 2008**

### **1 Major achievements and activities**

#### **1.1 Successful EPMR**

After doing an extensive review of AfricaRice's performance on all aspects of its activities, the Fifth External Program and Management Review (EPMR) Panel gave a positive report and predicted a bright future for AfricaRice, visualizing "A stronger and larger rice research Center serving all of SSA, in collaboration with IRRI and CIAT, and AfricaRice's many NARS and international partners."

At the Business Meeting during the CGIAR Annual General Meeting in December 2007, the EPMR Panel Chair presented their report. Many donors and partners, including France, England, Japan, European Union, Belgium, Canada, GFAR, Egypt, the Science Council and CGIAR Chairperson congratulated AfricaRice for a successful EPMR.

It was officially recorded at the Business Meeting that "AfricaRice is a unique model in the CGIAR and a good example for the third generation of CGIAR Centers with positive impact in several countries." CGIAR members acknowledged AfricaRice's efforts in maintaining quality research standards despite the turmoil it has faced.

Eighteen major recommendations have been made by the EPMR to help the Center improve its performance. AfricaRice is moving forward to implement the EPMR recommendations and the progress is being closely monitored.

#### **1.2 Council of Ministers and National Experts Committee meeting**

The 26th session of the AfricaRice Council of Ministers was successfully held under the chairmanship of Dr Abba Sayyadi Ruma, Honorable Minister of Agriculture and Water Resources, Federal Republic of Nigeria, in September 2007 in Abuja, Nigeria.

The session comprised a National Experts Committee (NEC) meeting that was chaired by Dr A.A. Ochigbo (Director General of the National Cereals Research Institute, NCRI), which presented its recommendations to the Council of Ministers for consideration.

The Council approved the NEC recommendations and issued 17 Resolutions. The Resolutions included the following main points:

- Endorsement of the new vision of AfricaRice which signifies that the vision is fully owned by the member states
- Approval for the addition of new member states
- Appreciation of the Director General's advocacy efforts that have resulted in increased membership contributions
- Participation of farmers' organizations in NEC meetings as observers
- Active involvement of AfricaRice in the production of breeder and foundation seed as well as in the development and harmonization of seed legislation in collaboration with national programs.
- Closer partnership between CTA and AfricaRice to serve member states in the dissemination of rice information
- Stronger links with sub-regional and regional bodies (ECOWAS/CEDEAO, CEMAC, UEMOA, CEAC, etc.) in order to benefit from their support
- AfricaRice should be recognized as a Center of Excellence of the African Union, while remaining an international Center supported by the CGIAR

Conveying its sincere thanks to the President and the Government of Nigeria for their warm hospitality and the excellent organization of the session, the Council approved Togo's assumption of the Council Chairmanship for the next two years.

### **1.3 Expansion of membership**

As a follow up to the resolutions of the 2005 Council of Ministers, which encouraged AfricaRice to expand its geographical mandate in accordance with AfricaRice's constitution, in early 2007 the DG invited countries in East, Central, Southern and North Africa to join AfricaRice.

Four countries from Central and Eastern Africa -- Central African Republic, Democratic Republic of Congo, Republic of Congo and Uganda – sent their applications which were approved by the 26<sup>th</sup> ordinary session of the Council of Ministers held in Abuja, Nigeria, in September 2007.

Therefore, for the first time since 1986, the AfricaRice map changed with the admission of these countries. With their addition, the number of AfricaRice member states has gone up to 21. Uganda is the first country from Eastern Africa to join AfricaRice.

In addition, Egypt has sent its application to join AfricaRice. This decision will be finalized at the end of June 2008. We will continue to advocate for increased membership to reflect the



status of the Africa Rice Center, while taking into account our real capacities in order to avoid dispersion of our efforts.

#### **1.4 Increase in member states' contributions**

Over the years AfricaRice has been seriously affected by low member state contributions. Thanks to effective advocacy, there were tangible improvements in contributions from the member states in 2007-2008. The amount received from the member states in 2007 is equivalent to the amount contributed in the last 10 years.

Several countries paid their arrears (for example, Nigeria paid its full arrears for 10 years). Benin, Senegal, Cote d'Ivoire, and Mali have also paid almost all their arrears. Some countries paid a part of their contribution for the first time (e.g. Liberia, Guinea-Bissau, Togo, and Niger). A number of member countries are in the process of paying their arrears (Cameroon, Guinea, Sierra Leone, Burkina-Faso, and Mauritania).

#### **1.5 Healthy financial situation**

Our 2008 budget estimate indicates an income of almost US\$14 million, which is the highest in the history of AfricaRice. This is an increase of 26% over 2007 audited income. AfricaRice could enter into the medium budget bracket among CGIAR Centers (i.e. above US\$15 million by the end of 2008) if big projects in the pipeline – for which we have strong positive indication from donors – materialize.

The projected amount to be transferred to our reserves is an all time high of US\$1.4 million in order to build up our total reserve for implementation of the center's strategic plan. This will move our long-term sustainability and short-term solvency days for 2007 to over 140 days from 105 days.

**Unrestricted budget support:** In 2007 we were able to balance our budget thanks to:

- Strict budget controls and fiscal discipline
- Increase in support from donors (USAID, Belgium, World Bank, IFAD)
- Steady support from Japan
- Opening up of new avenues of funding

**Boost in special projects:** Despite being conservative in our estimate of restricted projects, we have an increase of over 20% compared to 2007. In contrast to earlier AfricaRice trends of low share of restricted projects in terms of volume, in 2007 we succeeded in getting some high-volume projects approved. These include an IRRI/AfricaRice proposal approved by the Bill and Melinda Gates Foundation (BMGF) and two AfricaRice proposals approved by Common Fund for Commodities (CFC) and the International Fund for Agricultural Development (IFAD).

### **1.6 Corporate services alignment with IITA**

All corporate service functions in Cotonou – human resources, finance, planning and budgeting, information technology, operations and administration – are now under AfricaRice management since November 2007. Cost savings of about 20-25% are expected from 2009 onwards and we will strictly monitor this aspect. We thank the CGIAR and the World Bank for its support of these operations.

### **1.7 Research alignment with IRRI & CIAT**

The AfricaRice/IRRI/CIAT programmatic alignment to boost Africa's rice sector was an innovative development and highly acclaimed by the donors and African partners. After the official announcement by AfricaRice, IRRI and CIAT of a programmatic alignment in December 2006, a joint planning meeting was held at AfricaRice, Cotonou, in mid-2007. The joint meeting was attended by several high-level staff members from IRRI, CIAT and AfricaRice, including Dr Ren Wang, CGIAR Director, who was at that time the DDG for Research at IRRI. This was followed by a joint declaration that was signed by the Directors General of the three Centers.

Common themes for joint research have been identified: genomics, seed systems, post-harvest technologies, genetic resources, natural resource management and value chain analysis. Subsequently, several joint proposals have been submitted and approved, notably a US\$19 million project proposal by IRRI (developed jointly with AfricaRice) that was approved by BMGF.

The inception meeting for this project was held in March 2008 at AfricaRice. More than 66 participants attended this meeting including the IRRI and AfricaRice DGs, a BMGF representative, 20 participants from IRRI, and NARS representatives, mainly from the 14 project countries in Africa.

### **1.8 Strengthening partnership with French Institutions**

Since 2007, several meetings between AfricaRice and French agricultural research institutions (CIRAD, INRA, and IRD) have been held in Benin, France and at the CGIAR AGM to explore the possibility of bringing in French expertise to assist AfricaRice in addressing some of the issues recommended by the EPMR. Joint research proposals have been developed and submitted to donors. A MoU has just been signed to formalize the collaboration between AfricaRice and the French agricultural research institutions.

### **1.9 Strengthening partnership with FAO**

In 2007, the AfricaRice DG met with the DG of FAO who showed unreserved support for AfricaRice's new vision and requested that a common project on capacity building for African

NARS partners be developed. The FAO DG continues to take a strong personal interest in FAO-AfricaRice joint project proposals and has given specific instruction to his staff members to keep him updated.

As a result, FAO has sent AfricaRice a comprehensive list of seven ongoing and possible future FAO-AfricaRice collaborative projects, and AfricaRice is following up on these. The projects relate to capacity building, seeds, technology transfer and the Cartagena Protocol on Biosafety. With FAO and SG-2000, AfricaRice has recently published the NERICA Compendium. FAO is also actively participating in ARI meetings.

Recently AfricaRice DG again visited the FAO DG to discuss AfricaRice's Emergency Rice Initiative. AfricaRice's proposal was approved with great enthusiasm by FAO and the Emergency Rice Initiative is being carried out within the framework of the FAO Soaring Food Prices Initiative. FAO representatives attended the formulation meeting of the Emergency Rice Initiative at AfricaRice, from 9 to 12 June 2008.

#### **1.10 Strengthening partnership with CTA**

To forge a good collaboration with CTA, AfricaRice DG met with the CTA DG and the various CTA department heads in 2007 to discuss possibilities of funding support from CTA for key AfricaRice conferences, training and publications.

In 2007, CTA co-funded a HIV/AIDS conference in Cotonou and the publication of the proceedings of the first Africa Rice Congress. Upon receiving a positive response from CTA, AfricaRice has developed and sent a number of proposals which are being considered. CTA showed a keen interest in participating in AfricaRice's Council of Ministers meeting and was one of the key partners invited by the DG as an observer to the National Experts Committee meeting held prior to the Council of Ministers meeting. Following a resolution by the Council of Ministers, CTA has agreed to favorably consider any request coming from the Council.

#### **1.11 WCA Regional Collective Action Plan**

To avoid overlap and duplication of research activities and efforts of the CGIAR Centers operating in Africa, the Regional Collective Action Plans for West and Central Africa (REPCA-WCA) and Eastern Africa were initiated by CGIAR Centers and their partners as part of a new way of "doing business" together.

For WCA, the leadership of REPCA is provided by AfricaRice. CGIAR Centers, together with partners such as FARA, CORAF/WECARD and NARS were involved in the development of the REPCA-WCA Action Plan. Five priority joint programs have been identified and approved

by FARA for follow-up. The CGIAR Alliance is very keen to move forward with the Regional Action Plans and discussions are under way for funding by the Alliance of CG Centers.

### **1.12 Participation in FARA, GFAR, CORAF/WECARD & ASARECA meetings**

**FARA and GFAR:** DG attended the FARA Board and GFAR Executive Committee Meetings in his capacity as the Alliance Representative.

At the Fourth FARA General Assembly held in Johannesburg, South Africa, the DG was invited by the FARA Executive Secretary, Dr Monty Jones, to give a brief presentation, titled *Response to the status of the five requirements for turning Africa's agriculture around*.

DG took part in CORAF/WECARD and ASARECA activities and attended the 20th Anniversary of CORAF/WECARD.

### **1.13 Strengthening links with regional economic communities**

A big effort has been made to strengthen AfricaRice's relationship with the regional economic communities. For the first time, UEMOA and ECOWAS were invited as observers to the Council of Ministers. The AfricaRice DG attended the ECOWAS Heads of State and Governments Summit in Ouagadougou in January 2008. Discussions are under way with ECOWAS for developing a collaboration program on seed legislation and training courses, etc.

AfricaRice was invited to attend the extraordinary meeting of ministers of finance, trade and agriculture of ECOWAS countries on the food crisis, 18 and 19 May 2008, in Abuja. AfricaRice contributed extensively to the background document that was provided to the ministers for the meeting and AfricaRice's input was fully acknowledged. A representative from AfricaRice also attended the experts meeting held in this context.

AfricaRice has been invited to participate in the UN Economic Commission for Africa meeting from 24 to 26 June 2008 in Niamey, and to present a paper on AfricaRice's activities in regional integration. A representative has been sent to this meeting.

### **1.14 Highlights of member country visits**

The DG has visited 15 member states and had working sessions with ministers in charge of agricultural research, ministers of finance and two prime ministers. The results of these visits are tangible in:

- Significant increase in contributions from the member states
- Commitments by member states to give more support to national rice research

Some of the recent contacts are highlighted below:

**Uganda:** Immediately after Uganda joined AfricaRice as the first member country from Eastern Africa, the AfricaRice DG made a special visit in October 2007 to convey the Center's appreciation to the Government and to discuss themes for joint research with the national system.

The DG was warmly received by the Minister of Agriculture who spoke glowingly about the contribution of NERICA in Uganda. In the absence of the Vice-President of Uganda who is a great promoter of NERICA in the country, the DG met with the VP's Director of Cabinet.

The AfricaRice DG also had fruitful discussions with the DG of National Agriculture Research Organization (NARO) and took the opportunity to meet with the Executive Secretary of ASARECA, who is based in Uganda. The Executive Secretary assured him that he would strongly encourage other East African countries to join AfricaRice and advocate for the development of the rice sector in the region.

**Senegal:** An AfricaRice delegation led by the DG paid a courtesy call on the Honorable Minister for Agriculture of Senegal in January 2008. The delegation was accompanied by the DG of ISRA. The Minister expressed an urgent need for strong technical support from AfricaRice to help boost domestic rice production in Senegal within the context of the Government's national strategy and priority to attain self-sufficiency in rice.

The Minister asked the ISRA DG to convene a meeting between the national research and development organizations working on rice and AfricaRice in order to develop joint work-plans. As a follow-up to the meeting, the AfricaRice DDG presented a concept note to the Senegalese R&D representatives in St Louis on possible contributions of AfricaRice to the Senegalese rice self-sufficiency program. AfricaRice is grateful that the Government of Senegal has provided two motor pumps for irrigation (worth US\$30,000) in response to its request.

**Liberian Minister visits AfricaRice-Cotonou:** The Honorable Minister of Agriculture of Liberia visited AfricaRice on 2 October 2007 to hold comprehensive discussions on technical assistance that the Center could provide towards restoring the rice research and development program in Liberia, which is emerging from years of civil conflicts.

As a result of this visit and thanks to the personal initiative of the Minister, several joint proposals by AfricaRice and the Liberian NARS (CARI) were developed and submitted to donors (UNDP, IFAD, World Bank) to reactivate the country's rice seed sector.

**Visit to Mali in connection with the Rice Initiative:** The AfricaRice DG accompanied by the DDG-RD visited Mali to discuss AfricaRice's collaborative activities for managing the rice crisis in member countries. The delegation met with Dr Adama Traoré, Executive Secretary of CNRA (the Malian Council for Agricultural Research) and Vice Chair of the AfricaRice Board. The AfricaRice delegation paid a courtesy call on the Honorable Minister of Agriculture, accompanied by Dr Adama Traoré, and Dr Cissé of IER. The DG presented the Emergency Rice Initiative to the Minister, who welcomed the Initiative and said that it would complement the national rice initiative. Follow-up discussions were held with the DG of IER.

### **1.15 Board Meeting of 2008**

The AfricaRice Board meeting, held in March 2008 in Cotonou, approved the research directions proposed by the Center to urgently address the challenges of the rice crisis and climate change. It appreciated and congratulated the management and staff for a successful EPMP, expressed its satisfaction with improvements in resource mobilization efforts of AfricaRice and approved the 2008 working budget and a prudent investment policy for AfricaRice.

The Board Chair, in consultation with Management, has identified three top international scientists from advanced research institutions to form a Scientific Advisory Committee to the Board in order to maintain AfricaRice's research quality.

### **1.16 CGIAR Change Management Process**

CGIAR is going through an external review. It has also embarked on a reform process regarding its structure, operations, relevance and impact. This process has been undertaken in response to the fast-changing environment, particularly because funding to long-term strategic research in agriculture has drastically decreased.

A Change Management Team with four Working Groups from a wide range of stakeholders has been set up to make the process more inclusive. FARA and CORAF/WECARD are closely involved in all the discussions. Many issues are being debated, including the setting up of a fund for agricultural research, which some of the donors like DFID and CIDA are planning to support.

AfricaRice, through the Board Chair and the DG, is fully engaged in these processes. A AfricaRice Economist is representing young African scientists in one of the working groups. In the Change Management Process, the DG will serve as ad-hoc advisor to the Working Groups.

### **1.17 TICAD IV meeting**

AfricaRice was invited to the TICAD IV meeting in Yokohama, Japan, in May 2008, because of the special importance that Japan gives to AfricaRice in the context of Asia-Africa partnership.

The Chair of the AfricaRice Council of Ministers was requested by the CGIAR to attend the TICAD meeting and issue a TICAD-IV declaration on its behalf, thanking Japan for its support to CGIAR's research and urging the international community to step up investment in agricultural research in view of the food crisis. AfricaRice deeply appreciates the support of the DG of ITRA, Togo, in facilitating this.

The Chair of the AfricaRice Council of Ministers and the AfricaRice DG were invited to speak at the launching of the Coalition for African Rice Development (CARD), which will complement the activities of ARI. AfricaRice DDG-RD participated in the TICAD Experts Meetings and made a presentation on AfricaRice-IRRI research partnership for Africa. Throughout the TICAD proceedings, AfricaRice's research particularly on the development of NERICAs, was highly appreciated and was highlighted in the TICAD-IV Action Plan.

### **1.18 Emergency Rice Initiative with FAO, IFDC, CRS, IFAD and NARS**

AfricaRice in partnership with FAO, IFDC, CRS, IFAD and national partners has launched an Emergency Rice Initiative within the framework of the FAO Soaring Food Prices Initiative. The Emergency Initiative aims to significantly boost rice production in a number of pilot African countries in 2009, thereby reducing the need for rice imports and the associated drain on foreign currency reserves.

This Initiative specifically seeks to improve farmers' access to rice seed, mineral fertilizer, and best-bet knowledge on rice technologies. The Initiative covers 11 pilot countries but other countries are expected to be covered in a second phase. A Program Formulation workshop was held in early June 2008 in Cotonou to develop action plans and budgets per target country. Agricultural experts from the project countries and participants from FAO, IFDC, CRS, IFAD, IRRI, SG2000, AfDB, ROPPA, UNDP, USDA, BOAD, AGRA, BMGF and AfricaRice attended the meeting.

## **2 Research highlights**

### **2.1 New Deputy Director General for Research and Development**

On Dr Shellemiah Keya's retirement, the DG thanked him profusely for his wisdom and hard work that contributed to a successful EPMR. Dr Keya has been retained as the DG's Advisor for one year in order to gain from his long experience with the CGIAR community.



With effect from December 2007, Dr Marco Wopereis was appointed DDG for Research for after a rigorous selection process. He is bringing his vision, experience and youthful dynamism to AfricaRice's research and development activities.

## **2.2 New research structure**

The DDG-RD has proposed a new streamlined research structure, replacing the two previous programs and six projects with four programs, each relating to one MTP project:

- Program 1: Bridging genetic diversity and breeding to produce rice genetic resources adapted to changing environments
- Program 2: Enhancing productivity of rice-based farming while protecting ecosystem services
- Program 3: Stretching farmers' windows of opportunity through partnerships, learning and innovation systems
- Program 4: Rice policy and technology impact on food security and poverty reduction

The new structure was approved by the Board and will be presented to NEC.

The role of Thematic Groups within the Research and Development Division has been further clarified. They should focus on scientific issues, increase and improve publications and proposal writing, organize seminars on specific topics (e.g. research methodologies), and be involved in quality control through an internal peer-review system and a publications review committee.

The Thematic Groups were restructured as follows:

1. Genetic Improvement (biotechnology, biotic and abiotic stresses, plant physiology, plant pathology, breeding, modeling)
2. Integrated Pest Management (entomology, nematology, plant pathology, agronomy, modeling)
3. Crop and Natural Resources Management (agronomy, water management, hydrology, soil science, weed science, modeling)
4. Social Sciences (policy and institutional economics, socio-economics, sociology, anthropology, modeling)

**Annual evaluation and terms of reference for scientists:** In 2008, an annual evaluation process was introduced for all scientific staff and two standard evaluation forms were prepared. Terms of reference for all the scientists have also been developed and shared with them.



### **2.3 Development of a new Strategic Plan**

In response to the dynamics in the rice R & D sector and in keeping with AfricaRice's new vision as well as the recommendations of the 5<sup>th</sup> EPMR, the DDG-RD has initiated the development of a new Strategic Plan for the Center.

The first draft was shared with the Board, which made extensive comments and approved the Plan in principle. It will now be shared with NEC, whose input is extremely important to ensure that our new Strategic Plan responds to the needs of our member states. Once this is finalized and approved by AfricaRice and its partners, this will replace the Strategic Plan that was developed in 2003.

### **2.4 Joint activities with NARS in 2007**

AfricaRice pursued its mission of collaborating closely with the NARS. A few joint activities are highlighted below:

**Missions and workshops:** About 110 visits were made by AfricaRice scientists to member countries and 15 workshops were held in 2007.

#### **Technology transfer and seed production:**

- 6 training videos on rice production were translated in various African languages and shown in Benin, Burkina Faso, Guinea, Gambia, Mali & Uganda. It is estimated that about 28,500 farmers were reached through these videos.
- 150 tonnes of foundation seed of NERICAs were produced and distributed by ARI
- Production of 4500 tonnes of certified NERICA seed were facilitated in seven ARI pilot countries

#### Varieties released in 2007

- Senegal: 5 Sahel varieties
- Uganda: 2 NERICAs
- Ethiopia: 4 NERICAs

#### Varieties adopted in 2007

- Liberia: 4 NERICAs
- Nigeria: 2 NERICAs

### **2.5 Increased recognition and impact**

AfricaRice and NERICAs continued to receive worldwide publicity in 2007 and 2008 with more than 150 online news reports appearing in BBC, New York Times, The Economist, Le Monde, Jeune Afrique and many other international, regional and African news outlets.

In the context of the rice crisis, the DG prepared a number of articles that were published by the media in West Africa and in France. He has also been extensively interviewed by teleconference by the CGIAR press, RFI, New Scientist, La Dépêche, etc. In addition, a number of AfricaRice scientists have been featured in major international and national media outlets, including Reuters, Bloomberg, and l'Express.

AfricaRice's achievements were recognized at high levels in 2007 & 2008:

- Dr Monty Jones, Father of NERICA, was selected by Time Magazine among the world's most influential persons.
- Benin industrialist Mr Tunde received the FAO prize for NERICA promotion.
- An AfricaRice PhD trainee from Cote d'Ivoire won the Christiane Doré Award.
- Two young women scientists who won the UNESCO-L'OREAL awards – one from Senegal in 2007 and one from Gabon in 2008 – have chosen AfricaRice as the international Center where they are conducting their research.
- Two trainees from Benin won CODESRIA Awards for their theses.
- AfricaRice Ecophysiochemist Dr K. Futakuchi with Dr Sakurai (former AfricaRice scientist) authored a chapter in a book on the rice sector in Ghana which won the 23rd Masayoshi Ohira Memorial Prize
- DG was awarded a Certificate of Honor by CORAF/WECARD during its 20th Anniversary Ceremony “in recognition of his significant contribution to partnership in agricultural research for development in WCA.”
- For the second year running, AfricaRice received a superior rating in the CGIAR Performance Measurement Indicators

In its 2007 report, FAO officially recognized that NERICA was a major factor in the increase in rice production in Africa in 2006 (6% above 2005 level). FAO underlined that substantial production increases were reported in Burkina Faso, The Gambia, Guinea, Mali, Niger, Nigeria, Senegal and Togo. FAO also announced that NERICA was the main factor for the 5% increase in rice production in Guinea in 2007. NERICA was also highlighted several times by the World Bank, particularly in its 2008 Development Report. It received high praise from Japan, IFAD and AGRA.

The EPMR report highly appreciated AfricaRice's achievements in integrated crop management and technologies developed for lowland and irrigated ecologies as well as for uplands.

### 3 Conclusion

The AfricaRice system, which includes the NARS as an integral part, is geared up for an increased pace of progress. However, we need to redouble our efforts, because there are no foregone achievements and major challenges remain to be overcome.

In the near future, we will focus on the following major priorities that will make the AfricaRice system stronger and more relevant:

- Implement effectively the FAO-IFDC-AfricaRice Emergency Rice Plan with the support of donors, NARS and development partners
- Fast-track the preparation of summit for the Dr Yayi Boni Initiative
- Develop a consistent implementation strategy of EPMR recommendations
- Apply the new annual evaluation formulae for scientists using output targets set out in their terms of reference
- Continue advocacy in the member states to recover all arrears
- Finalize the AfricaRice Strategic Plan
- Commission the Marketing Unit
- Launch the Post-Masters Program

# Africa Holds the Future for World Rice Farming

**Dr Papa A. Seck**

*Agricultural Policy and Strategies Specialist  
Director General, Africa Rice Center (AfricaRice)*

There is no doubt that humanity now faces an acute rice crisis that is a serious threat to law and order. This comes as no surprise to us since the huge weight of past evidence and knowledge makes it hard – even inevitable – not to predict this likelihood. For at least the past two years, the Africa Rice Center (AfricaRice) has predicted a rice crisis in Africa from 2008.

The most recent whistle blowing was at the Council of Ministers of AfricaRice member states held in Abuja in September 2007. During that important meeting, AfricaRice's Director General made a presentation on the "*Rice crisis in Africa, myth or reality?*" It clearly emphasized that our continent was heading towards real supply difficulties.

In fact, Africa accounts for 10 to 13 per cent of the world population but consumes 32 per cent of world imports with a consumption growth rate of about 4.5 per cent per annum. This has to be coupled with world stocks at their lowest level for 25 years, with less than 2 months of reserves, of which half are kept in China.

It must also be emphasized that econometric models were estimating that 2008 prices would at least be double those of 2002. Finally, supply is shrinking steadily. For example, a leading producer such as China which has lost 4 million hectares over 10 years could decide to look for 10 per cent of its requirements on the international markets, representing a 35 per cent share of the total amount traded. This is actually equivalent to Africa's current share.

African governments have taken many initiatives but it has to be accepted and underlined that – just as in other parts of the world – we were powerless to stop this major event.

The rice crisis is a structural one that is likely to be long and hard because Asia is less and less capable of feeding the world. An analysis of the last 10 years shows that world consumption is increasing on average by 1 per cent per annum and productivity by 0.5 per cent. The crisis might therefore be the cumulative effect of these annual shortfalls.

We at AfricaRice are convinced that the future for rice farming lies in Africa. Unlike Asia this continent has a great untapped potential, which can be seen in its vast stretches of land and its barely-used water resources (Zambia, DRC, Sierra Leone, Mali, Senegal, etc.). For example, sub-Saharan Africa has 130 million hectares of lowlands but just 3.9 Mha are under cultivation.

On the other hand, the challenge in Asia is not about increasing the rice area but rather about maintaining it. The competitiveness of local rice production in sub-Saharan Africa is now a fact as demonstrated by comparing the yields achieved in Thailand and Vietnam with those recorded in Senegal, Mali and Niger. Old prejudices about Africa's cost and quality competitiveness belong to the past. The real problems of today lie elsewhere.

Africa needs to break from the past and abandon the 'fire engine' approach to crisis management in favor of rational and considered reflection on what has taken place, followed by concrete steps to recovery. Viewed in this light, this crisis becomes an opportunity to think and act out of the box to feed ourselves on a self-sustaining basis. The questions to be faced are simple: what are the problems and what should be done?

In the short term, the measures taken by several African governments to reduce tariffs and introduce mechanisms aimed at openness in the markets are justified. Governments must however be more pro-poor focused. They must also immediately start thinking about and taking medium- and long-term action, because the recurrent issues will be more and more allied to resource availability than to access to resources.

In this respect, the following points can be made:

**1. Significantly increase the share of high-yielding irrigated rice farming in production:**

Irrigated areas in Africa currently account for less than 10 per cent of the total rice area compared to more than 50 per cent in Asia. Irrigated rice farming allows farmers to obtain very high yields (3 to 4 times higher than for rainfed rice) and to double-crop.

**2. Promote the use of varieties such as NERICA®:** NERICA (a range of varieties developed by AfricaRice through crossing African rice with Asian rice) offers a marked increase in yields in a number of ecosystems, a shorter cycle (less than 50 days compared to traditional varieties) and a protein value which is higher by 25 per cent than in imported rice. Today there are 18 varieties of NERICA developed for uplands and 60 for lowlands, which have been released in 20 African countries. Streamlining and fast tracking the procedures for releasing these varieties through the use of the participatory methods advocated by AfricaRice should be approved by all African countries to reduce the adoption process by several years.

**3. Increase access to improved seed:** Seed availability is one of the major constraints to the successful use of improved varieties such as NERICA. The following measures, among others, are necessary to overcome this: (i) enact standard laws for seed and define efficient mechanisms for seed control and certification, and ensure their implementation; (ii) set up a seed legislation system to support private sector involvement in seed supply and trade; (iii) support national agricultural research systems (NARS) to produce breeder's seed and foundation seed.

**4. Improve cropping practices:** AfricaRice and its partners have highlighted the possibility of increasing yields in farmers' fields through integrated management of the rice campaign and alternative practices covering land preparation to harvest. Yield gains from one to two tonnes per hectare have been made in irrigated systems and lowlands without any significant increase in production costs; the improvements specifically focus on soil fertility management and weed control.

**5. Reduce harvest and post-harvest losses:** Harvest and post-harvest losses (in both quantity and quality) account for 15 to 50 per cent of the market value of production. Making efficient equipment available to operators and training them is therefore the only way to reduce losses and to improve quality together with links between the various participants in the rice value chain.

**6. Strengthen research and extension systems and their links:** Establishing a platform for stakeholders in the rice sector, a national rice program support fund and adequate funding for rice research and extension systems seem to us the major thrusts to be considered.

**7. Fortify support for the rice sector:** International trade is being deregulated. Until recently, the 11,000 rice farmers in North America received subsidies worth US\$1.4 billion per year. Meanwhile, seven million African rice farmers keep on battling in a liberalized market without any subsidy and with limited access to credit, to inputs and market information.

It is evident that rural African stakeholders like their counterparts all around the world need substantial help.

**8. Improve our infrastructure to reduce the high cost of inputs:** Fertilizer prices in Africa are generally two to six times higher than prices in Asia, Europe and North America, mainly due to high transportation charges. This imposes real limits to the smart use of intensification to boost African rice productivity.

## Conclusion

Africa has to understand that it must secure supplies of rice that are sufficient in quantity and satisfactory in quality, while making home-grown rice both rewarding for producers and affordable by the poorest consumers. This is the price that has to be paid to escape being taken "hostage" by world prices. It is no secret that competitive and sustainable agriculture is achieved through cleverly combining three factors: efficient technologies, solid infrastructure and an enabling environment. Yes, it is possible to reverse the trends, but in the medium term.

## **ANNEX II**

### **Resolutions of the 26th Ordinary Session of the Council of Ministers of AfricaRice**

**27-28 September 2007, Abuja, Nigeria**

#### **Resolution 1: Congratulations to Director General of AfricaRice**

The Council of Ministers,

- Considering the efforts made by the Director General since his appointment to revamp the Center's activities;
- Considering the enthusiasm and impetus generated within the Center by the new vision of the Director General, fostering specifically Center competitiveness and capacity to address member states' concerns and expectations;

*Warmly congratulates the Director General for his accountability and leadership.*

#### **Resolution 2: AfricaRice/IRRI/CIAT programmatic alignment in Africa**

The Council of Ministers,

- Considering that AfricaRice, IRRI and CIAT mandates involve rice sector research and development activities;
- Considering that all three Centers are supported by the Consultative Group on International Agricultural Research (CGIAR);
- Considering the meaningful results achieved by IRRI in Asia, CIAT in Latin America and AfricaRice in Africa;

*Welcomes the materialization of the AfricaRice, IRRI and CIAT programmatic alignment for a greater synergy and complementarity to meet Africa's rice needs;*

*Seeks the furtherance and widening of the activities of these three Centers to improve the performance of the African rice sector.*

#### **Resolution 3: Payment of contributions by member states**

The Council of Ministers,

- Having noted efforts made by AfricaRice management to recover contributions from member states;
- Having noted the significant increase in the amounts recovered;

*Congratulates the member states that have paid up their contributions;*

*Urges those that have not yet paid to do so; and*

*Encourages the Director General to continue his program of visits to member states.*

#### **Resolution 4: Resource mobilization from donors**

The Council of Ministers,

- Having noted the meaningful results in resource mobilization from bilateral and multilateral donors by AfricaRice;

*Encourages the AfricaRice Board and management to continue its efforts at increasing and diversifying the Center's external funding sources.*

#### **Resolution 5: Expansion of AfricaRice's geographic mandate**

The Council of Ministers,

- Considering the application for membership by some African States;
- Given the large dissemination and adoption in our continent of the international public goods generated by AfricaRice;
- Considering the continental role of AfricaRice as the "Africa Rice Center";

*Accepts the countries of i) Central African Republic, ii) Congo Brazzaville, iii) Democratic Republic of Congo and iv) Uganda as member states of the Africa Rice Center, extends its congratulations and welcomes them to the AfricaRice family.*

#### **Resolution 6: Post-Masters Program**

The Council of Ministers,

- Considering the need to build African capacity in rice research and development;

*Commends the Director General of AfricaRice for his pioneering initiative and seeks the implementation of the program to develop African skills in scientific research.*

#### **Resolution 7: Production of quality rice seed**

The Council of Ministers,

- Considering the insufficiency of improved rice seeds in Africa and the high demand for quality seeds including those of NERICA varieties;



*Urges AfricaRice to continue its involvement in the production of breeder and foundation rice seed in collaboration with NARS;*

*Recommends that AfricaRice be involved at the regional level in the establishment and harmonization of seed legislation.*

#### **Resolution 8: Marketing and Communications Unit**

The Council of Ministers,

- Considering the significance of an effective communication strategy in the funding of research;
- Considering the need to increase advocacy for local rice production and consumption;

*Endorses the establishment of a Marketing and Communications Unit at AfricaRice to support AfricaRice management and scientists in the search for funding and in the advocacy for African rice.*

#### **Resolution 9: Reform and alliance processes within the Consultative Group on International Agricultural Research (CGIAR)**

The Council of Ministers,

- Takes note of the reform process underway in the Consultative Group on International Agricultural Research (CGIAR);

*Supports all proposals aiming to strengthen AfricaRice as a Center of Excellence for rice sector research and development in Africa.*

#### **Resolution 10: Cooperation with CTA**

The Council of Ministers,

- Considering the critical role of information access in all decision making processes;

*Highly appreciates the support provided by CTA to AfricaRice;*

*Urges both institutions to further develop their cooperation and to implement a multi-annual work plan.*

### **Resolution 11: Consultations with producer organizations**

The Council of Ministers,

- Recognizing the need to strongly associate the users of research in the activities of the Center;

*Recommends that rice producers be involved through their organisations as observers in proceedings of the AfricaRice National Experts Committee (NEC).*

### **Resolution 12: Proposal for a high level international conference on the African rice sector**

The Council of Ministers,

- Considering the strategic significance of rice for food security in Africa;
- Considering the low level of rice needs met from domestic production in Africa;
- Considering the relevance of current initiatives being undertaken in our individual member states to increase domestic rice production;

*Wishes that AfricaRice takes all necessary steps to support the Initiative of President Boni Yayi of Benin for consultations at the level of Heads of States on ways and means to promote rice farming in member countries;*

*Urges all member countries to be involved in large scale exchanges on national strategies to promote rice farming.*

### **Resolution 13: Maintaining AfricaRice headquarters in Côte d'Ivoire**

The Council of Ministers,

*Reaffirms that AfricaRice Headquarters is still at M'bé (Côte d'Ivoire), and that AfricaRice's return will be examined by the competent authorities at the appropriate time;*

*Appreciates efforts by the Government of Côte d'Ivoire to protect the AfricaRice headquarters at M'bé;*

*Urges the Government of Côte d'Ivoire to continue to ensure the security of AfricaRice staff and its campus.*

**Resolution 14: Strengthening collaboration with sub-regional and regional institutions responsible for integration**

The Council of Ministers,

*Urges AfricaRice to work for a greater collaboration with sub-regional and regional economic communities and institutions responsible for African integration (ECOWAS, CEMAC, UEMOA and CEAC) and to benefit from their support.*

**Resolution 15: AfricaRice, a Center of Excellence of the African Union**

The Council of Ministers,

*Reiterates its commitment to take the necessary steps for AfricaRice, as an International Center supported by the CGIAR, to be also recognized as a Center of Excellence of the African Union.*

**Resolution 16: Request by Liberia**

The Council of Ministers,

*Takes note of the request by Liberia for the cancellation of its outstanding contribution;*

*Decides that AfricaRice should examine the matter and offer recommendations consistent with its Articles of Incorporation to facilitate the Council to take a decision on the request at the next Council of Ministers meeting in Togo.*

**Resolution 17: Rotation of Chairmanship of the Council of Ministers**

The Council of Ministers,

Considering Article VI of the AfricaRice Constitution on the Chairmanship of the Council of Ministers;

Considering the proposal for the rotation of the chairman and rapporteurs adopted by the 20<sup>th</sup> Ordinary Session of the Council of Ministers in Niamey, Niger, on September 8, 1995;  
Considering the correction made to the rotation program of chairmanship of the Council adopted in Dakar on August 24, 2001, according to which Togo should assume the chairmanship of the Council and host the 27<sup>th</sup> Ordinary Session;

*Commends Togo for agreeing to assume the chairmanship of the Council of Ministers and host the 27<sup>th</sup> Ordinary Session of Council in 2009;*

*Commends Côte d'Ivoire and Guinea-Bissau for agreeing to serve as rapporteurs at the next meeting of Council.*

Vote of Thanks to His Excellency the President of Nigeria

The Council of Ministers,

- Considering the significant means made available to organizers by His Excellency the President of Nigeria and his Government;
- Considering the successful organization of the Council of Ministers meeting;

*Expresses its sincere gratitude to His Excellency the President, the Government and People of Nigeria for the warm and brotherly welcome extended to all participants.*

*Made in Abuja on 28<sup>th</sup> September 2007*

*The Council of Ministers*

## **ANNEX III**

### **Status of Rice Research Capacity, Technology Adoption and Research Priorities in Member Countries of the Africa Rice Center**

(As presented by the directors general or their representatives of the 22 national agricultural research systems that are member states of AfricaRice)

#### **Background**

The 6th Biennial Regional Consultative Meeting of the National Experts Committee (NEC) of the Africa Rice Center (AfricaRice) was held from 23 to 25 June 2008 in Cotonou, Benin. The NEC comprises the directors general or their representatives of the national agricultural research systems (NARS) in AfricaRice's 22 member countries. This report summarizes data and information related to rice research, technology adoption and rice sector performance for each of AfricaRice's member countries as presented during the NEC meeting held in 2008.

#### **1 Rice research capacity**

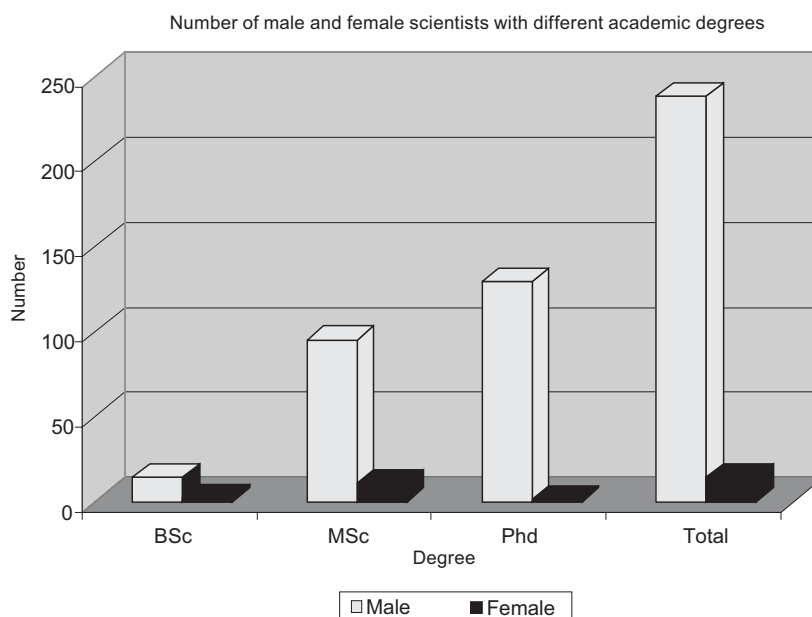
The number of scientists working at least part of their time on rice in each of AfricaRice's member countries is shown in Table 1. The data has to be regarded with great caution, as most scientists will have many other assignments than working on rice. The tables need to be reviewed after an estimation of time allocated to rice research is obtained. The partitioning of scientists by academic degree and sex for the part of the sample where data are available shows that out of 238 male scientists 129 are PhD degree holders, 95 MSc and 14 BSc. The majority of female staff are MSc degree holders. In some countries, no female research staff are reported.

**Table 1:** Number of male and female scientists per AfricaRice member country that are to some extent involved in rice research

Country	Male	Female	Total
Benin	4	0	4
Burkina Faso	12	2	14
Cameroon	16	2	18
Central African Republic	7	0	7
Congo	4	0	4
Côte d' Ivoire	8	0	8
The Gambia	12	1	13
Mali	27	1	28
Mauritania	8	0	8
Niger	7	0	7
Nigeria	27	2	29
Senegal	7	0	7
Sierra Leone	18	3	21
Uganda	9	0	9
Egypt	50	1	51
Democratic Republic of Congo	10	0	10
Guinea	8	2	10
Ghana	20	1	21
Chad	5	0	5
<b>Total</b>	<b>259</b>	<b>15</b>	<b>274</b>

**Table 2:** Male and female NARS researchers according to country and academic degree

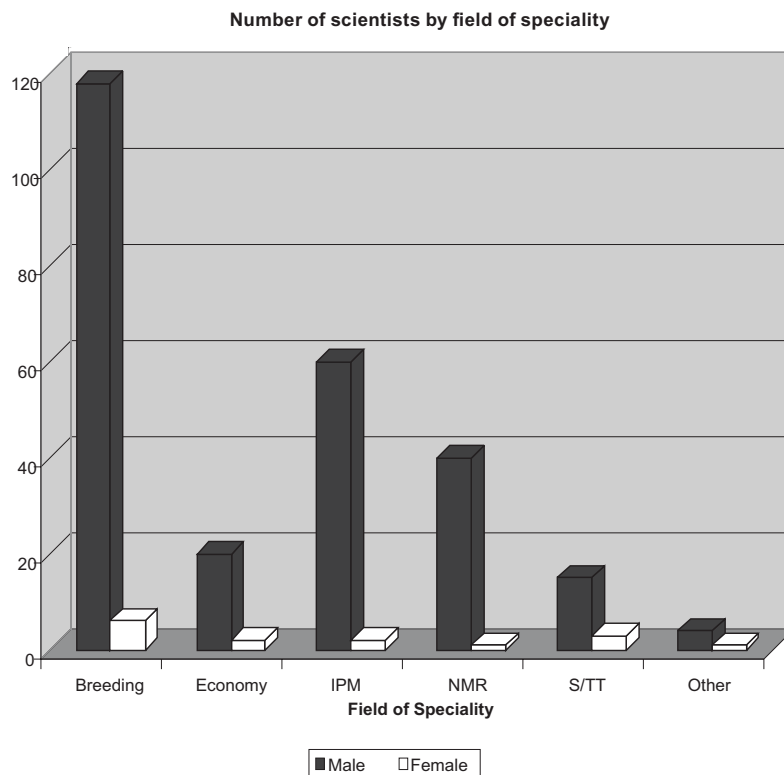
Sex	Country	Degree			Total
		BSc	MSc	PhD	
Male	Benin	0	4	0	4
	Burkina Faso	0	3	9	12
	Cameroon	0	8	8	16
	Central African Republic	0	6	1	7
	Congo	1	1	1	3
	Côte d' Ivoire	0	4	4	8
	The Gambia	0	7	5	12
	Mali	1	16	10	27
	Mauritania	0	8	0	8
	Niger	0	5	2	7
	Nigeria	0	4	23	27
	Senegal	0	3	4	7
	Sierra Leone	0	13	5	18
	Uganda	4	2	3	9
	Egypt	0	0	50	50
	Democratic Republic of Congo	2	8	0	10
	Guinea	5	1	2	8
	Chad	1	2	2	5
	<b>Total</b>	<b>14</b>	<b>95</b>	<b>129</b>	<b>238</b>
Female	Burkina Faso	0	2	0	2
	Cameroon	0	2	0	2
	The Gambia	0	1	0	1
	Mali	0	1	0	1
	Nigeria	0	2	0	2
	Sierra Leone	0	3	0	3
	Egypt	0	0	1	1
	Guinea	2	0	0	2
	<b>Total</b>	<b>2</b>	<b>11</b>	<b>1</b>	<b>14</b>



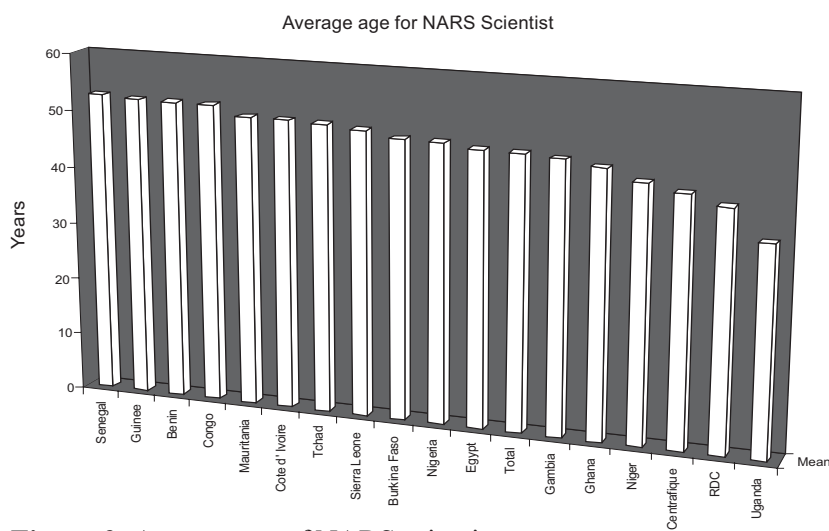
**Figure 1:** Number of male and female scientists with different academic degrees

The number of NARS scientists categorized by their specialization and sex is enlightening. The great majority of scientists are categorized as breeders - 118 male and 6 female. However, these are not all full-time rice breeders, but breeders that work on many crops, including rice. The second most important category are the integrated pest management (IPM) specialists - 60 males and 2 females. Next are the natural resource management (NRM) scientists (41) followed by economists (22). For these groups, male scientists are also dominant. The following six specialty clusters were formed in line with the major research specialties: Breeding; IPM; NRM; S/TT (social science and technology transfer); economics and others (food technology, nutrition, agro-meteorology).





**Figure 2:** Number of scientists by field of specialty



**Figure 3:** Average age of NARS scientists

On an average, NARS scientists are about 48 years old, with clear differences in age profiles in different countries. Uganda has the youngest research staff and Senegal the oldest.

**Table 3:** Average age of NARES scientists

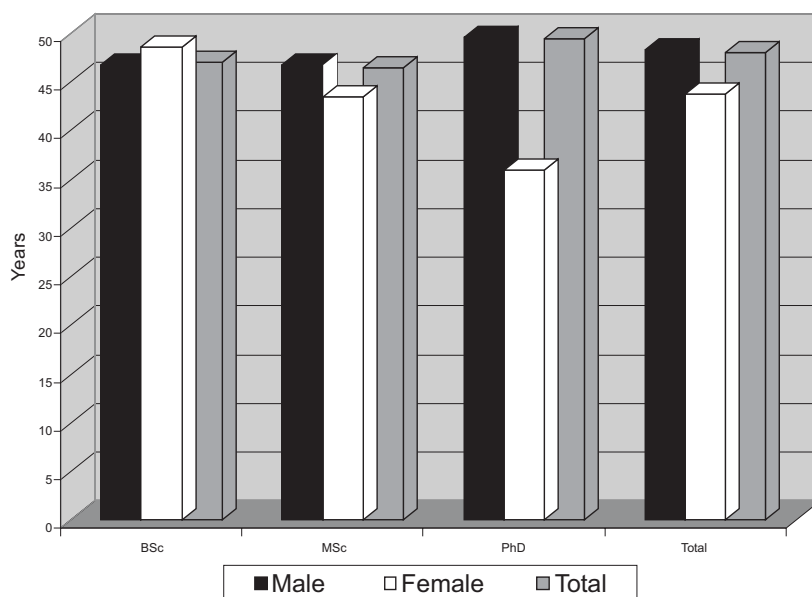
Country	Mean	Number	Std. Deviation
Benin	52	4	1.5
Burkina Faso	49	14	9.3
Central African Republic	43	7	6.2
Congo	52	4	3.9
Côte d' Ivoire	51	8	3.9
The Gambia	48	13	10.2
Mauritania	51	8	9.7
Niger	45	7	4.5
Nigeria	49	22	6.9
Senegal	53	7	4.8
Sierra Leone	50	21	10.4
Uganda	36	9	7.1
Egypt	48	51	9.8
RDC	42	10	8.8
Guinea	52	10	3.8
Ghana	47	16	5.8
Chad	50	5	4.8
<b>Total</b>	<b>48</b>	<b>216</b>	<b>8.6</b>

Other age related statistics are given in Table 4, which shows that in all countries, female scientists are younger than male scientists. While differences between the means are statistically significant for sex and academic qualification, it is not significant for area of specialty.

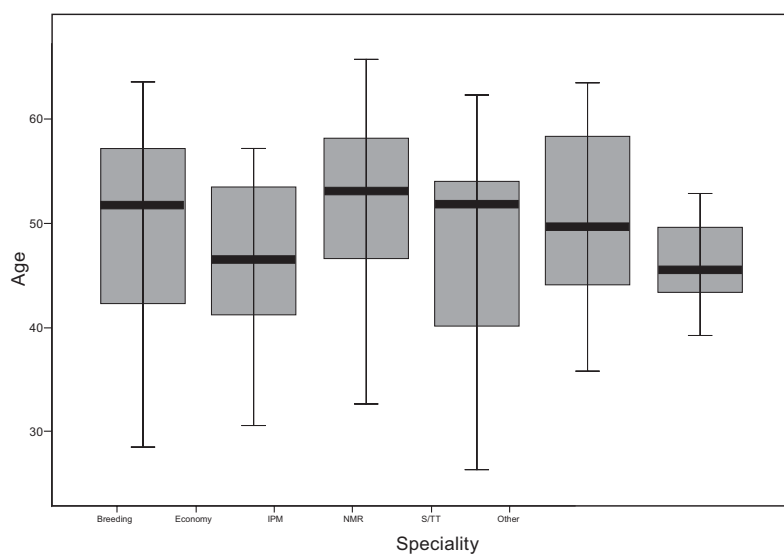
**Table 4:** Other statistics

<b>Sex</b>	<b>Mean age</b>	<b>Number</b>	<b>Std. Deviation</b>
Male	48.2	204	8.50
Female	43.4	12	10.12
<b>Total</b>	<b>47.9</b>	<b>216</b>	<b>8.64</b>
<b>Academic degree</b>			
BSc	47	15	8.4
MSc	46	79	9.3
PhD	49	105	8.4
<b>Total</b>	<b>48</b>	<b>199</b>	<b>8.9</b>
<b>Speciality</b>			
Breeding	48.2	95	8.8
Economy	44.8	16	8.1
IPM	49.7	49	8.0
NRM	45.8	33	9.4
S/TT	48.5	16	8.8
Other	44.6	5	5.1
<b>Total</b>	<b>47.9</b>	<b>214</b>	<b>8.7</b>

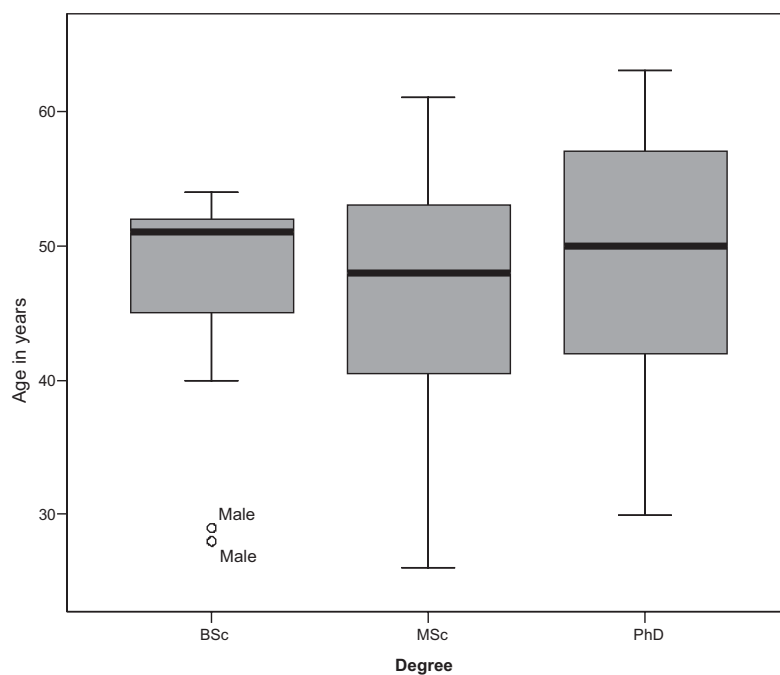
The average age by sex and by academic degree shows that female scientists holding a BSc degree are on average a little older than their male colleagues while the reverse is true for staff with MSc degree. For the total sample, female rice scientists are younger than male scientists. Several reasons can explain why most of the female scientists remain at BSc level: they quickly become housewives, or members of households with large family sizes; or sometimes they lack the opportunity to undertake advanced studies.



**Figure 4:** Average age for NARS scientists by academic degree and by sex



**Figure 5:** Box plots for NARS scientists' age in relation to speciality



**Figure 6:** Box plots for NARS scientists in relation to academic degree

## 2. Total approximate budget devoted to rice research

The total approximate annual budget devoted to rice research presented in Table 5 shows vastly different figures, implying that countries have different research priorities. There are also difficulties in identifying which part of a research project or budget is devoted to rice research. The data reflects what was reported by the directors general of the NARS, but should be interpreted with great caution.

**Table 5:** Budget devoted to research by member countries

Country	Budget amount	Budget unit	Budget currency	Rate of currency to USD	Budget in USD
Benin	100	Million	FCFA	500	200,000
Cameroon	25	Million	FCFA	500	50,000
Central African Republic	1	Million	CFA	500	2,000
Congo	3	Million	FCFA	500	6,000
Côte d'Ivoire	8	Billion	FCFA	500	16,000,000
Egypt	6	Million	EGP	5.63183	1,065,373
The Gambia	11	Million	USD	1	11,000,000
Guinea	164,527		Euro	1.259	130,681
Liberia	1.3	Million	LRD	64	20,313
Mali	300	Million	FCFA	500	600,000
Mauritania	100	Thousand	USD		100,000
Niger	20	Million	FCFA	500	40,000
Nigeria	68.5	Million	Naira	148	462,838
Senegal	70	Thousand	USD		70,000
Sierra Leone	2	Billion	Le		677,966
Togo	5	Million	FCFA	500	10,000

Source: VI<sup>th</sup> . NEC Meeting held from 23 to 25 June 2008 in Cotonou, Benin

### **3 Most popular rice varieties cultivated (local and improved)**

The most popular rice varieties cultivated in the different rice growing ecologies were identified.

#### **Most popular lowland rice varieties cultivated**

Table 6 gives a list of 24 lowland rice varieties cultivated in 11 countries, with several countries cultivating the same improved lowland varieties.

**Table 6:** List of the most popular lowland rice varieties cultivated

Countries	Name of variety	Ecology	Year of release	Area (Estimate), Ha
Benin	I1365	Lowland	NA	NA
	BERIS21	Lowland	NA	NA
	BL19	Lowland	NA	NA
	Gambiaka	Lowland	NA	NA
	IR841	Lowland	NA	NA
	WITA4	Lowland	NA	NA
Burkina-Faso	FKR19	Lowland	1994	Evaluation in progress
Central African Republic	BG 90-2	Lowland	NA	NA
Côte d'Ivoire	Bouaké 189	Lowland	1977	
	WAB 638-1	Lowland	1992	
	WITA 9	Mixed	1992	
The Gambia	ROK 3	Upland and lowland	1974	-
	ROK 31	Lowland (rainfed)	1978	-
Liberia	FKR 19	Lowland		
Mali	BW 348	Lowland	-	
	Khao dawk mali	Lowland	1999	
	Mut 93 -2 -2- 4- 1	Lowland	1999	
	Sik 131	Lowland	1999	
	Swétassoké	Lowland	1999	
Niger	Sintane Diofor	Lowland	1970	-
Nigeria	FARO 44 (Sipi)	Lowland	1996	NA
	FARO 52 (WITA 4)	Lowland	2001	NA
Sierra Leone	ROK 3	Upland and lowland	1974	-
	ROK 31	Lowland (rainfed)	1978	-
Togo	Dapango	Lowland		
	IR 841 (aromatique)	Irrigated / Lowland		
	TGR 203 /WITA 4	Lowland		

For example, FKR 19 is cultivated in Burkina Faso and Liberia, IR841 in Benin and Togo, and WITA 4 in Benin, Nigeria, and Togo (Table 7). This could be the outcome of regional collaborative research activities between AfricaRice and the NARS, mostly through the breeding task force. This table also highlights the important fact that many countries lack

information on the year of release and the number of hectares cultivated to some of the varieties. Since the yield potential and the area cultivated to a variety are indicators of the potential contribution of that variety for boosting domestic rice production, efforts should be made to generate this type of information, even if it has to start with a regional pilot project.

**Table 7:** Lowland rice varieties cultivated in several countries

Name of variety	Countries	Ecology	Year of release	Area (Estimate) in hectares
FKR 19	Liberia	Lowland	-	
	Burkina-Faso	Lowland	1994	Evaluation in progress
IR 841 (aromatic)	Togo	Irrigated / Lowland		
	Benin	Lowland	NA	NA
WITA 4	Togo	Lowland	-	
	Nigeria	Lowland	2001	NA
	Benin	Lowland	NA	NA

### Most popular irrigated rice varieties cultivated

As many as 50 irrigated rice varieties are cultivated (Table 8) in nine countries (Burkina Faso, Cameroon, Egypt, The Gambia, Mali, Mauritania, Niger, Senegal, and Togo). Out of these, 16 are grown in Egypt, the only country for which detailed statistics are available on the area cultivated for each variety (Table 8). It is hypothesized that this lack of information could be due to several factors, including the lack of a systematic monitoring system for the varietal dissemination process, and the informal farmer to farmer exchange of seed.

**Table 8:** Most popular irrigated rice varieties cultivated

Countries	Name of variety	Ecology	Year of release	Area (Estimate) ha
Burkina-Faso	FKR14	Irrigated	1986	Evaluation in progress
	FKR28	Irrigated	1993	Evaluation in progress
	FKR16	Irrigated	1986	Evaluation in progress
Cameroon	ITA 300	Irrigated	-	
	TOX 3145, 34, 3, 2	Irrigated	-	



Countries	Name of variety	Ecology	Year of release	Area (Estimate) ha
Egypt	Giza 171	Irrigated	1970	5,000,000
	Giza 172	Irrigated	1971	4,500
	Reiho	Irrigated	1984	200,000
	Giza 181	Irrigated	1988	100,000
	Giza 175	Irrigated	1989	400,000
	Giza 176	Irrigated	1991	500,000
	Giza 177	Irrigated	1995	112,000
	Giza 178	Irrigated	1997	116,000
	Sakka 101	Irrigated	1997	272,000
	Sakka 102	Irrigated	1997	34,000
	Egyptian Yasamine	Irrigated	1997	390
	Sakha 103	Irrigated	2000	17,000
	Sakha104	Irrigated	2000	126,000
	Giza 182	Irrigated	2000	100
	Black Rice	Irrigated	2005	10
	Hybrid Rice	Irrigated	2006	2,500
Mali	Kogoni 91-1	Irrigated	1991	
	Adny 11	Irrigated	1987	
	BG 90-2	Irrigated	1985	
	Wassa	Irrigated	1991	
	Nionoka	Irrigated	2000	
	Sahélika	Irrigated	1992	
	Sambala Malo	Irrigated	2004	
	Jama Jigui (Leizong)	Irrigated	1999	
Mauritania	Jaya	Irrigated	1974	In regression
	IR 28	Irrigated	1974	In regression
	Sahel 108	Irrigated	1993	In regression
	Sahel 201	Irrigated	1993	In regression
	Sahel 202	Irrigated	1993	In regression
	IR 1529-680-3	Irrigated	2004	In regression

Countries	Name of variety	Ecology	Year of release	Area (Estimate) ha
Niger	BG 90-2	Irrigated	1982	960
	IR1529-680-3	Irrigated	1971	4,067
	IR54	Irrigated	1982	-
	D5237	Irrigated	1952	-
	WITA 8	Irrigated	1997	1,120
	WITA 9	Irrigated	1997	319
Senegal	Sahel 108	Irrigated	1994	
	Sahel 201	Irrigated	1994	
	Sahel 202	Irrigated	1994	
	Jaya	Irrigated		
	IRIS 529	Irrigated		
	Sahel 202	Irrigated	-	
	Sahel 201	Irrigated	-	
	IKP	Irrigated	-	
	ITA123	Irrigated	1997	
	BG 90-2	Irrigated	1997	
	BW248-1	Irrigated	1997	
	BR51-46-5	Irrigated	1997	
	TCS10	Irrigated	1997	
Togo	IR 841 (aromatic)	Irrigated / Lowland	-	-
The Gambia	BG 90-2	Irrigated	1985	1, 000
	IET 3137	Irrigated	1987	3, 000
	RAS1	Irrigated / lowland	1989	4, 000
	IR 64	Irrigated / lowland	1989	500

Table 9 shows the irrigated rice varieties that are cultivated in more than one country: BG 90-2 in Mali, Niger, The Gambia, and Senegal; IR 1529 in Mauritania and Niger; Jaya, Sahel 108, Sahel 201, and Sahel 202 in Mauritania and Senegal. The irrigated rice growing system is relatively homogenous, despite the variation in soil physical conditions, water and crop management systems, and biotic constraints. Therefore, their performances under normal conditions should be comparable to the performance in farmers' fields.

**Table 9:** Irrigated rice varieties cultivated in several countries

Name of variety	Countries	Ecology	Year of release	Area (Estimate), ha
BG 90-2	Gambia	Irrigated	1985	1, 000
	Mali	Irrigated	1985	
	Niger	Irrigated	1982	960
	Senegal	Irrigated	1997	
IR 1529	Mauritania	Irrigated	2004	In regression
	Niger	Irrigated	1971	4,067
Jaya	Mauritania	Irrigated	1974	In regression
	Senegal	Irrigated		
Sahel 108	Mauritania	Irrigated	1993	In regression
	Senegal	Irrigated	1994	
Sahel 201	Mauritania	Irrigated	1993	In regression
	Senegal	Irrigated	1994	
Sahel 202	Mauritania	Irrigated	1993	In regression
	Senegal	Irrigated	1994	

### Most popular upland rice varieties cultivated

Table 10 shows that 38 upland rice varieties (both improved and local) were reported by 13 countries, the most common being NERICA 1, 2, 3, 4, 5, 6, 7, and 8, WAB 56-50, WAB 56-104 and WAB 181-18. The year of varietal release is a crucial piece of data that is missing for a few countries (Cameroon, Congo, Liberia, and Togo) and to some extent Côte d' Ivoire. Estimates of the area cultivated are also missing for this particular ecology for most countries. The development and incorporation of GIS tools will probably improve data collection on area cultivated to each variety. There is a need for a collaborative pilot project in this area.

**Table 10:** Most popular upland rice varieties cultivated

Countries	Name of variety	Ecology	Year of release	Area (Estimate), ha
Benin	NERICA 1	Upland	2004	
	NERICA 2	Upland	2004	
Burkina-Faso	FKR 33	Upland	1992	Evaluation in progress
	FKR 43	Upland	2003	Evaluation in progress

Countries	Name of variety	Ecology	Year of release	Area (Estimate), ha
Cameroon	NERICA 3	Upland		
	WAB 56-50	Upland		
Central African Republic	IRAT144	Upland	NA	
	IRAT170	Upland	NA	
	IRAT213	Upland	NA	
	IRAT216	Upland	NA	
	TCS10	Upland	NA	
Congo	Dourado precoce	Upland		500
	Igouape calelo	Upland		1,000
	IRAT 144	Upland		500
Côte d'Ivoire	Aziko	Upland		
	Digbeu Gbassou	Upland		
	Dogore	Upland		
	Gokli	Upland		
	IDSA 10	Upland	1983	
	IDSA 78	Upland	1997	
	IDSA 85	Upland	1991	
	Kimisere	Upland		
	Lokple	Upland		
	NERICA 1	Upland	1994	
	NERICA 2	Upland	1994	
	Non Non Non	Upland		
	WAB 56-50	Upland	1989	
The Gambia	Peking	Upland	1985	2, 000
	NERICA (1-6)	Upland	2005	800
	PRASANA	Upland	1980	1, 000
Liberia	NERICA 1	Upland		
	NERICA 2	Upland		
	NERICA 4	Upland		
	NERICA 7	Upland		
	NERICA 8	Upland		

Countries	Name of variety	Ecology	Year of release	Area (Estimate), ha
Mali	Kumabani (WAB 189 B.B.B.8HB)	Upland	2004	
	NERICA 4 (Dususuma)	Upland	2004	
	Sikasoka (WAB 181 18)	Upland	2004	
	WAB 56-104	Upland	2004	
Nigeria	ITA 150	Upland	1996	
	NERICA 1	Upland	2003	
Senegal	IKP	Upland		
	Tox 728-1	Upland	1997	
	DJ 11-509	Upland (strict)	1997	
	DJ 8-341	Upland (strict)	1997	
Sierra Leone	DC Kono (local)	Upland	-	-
	ROK 17	Upland	1978	-
	ROK 16	Upland	1978	-
	ROK 3	Upland and lowland	1974	-
Togo	NERICA 1 (aromatic)	Upland		
	NERICA 4	Upland		
	O. glaberrima varieties	Upland		

NERICA 1 is cultivated in Benin, Côte d'Ivoire, The Gambia, Liberia, Nigeria, and Togo, while WAB 56-50 is grown in Cameroon and Côte d'Ivoire (Table 11). Knowledge of the extent of varietal dissemination in terms of cultivated area is also important in this case for effectively evaluating the mechanism through which the varieties were released. For example, the NERICA varieties were introduced in Côte d'Ivoire in 1994, the same year in which NERICA 1 and 2 were released in that country.

**Table 11:** Upland rice varieties cultivated by several countries

Name of variety	Countries	Ecology	Year of release	Area (Estimate), ha
IRAT 144	Congo	Upland		500
	Central African Republic	Upland	NA	
NERICA 1	Benin	Upland	2004	
	Côte d'Ivoire	Upland	1994	
	The Gambia	Upland	2005	
	Liberia	Upland		
	Nigeria	Upland	2003	
	Togo	Upland		
NERICA 2	Benin	Upland	2004	
	Côte d'Ivoire	Upland	1994	
	The Gambia	Upland	2005	
	Liberia	Upland		
	Nigeria	Upland	2005	
NERICA 4	Liberia	Upland		
	Togo	Upland		
	The Gambia	Upland	2005	
	Mali	Upland	2004	
WAB 56-50	Cameroon	Upland		
	Côte d'Ivoire	Upland	1989	

N.B: In The Gambia, the total estimated cultivated area for NERICA 1-6 is 800 hectares and NERICA 1 and 2 covered more than 186,000 hectares in Nigeria during 2007.

### **Most popular mangrove rice varieties cultivated**

The mangrove rice growing ecology is mostly found in The Gambia, Sierra Leone, and Senegal and the most popular cultivated improved mangrove rice varieties are Rok and WAR varieties. Some of these varieties are also suitable for the inland valley and boliland (lowland). The Rok varieties were released much earlier (1974-78, 1982) than the WAR varieties (1997, 1992).

**Table 12:** Most popular mangrove rice varieties cultivated

Countries	Name of variety	Ecology	Year of release	Area (Estimate), ha
The Gambia	WAR77-3	Mangrove	1992	500
	ROK 5	Mangrove	1982	2500
Senegal	WAR1	Mangrove	1997	
	WAR77-3-2-2	Mangrove	1997	
	WAR81-2-1-3-2	Mangrove	1997	
Sierra Leone	Pa 3-Months	Inland valleys and mangrove swamps	-	-
	Pa Gbessay (Local)	Inland valleys and mangrove swamps	-	-
	ROK 10	Inland valleys, mangrove swamps and Boliland	1978	-
	ROK 21	Mangrove swamps	1978	-
	ROK 22	Mangrove swamps	1978	-
	ROK 24	Inland valleys and mangrove swamps	1978	-
	ROK 5	Inland valleys and mangrove swamps	1974	-

WAR 77-3, is cultivated in The Gambia and Senegal while Rok 5 is cultivated in The Gambia and Sierra Leone (Table 13).

**Table 13:** Mangrove rice varieties cultivated in more than one country

Name of variety	Countries	Ecology	Year of release	Area (estimate), ha
WAR77-3	The Gambia	Mangrove	1992	500
	Senegal	Mangrove	1997	-
ROK 5	The Gambia	Mangrove	1982	2500
	Sierra Leone	Inland valleys and mangrove swamps	1974	-

## 4 Rice varieties released/adopted over the last ten years (1997–2007)

### Irrigated rice varieties released/adopted over the last ten years (1997–2007)

The list of irrigated rice varieties released or adopted over the last ten years (1997–2007) (Table 14) shows that many irrigated rice varieties are cultivated in the countries, highlighting the rich biodiversity of rice germplasm in terms of year of official release and number of varieties released. However, information on yield and area estimates are lacking. Côte d'Ivoire

cultivates Bouaké 189; WITA 4 is cultivated in Benin, Nigeria, and Chad; WITA 8 and WITA 9 are cultivated in Niger; while the Sahel varieties are mostly cultivated in Senegal,.

**Table 14:** Irrigated rice adopted over the last ten years (1997-2007)

Countries	Name	Ecology	Year of official release	Yield, Tonnes/ha	Area (estimate), ha
Benin	11365	Lowland / irrigated			
	BL19	Lowland / irrigated			
	INRAIS88	Lowland / irrigated			
	IR841	Lowland / irrigated			
	WITA 4	Lowland / irrigated			
Burkina Faso	FKR 49N	Lowland / irrigated	2005		Evaluation in progress
	FKR 56N	Lowland / irrigated	2005		Evaluation in progress
	FKR 58N	Lowland / irrigated	2005		Evaluation in progress
	FKR 60N	Lowland / irrigated	2005		Evaluation in progress
Côte d'Ivoire	Bouaké 189	Lowland / irrigated			
Egypt	Black rice	Irrigated	2005		10
	Egyptian Yasmine	Irrigated	1997		390
	Giza 177	Irrigated	1995		112,000
	Giza 178	Irrigated	1997		116,000
	Giza 182	Irrigated	2000		100
	Hybrid rice	Irrigated	2006		2,500
	Sakha 102	Irrigated	1997		34,000
	Sakha 104	Irrigated	2000		126,000
	Sakha 101	Irrigated	1997		272,000
	Sakha 103	Irrigated	2000		17,000
The Gambia	TNS 14	Irrigated / lowland	1997		500
	TNS 19	Irrigated / lowland	2000		400
Mali	Jama Jigui	Irrigated	1999		
	NERICA-L-1-IER	Irrigated	2004		
	NERICA-L-2-IER	Irrigated	2004		
	Nionoka	Irrigated	2000		
	Sambala malo	Irrigated	2004		



Countries	Name	Ecology	Year of official release	Yield, Tonnes/ha	Area (estimate), ha
Mauritania	BG 380-2	Irrigated			
	IR 3941	Irrigated	Dissemination		
	IR 64	Irrigated			
	ITA 222	Irrigated			
	BG 400-1	Irrigated			
Niger	Chiannung Sen Yu 30	Irrigated	2006		-
	Kogoni 91-1 (Gambiaka)	Irrigated	2006		76
	NERICA L-39	Irrigated	2007		50
	NERICA L-49	Irrigated	2007		107
	WAS4-B-B-9-1-4TGR48	Irrigated	2007		30
	WITA 8	Irrigated	1997		1120
	WITA 9	Irrigated	1997		319
	TOX 4004-43-1-2-1 (FARO 57)	Rainfed / irrigated	2005		
	Cisadane (FARO 51)	Rainfed / irrigated	1998		
	WITA 4 (FARO 52)	Rainfed / irrigated	2001		
Senegal	Sahel 134	Irrigated	2006		
	Sahel 159	Irrigated	2006		
	Sahel 208	Irrigated	2006		
	Sahel 209	Irrigated	2006		
	Sahel 210	Irrigated	2006		
	ITA 123	Lowland / irrigated	1997		
	BG 90-2	Lowland / irrigated	1997		
	BW248-1	Lowland / irrigated	1997		
	BR51-46-5	Lowland / irrigated	1997		
Chad	Tox 728-1	Irrigated		4	
	WITA 4	Irrigated		4.5	

### **Lowland varieties released / adopted over the last ten years (1997–2007)**

Different varieties are grown in the lowland rice growing ecosystem in the various countries. However some lowland rice varieties are also cultivated in irrigated rice growing environments

(Table 15). In the specific case of Togo, some lowland NERICA varieties (NERICA L-14, NERICA L-19, and NERICA L-20) are cultivated under irrigated conditions. WITA 4 and Bouaké 189 are cultivated under both lowland and irrigated rice growing conditions.

**Table 15:** Lowland rice adopted over the last ten years (1997–2007)

Countries	Name	Ecology	Year of official release	Yield, Tonnes/ha	Area (estimate), ha
Benin	I1365	Lowland / irrigated			
	BL19	Lowland / irrigated			
	INRAIS88	Lowland / irrigated			
	IR841	Lowland / irrigated			
	WITA 4	Lowland / irrigated			
Burkina Faso	FKR 52	Lowland	2004		Evaluation in progress
	FKR 49N	Lowland / irrigated	2005		Evaluation in progress
	FKR 56N	Lowland / irrigated	2005		Evaluation in progress
	FKR 58N	Lowland / irrigated	2005		Evaluation in progress
	FKR 60N	Lowland / irrigated	2005		Evaluation in progress
Côte d'Ivoire	Bouaké 189	Lowland / irrigated			
The Gambia	TNS 14	Irrigated / lowland	1997		500
	TNS 19	Irrigated / lowland	2000		400
Guinea	Variétés CK	Lowland			
Mali	BW 348	Lowland	-		
	Mut 93 -2 -2- 4- 1	Lowland	1999		
	Sik 131	Lowland	1999		
	Swétassoké	Lowland	1999		
	Khao dawk mali	Lowland	1999		
Senegal	ITA 123	Lowland / irrigated	1997		
	BG 90-2	Lowland / irrigated	1997		
	BW248-1	Lowland / irrigated	1997		
	BR51-46-5	Lowland / irrigated	1997		

Countries	Name	Ecology	Year of official release	Yield, Tonnes/ha	Area (estimate), ha
Chad	BW 348-1	Lowland		4.5	
	FARO 20	Lowland		3.7	
	ITA 222	Lowland		5	
Togo	WITA 4 (TGR 203)	Lowland		6 -7	
	NERICA L-14	Lowland		4 - 5	
	NERICA L-19	Lowland		4 - 5	
	NERICA L-20	Lowland		4 - 5	

#### **Upland varieties released / adopted over the last ten years (1997–2007)**

More than 38 upland varieties, including the NERICA and WAB series, were listed (Table 16) but data on yield and estimated cultivated area are missing. There is a need to introduce a new and efficient advanced technology for rice data and information collection using GIS tools to quickly gather these important data.

**Table 16:** Upland rice adopted over the last ten years (1997–2007)

Countries	Name	Ecology	Year of official release	Yield, Tonnes/ha	Area (estimate), ha
Benin	IRAT136	Upland			
	NERICA 1	Upland	2004		1500
	NERICA 2	Upland	2004		1500
Burkina-Faso	FKR 43	Upland	2002		Evaluation in progress
	FKR 45N	Upland	2005		Evaluation in progress
	FKR 47N	Upland	2005		Evaluation in progress
	FKR 54	Upland	2004		Evaluation in progress
Congo	Dourado précoce	Upland	1983		500
	Igouape cateto	Upland	1985		1000
	IRAT 144	Upland	1990		500

Countries	Name	Ecology	Year of official release	Yield, Tonnes/ha	Area (estimate), ha
Côte d'Ivoire	IDSA 10	Upland			
	IDSA 78	Upland			
	IDSA 85	Upland			
The Gambia	ATM Sel 3	Upland	2003		600
	NERICA 1,2,3,4, 5, 6	Upland	2005		2000
	P 105	Upland	2006		
	P 106	Upland	2006		-
	WAB 56-50	Upland	-		-
	WAB 56-104	Upland	-		-
Guinea	NERICA 1	Upland			
	NERICA 2	Upland			
	NERICA 3	Upland			
	NERICA 4	Upland			
	Variétés CK	Upland			
Mali	NERICA 4 (Dususuma)	Upland	2004		
	WAB 181 18 (Sikasoka)	Upland	2004		
	WAB 189 (Kumabani)	Upland	2004		
	WAB 56 104 ( Jigifa)	Upland	2004		
Nigeria	ITA 321 (FARO 53)	Upland	2003		
	NERICA 1 (FARO 55)	Upland	2003		
	NERICA 2 (FARO 56)	Upland	2005		
	WAB189-B-B-B-8-HB (FARO 54 )	Upland	2003		
Senegal	DJ11-509	Upland	1997		
	DJ8-341	Upland	1997		
	TOX 728-1	Upland	1997		

Countries	Name	Ecology	Year of official release	Yield, Tonnes/ha	Area (estimate), ha
Sierra Leone	NERICA 1	Upland	-		-
	NERICA 3	Upland	-	-	
	NERICA 4	Upland	-	-	
	NERICA 6	Upland	-	-	
	WAB 515-B-16A2-2	Upland	-		-
	WAB 56-50	Upland	-		-
	WAB 96-1-1	Upland	-		-
Chad	CT6240-12-2-2-3-6P	Upland		2.3	
Togo	NERICA 1 (aromatic)	Upland		3 - 4	
	NERICA 11	Upland		3 - 4	
	NERICA 4	Upland		3 - 3.5	
	NERICA 8	Upland		3	
	WAB 515-2-A (TGR 405)	Upland		3 -3.5	
Uganda	NARIC 1	Upland	2002		
	NARIC 2	Upland	2002		
	NERICA 1	Upland	2007		
	NERICA 10	Upland	2007		
	NERICA 4 (NARIC 3)	Upland	2002		
	NP 2	Upland	1995		
	NP 3	Upland	1995		
	UK 2	Upland	1995		

### **Mangrove varieties released / adopted over the last ten years (1997–2007)**

The cultivation of mangrove rice varieties is reported for only three West African countries - The Gambia, Senegal, and Sierra Leone. Recently released mangrove rice varieties are the different WAR (AfricaRice Rokupr) varieties but there is scanty information on yield and area cultivated (Table 17).

**Table 17:** Mangrove rice adopted over the last ten years (1997–2007)

Countries	Name	Ecology	Year of official release	Yield tonnes/ha	Area (estimate, Ha
The Gambia	WAR77-3	Mangrove	1992		500
	ROK 5	Mangrove	1982		2500
Senegal	WAR 1	Mangrove	1997		
	WAR 77-3-2-2	Mangrove	1997		
	WAR 81-2-1-3-2	Mangrove	1997		
Sierra Leone	WAR 115-1-2-2-1-B-B-1	Mangrove swamp	-		-
	No 1BP 148	Mangrove swamp	-		-
	WAR 77-3-2-2	Mangrove swamp	-		-

## 5 State of dissemination of NERICA varieties

### Upland NERICA varieties

Upland NERICA varieties are cultivated mostly in West Africa (Benin, Burkina Faso, Côte d’Ivoire, The Gambia, Guinea, Liberia, Mali, Nigeria, Senegal, Sierra Leone, and Togo), Cameroon in Central Africa, and Uganda in East Africa. The dissemination process started in 2004/2005 in West Africa and in 2002 in Uganda. The yields reported range from 2.5 to 5.0 tonnes /ha (Table 18). Not much information is available on actual area cultivated but Nigeria has reported an estimated cultivated area of more than 186,000 hectares for NERICA 1 and 2 in 2007; Benin estimated around 9,000 hectares and The Gambia more than 3,000 hectares.

**Table 18:** Status of upland NERICA dissemination

Country	Name	Ecology	Year of official release	Number of hectares	Yield, Tonnes / Ha	Comment
Benin	NERICA 1	Upland	2004			Among the most popular varieties
	NERICA 2	Upland	2004			Among the most popular varieties
	NERICA 4	Upland	2004			Among the most popular varieties
	NERICA 1	Upland		1500		
	NERICA 2	Upland		1500		

Country	Name	Ecology	Year of official release	Number of hectares	Yield, Tonnes / Ha	Comment
	NERICA 4	Upland		1500		
	NERICA 1	Upland	2004	1500		Released/adopted over the last 10 years
	NERICA 2	Upland	2004	1500		Released/adopted over the last 10 years
	NERICA 4	Upland	2004	1500		Released/adopted over the last 10 years
Burkina Faso	NERICA 12 (FKR45N)	Upland		Evaluation in progress		
	NERICA 17 (FKR47N)	Upland		Evaluation in progress		
Cameroon	NERICA 3	Upland			2.5 - 5.0	
Côte d'Ivoire	NERICA 1	Upland				
	NERICA 2	Upland				
The Gambia	NERICA 1	Upland	-			
	NERICA 4	Upland	-			
	NERICA 6	Upland	-			
	NERICA 22 (P 163)	Upland	-			
Guinea	NERICA 1	Upland				
	NERICA 2	Upland				
	NERICA 3	Upland				
	NERICA 4	Upland				
Liberia	NERICA 1	Upland			2.5 – 3.8	
	NERICA 2	Upland			2.5 – 3.8	
	NERICA 4	Upland			2.5 – 3.8	
	NERICA 7	Upland			2.5 – 3.8	
	NERICA 8	Upland			2.5 – 3.8	
Mali	NERICA 4	Upland				Dususuma
	WAB 56 104	Upland				Jiguifa

Country	Name	Ecology	Year of official release	Number of hectares	Yield, Tonnes / Ha	Comment
	WAB 189	Upland				Kumabani
	WAB 181 18	Upland				Sikassoka
Nigeria	NERICA 1 (FARO 55)	Upland	2003	186,411		Released/adopted over the last 10 years
	NERICA 2 (FARO 56)	Upland	2005			Released/adopted over the last 10 years
Senegal	NERICA	Upland				PVS in Kolda and Kedougou - 74 varieties in test
Sierra Leone	NERICA 1	Upland				
	NERICA 3	Upland		820		For all upland NERICA
	NERICA 4	Upland				
	NERICA 6	Upland				
Togo	NERICA 1	Upland			3.0 - 4.0	Aromatic
	NERICA 4	Upland			3 - 3.5	
	NERICA 8	Upland			3.0	
	NERICA 11	Upland			3.0 - 4.0	
Uganda	NERICA 1	Upland	2007			
	NERICA 4 (NARIC 3)	Upland	2002			
	NERICA 10	Upland	2007			

The most popular upland NERICA varieties are NERICA 1, NERICA 4, and NERICA 2, which are cultivated in ARI (African Rice Initiative) member countries and Uganda.

### **NERICA varieties grown in irrigated conditions**

In Burkina Faso, Mali, Niger, and Senegal, the lowland NERICA varieties are being grown in irrigated conditions. In Senegal, three varieties were selected and are undergoing PVS trials in the Senegal River Valley (Table 19). In Niger, two lowland NERICA varieties (NERICA L-49 and L-39) are being grown on 107 ha and 50 ha, respectively, spread across all the 46 irrigated perimeters along the Niger River Valley. In Burkina Faso, four irrigated NERICA varieties (NERICA 13, NERICA L-41, NERICA L-20, and NERICA L-19) are grown. Mali has adopted both NERICA L-1 and NERICA L-2.



**Table 19:** State of irrigated NERICA dissemination

Country	Ecology	Variety Name	Year of official release	Number of hectares	Yield, Tonnes / Ha	Comment
Burkina Faso	Lowland / Irrigated	NERICA 13		Evaluation in progress		FKR49N
	Lowland / Irrigated	NERICA L-41		Evaluation in progress		FKR56N
	Lowland / Irrigated	NERICA L-20		Evaluation in progress		FKR60N
	Lowland / Irrigated	NERICA L-19		Evaluation in progress		FKR62N
Mali	Irrigated	NERICA L-1				
	Irrigated	NERICA L-2				
Niger	Irrigated	NERICA L-49	2008	107		NERICA dissemination in all 46 irrigated perimeters
	Irrigated	NERICA L-39	2008	50		NERICA dissemination in all 46 irrigated perimeters
Senegal	Irrigated	NERICA				PVS in Senegal River Valley – 3 varieties

**Lowland NERICA varieties**

Lowland NERICA varieties are cultivated in Benin (150 hectares), Burkina Faso, Sierra Leone (22 hectares), Senegal, and Togo (Table 20). Further information is needed on some of the technical indicators including yield, area covered, and the year of official release. However, in Togo, a range of 4 to 5 tonnes/hectare is given for all the lowland NERICA varieties.

**Table 20:** Lowland NERICA varieties

Country	Ecology	Variety Name	Year of official release	Number of hectares	Yield, Tonnes / Ha	Commentary
Benin	Lowland	NERICA L-20		50		
	Lowland	NERICA L-26		50		
	Lowland	NERICA L-27		50		
Senegal	Lowland					PVS in Fatick and Kedougou ( 64 varieties in test)
Sierra Leone	Lowland	NERICA L-19		22		
Togo	Lowland	NERICA L-14			4.0 - 5.0	
	Lowland	NERICA L-19			4.0 - 5.0	
	Lowland	NERICA L-20			4.0 - 5.0	
Burkina Faso	Lowland / Irrigated	NERICA 13		Evaluation in progress		FKR49N
	Lowland / Irrigated	NERICA L-41		Evaluation in progress		FKR56N
	Lowland / Irrigated	NERICA L-20		Evaluation in progress		FKR60N
	Lowland / Irrigated	NERICA L-19		Evaluation in progress		FKR62N

## 6 Major constraints to rice production

Major constraints to rice production are mostly country-specific with some degree of relationship to each country's rice sector development priorities. On an average most countries reported four main constraints to rice production. First priority constraints are summarized in Table 21 and include lack of or insufficient human resources and lack of sustainable research funding. Other important constraints are the lack of national policy to promote rice production and the lack of technical and economic assessment capacity.

**Table 21:** Main constraints to rice production (first priority)

Countries	Main constraints to rice production (first priority)
Benin	Following the non recruitment of civil servants, there is a shortage of scientists and field technicians
Burkina Faso	Absence of a national policy to promote rice production
Cameroon	Germplasm is not sufficient
Central Africa	Low research capacity of researchers and technicians
Congo	Lack of human resources
Côte d'Ivoire	Inadequate research funding
Egypt	Limited area and water resources, while the population and demand are increasing
The Gambia	Insufficient and unsustainable research funding
Guinea	The capacity for technical and economic assessment is lacking
Liberia	Shortage of trained staff
Mali	Shortage of sustained funding for research
Mauritania	Lack of human resources at different qualification levels
Niger	Lack of specialized researchers both in numbers and quality
Nigeria	Lack of irrigation facilities
Senegal	Shortage of funding to satisfy the increased demand for research activities (not specific though to rice)
Sierra Leone	Insufficient funding to implement research projects
Togo	Insufficient human resources
Uganda	Insects and diseases for upland rice (stalk-eyed flies, termites, stem borers, stink bug, rice mealy bug, rice bug, rice weevil, rice blast, neck blast)

Some second priority constraints were also reported by the countries (Table 22). In addition to some of the constraints from the first list, more technical constraints were cited in this list. Therefore, it can be concluded that the acute problems faced by the countries relate to the critical mass for human resource capacity, shortage of training and sustained funding for rice research activities.

**Table 22:** Main constraints to rice production (second priority)

Countries	Main constraints to rice production (second priority)
Benin	Insufficient funding to implement the national program
Burkina-Faso	Insufficient funding of rice research activities since the end of PNDSA II (the national development program for agricultural services), ROCARIZ and other networks
Cameroon	Funding is not sufficient in relation to rice research objectives
Central Africa	Lack of financial resources
Congo	Lack of financial resources
Côte d'Ivoire	Lack of human and equipment capacities
Egypt	Salinity problems exist in the coastal areas while there are limited sources for salinity tolerance
The Gambia	Lack of a multidisciplinary approach to research to build a critical mass
Guinea	Defining a policy framework
Liberia	Little or no facilities & equipment
Mali	Problem of aging research staff
Mauritania	Insufficient infrastructure and research equipment
Niger	Insufficient financial resources allocated to rice research
Nigeria	Lack of stable electricity supply
Senegal	Lack of critical mass of expertise in some research areas due to “brain drain” in favor of universities, NGOs, etc.
Sierra Leone	Lack of relevant expertise for undertaking research in some disciplines, especially in socio-economic research
Togo	Insufficient funding
Uganda	High labor cost

The third and fourth priority constraints to rice production are given in Table 23 and 24 respectively. These comprise mostly the technical constraints that the countries are facing in addition to the various logistical problems such as the lack of laboratory equipment, transport, and poor research infrastructure. Rice research tends to be “forgotten” in the countries’ overall plans to develop the agricultural sector. However, since rice has become a strategic crop for attaining food security, public investments in favor of rice research should increase considerably, despite the various other demands on governments’ budgets. In the long term, research outputs will positively impact on countries’ food security objectives and hence contribute to save foreign exchange for other priority objectives.

**Table 23 :** Main constraints to rice production (third priority)

<b>Countries</b>	<b>Main constraints to rice production (third priority)</b>
Benin	Low utilization of research outputs due to the low national rice production
Burkina Faso	Biotic constraints: diseases (blast, bacterial leaf blight, RYMV), insects (stem borers, African rice gall midge (AfRGM )), weeds, root nematodes
Cameroon	Insufficient number of researchers which is disproportionate to the diversity of ecologies
Central Africa	Lack of a national seed policy
Congo	Shortage of equipment and vehicles
Côte d'Ivoire	Climate change
Egypt	High mutability of the blast fungus which makes it necessary to have a long term plan to develop a variety with multiple resistant genes
The Gambia	Ineffective implementation of a strategic plan to ensure continuity
Guinea	Necessity to conduct impact studies
Liberia	Limited funding
Mali	Insufficient or lack of equipment (biotechnology laboratory, phytopathology and entomology)
Mauritania	Insufficient financial resources
Niger	Insufficient laboratory equipment
Nigeria	Ill-equipped biotechnology and diagnostic laboratory. Budgetary allocation has been made in the 2008 budget for upgrading of the laboratory
Senegal	Inappropriate conditions for the transfer and adoption of technologies generated through rice research
Sierra Leone	Poor electricity and water supply services as well as the lack of essential laboratory equipment
Togo	Lack of support from donors
Uganda	Drought

**Table 24:** Main constraints to rice production (fourth priority and other constraints)

<b>Countries</b>	<b>Main constraints to rice production (fourth priority and other)</b>
Benin	Non-functioning of the national seed release system and their cataloging
Burkina Faso	Constraints in post harvest activities for improving the quality of locally produced rice due to lack of appropriate equipment and knowledge
Cameroon	Rice sector study has not been carried out to identify the major bottlenecks affecting the sector
Central Africa	Low capacity to add value to technical innovations
Congo	Inadequate training of staff
Côte d'Ivoire	Mastering local rice post harvest quality management
Egypt	Difficulties in producing Japonica hybrid rice due to the lack of restorer Japonicas

Countries	Main constraints to rice production (fourth priority and other)
The Gambia	Poor research infrastructure
Guinea	RYMV
	Participatory research methodology (PVS, PPB, etc.)
	Water managment
	Soil fertility managment
	Post-harvest technology (quality)
	Training of staff
Liberia	Weak governance structure
Mali	Lack of expertise in some research areas (nematology, BLB, physiology, etc.)
Mauritania	National extension system is not very efficient
Niger	Lack of national rice policy
Nigeria	Reduced staff strength due to retirement. However arrangement is in top gear to recruit staff
Sierra Leone	Poor incentives and high staff attrition, especially of young scientists
Togo	Insufficient logistics (transport, computers)
	Stakeholders involvement, land tenure issues, reduction of public investments
Uganda	Availability of rice mills
	African rice gall midge
	Labor
	Marketing
	Other constraints
	Production skill
	Quelea spp
	Striga
	Value addition
	Variety availability and knowledge
	Weeds

## 7 Major research questions currently addressed (2008–2010)

Table 25 presents the major research questions currently being addressed in 2008–2010 (short term) by the various countries.

**Table 25:** Major rice research questions (2008–2010)

Priority level	Countries	Major rice research questions (2008–2010)
1	Benin	Rice Breeding (resistance/tolerance to biotic and abiotic stresses; cooking qualities)
	Burkina –Faso	Rice breeding and varietal selection: Development of varieties adapted to different rice ecologies (upland, lowland, irrigated) with good milling and cooking qualities; high yielding and stable; resistant / tolerant to diseases, insects and abiotic stresses. Adding value to local genetic resources by crossing <i>Oryza sativa</i> x <i>O. glaberrima</i> and development of NERICA varieties with good quality (Basmati, aromatic).
	Cameroon	Breeding of high yielding varieties adapted to different ecologies: cold resistance; resistance to RYMV; blast resistant and resistance to iron toxicity.
	Central African Republic	Conservation and varietal improvement: high yielding varieties targeted to various production systems; resistance to biotic stresses (diseases resistance) and abiotic stresses (drought tolerance).
	Congo	Breeding and varietal improvement
	Côte d’Ivoire	Reconstituting and management of genetic resources; cultivar characterization.
	Egypt	Increasing productivity and production of saline and poor fertile soils
	The Gambia	Varietal improvement for all ecologies
	Guinea	Varietal improvement
	Liberia	Introduction, evaluation & multiplication of new materials
	Mali	Increasing rice production and productivity within different rice growing ecologies through the development and introduction of high yielding varieties with good grain quality.
	Mauritania	Varietal selection
	Niger	Introduction/Development and evaluation of new NERICA generations for irrigated/lowland systems
	Nigeria	Develop non-lodging, early to medium maturing, high yielding, pest and disease resistant/tolerant varieties of rice
	Senegal	Soil fertility management and improvement of cropping techniques for irrigated, upland, and lowland systems

Priority level	Countries	Major rice research questions (2008–2010)
	Sierra Leone	Development of high yielding, pest and disease resistant/tolerant varieties of rice and other crops (sorghum and vegetables) with desirable consumer characteristics
	Chad	RYMV (principal cause for crop losses)
	Togo	Varietal improvement: PVS for NERICA promotion
	Uganda	Adapted and disease resistant varieties
2	Benin	Development of low cost complementary technologies to motivate small scale producers to use inputs and research outputs.
	Burkina Faso	Agronomy and cropping techniques: research on rice fertilization; development of specific rice fertilization recommendation; adding value to natural resources (Burkina phosphate, organic matter)
	Cameroon	Evaluate the new NERICA varieties
	Central African Republic	Integrated pest management
	Congo	Phytopathology
	Côte d'Ivoire	Improving the productivity of local preferred cultivars
	Egypt	Increasing productivity and production of saline and poor fertile soils
	The Gambia	Development of drought-tolerant rice (upland system)
	Guinea	Control of diseases and pests
	Liberia	Establish viable seed certification & legislation
	Mali	Integrated water management
	Mauritania	Competitiveness of rice production
	Niger	RYMV, BLB
	Nigeria	Develop rice varieties with acceptable cooking and eating qualities
	Senegal	Stress control in irrigated, upland, and lowland systems (salinity, alkalinity, temperatures, low rainfall) through the introduction of material adapted to the different rice growing ecologies
	Sierra Leone	Characterize crop production environments and develop sustainable crop and soil fertility management practices
	Togo	Conservation of genetic resources
	Uganda	Development of drought tolerant varieties
3	Benin	Development of participatory seed production and certification.
	Burkina Faso	Irrigation and water management: Rice irrigation water management, Upland rice agro-climatic characterization.
	Cameroon	Development sustainable cropping systems (through participatory research)
	Central African Republic	Improvement of productions techniques
	Congo	Production and conservation of seeds



Priority level	Countries	Major rice research questions (2008–2010)
	Côte d'Ivoire	Fertility management in rice production : organic and mineral fertilization
	Egypt	Exploit and commercialize hybrid rice varieties >12t/ha
	The Gambia	Yield and grain quality (lowland system)
	Guinea	Eco-agriculture
	Liberia	Release of varieties to farmers
	Mali	Cropping systems and cultural techniques : crop rotations and development of appropriate small equipment that can help easy
	Mauritania	Fight against weeds and rice pests
	Niger	Research on tolerant / resistant varieties to soil salinity
	Nigeria	Improve cultural practices for rice crop management
	Senegal	Updating of knowledge on the functioning, strategies, and dynamism of rice sector in the context of food crisis
	Sierra Leone	Understanding the socio economic constraint and opportunities to increase production, processing and marketing.
	Togo	Plant protection (weeds, diseases, insects)
	Uganda	Improvement of threshing ability
4	Benin	Development of rice processing techniques for value added rice-based products
	Burkina Faso	Agricultural, social and economic analyses: Social profitability analysis of rice research and extension, Social profitability of developed technologies
	Cameroon	Development of appropriate crop management techniques
	Central African Republic	To contribute to technology transfer: breeder and foundation seeds to establish / reinforce seed producer network
	Congo	Rice processing
	Côte d'Ivoire	Defining fertilization recommendation appropriate to different ecologies
	Egypt	Genetic resistance to blast disease which affected the top high yielding varieties (SK 101 and SK 104)
	The Gambia	Salinity tolerant varieties for the lowland swamps
	Guinea	Post-harvest technologies
	Liberia	Partnership with other institutions & stakeholders
	Mali	Integrated management of soil fertility and integrated pest management (weeds, insects, diseases)
	Mauritania	Salinity and alkalinity of rice soils
	Niger	Impact and adoption studies of new rice technologies
	Nigeria	Develop efficient methods of improving soil fertility in rice soils
	Senegal	Evaluation and introduction of NERICA varieties in irrigated, upland, and lowland systems
	Sierra Leone	Facilitate effective and sustainable systems for transfer of improved technologies to small and medium scale farmers

Priority level	Countries	Major rice research questions (2008–2010)
	Togo	Cropping systems management
	Uganda	Improved grain quality
5	Burkina Faso	Crop protection: Bio-ecology / epidemiology of principal rice pest and diseases (insects, nematodes, fungus, bacteria, virus, weeds) Development of technological package for integrated management of pest and diseases, Research on sources of resistance within local and introduced materials, Molecular mechanisms of RYMV pathogen to escape high resistance of rice to the disease.
	Côte d'Ivoire	Development of integrated management methods of blast and RYMV
	Egypt	Emphasize on producing more clean rice with less water and fertilizers
	The Gambia	Research on biotic stress in upland and lowland systems
	Guinea	Rice sector study
	Mali	Management of aquatic weeds
	Mauritania	Irrigation water management
	Nigeria	Develop appropriate techniques for pest and disease management
	Togo	Lowland management, Evaluation of costs of production
	Uganda	Current crop management research
Other Priorities	Côte d'Ivoire	Technology transfer optimization Evaluation of the impact of the new rice varieties
	The Gambia	Soil fertility maintenance in the uplands and lowlands
	Guinea	Impact studies Human Resources Training Equipments Exploiting research results Communication Partnership reinforcement
	Nigeria	Develop small-scale farm implements for rice production Train extension workers and farmers on improved technology for rice production Improve on the rice processing methods
	Uganda	Variety evaluation to identify superior upland & lowland varieties , Non-NERICA for upland & lowland conditions Fertilizer response trials Seeding rate trials Weed control (herbicide pre-screening) Water application trials

## 8. Major research questions for the future (2011–2020) to be addressed (long term)

**Table 26 :** Major rice research questions (2011–2020)

Priority level	Countries	Major rice research questions (2011–2020)
1	Benin	Participatory approach to promote the use of small scale processing unit by women
	Egypt	Maximizing the yield/unit area (more than 10t /ha) by developing either inbred and hybrid varieties.
	Congo	Appropriate research infrastructure.
	Burkina Faso	Follow up on short term activities in breeding and varietal improvement
	Côte d'Ivoire	Continuation of research activities undertaken during 2008-2010
	Uganda	Adapted high yielding lowland and irrigated
	Mali	Increase rice production through the introduction and the development of high performing material
	Niger	Development / introduction and evaluation of new lowland / irrigated NERICA generation
	Senegal	Soil related constraints, salinity, acidity, nutrients deficit or toxicity (Casamance)
	Central African Republic	Rice sector studies in order to improve the sector performance
	Liberia	Post-harvest & value addition
	Sierra Leone	Development of adaptable rice and other crop varieties with desirable characteristics for low input agricultural systems
	Mauritania	Biotic (insects) and abiotic resistance (climate)
	Nigeria	Training of scientists and technicians on skills acquisition in rice research
	Chad	Use of the cultivable land potential estimated at 39 million hectares
	Togo	Varietal improvement and seed production
	The Gambia	Climate change adaptation (cold, drought, submergence tolerance)
2	Benin	Soil fertility management and development of economic fertilization recommendation doses

Priority level	Countries	Major rice research questions (2011–2020)
	Egypt	Increase the area which is covered by certified seeds up to 70%
	Congo	Research team reinforcement
	Burkina Faso	Study of the evolution of soil fertility under different levels of fertilization and under different production systems (upland, lowland, and irrigated)
	Côte d'Ivoire	Post-harvest (processing/conservation/quality)
	Uganda	Development of cold-tolerant varieties
	Mali	Sustainable soil fertility management and better improvement of cropping systems management
	Niger	Research on RYMV and Bacterial leaf blight
	Senegal	Climatic constraints related to high temperatures and technical constraints related to field operations, seed quality, inadequate equipment, and low technical capacity of producers
	Central African Republic	Breeding and development of improved technology package
	Liberia	Mechanization & environmental impact
	Sierra Leone	Reduction of on-farm manual labor requirements through appropriate mechanization
	Mauritania	Rice intensification (increase cropping intensity: 2 rice crop per year)
	Nigeria	Development varieties with resistance/tolerance to African rice gall midge (AfRGM), rice yellow mottle virus (RYMV) and iron toxicity
	Chad	Irrigation potential: 5.6 millions hectares
	Togo	Genetic resource conservation
	The Gambia	Germplasm collection, maintenance and conservation
3	Benin	Weed management in lowland rice production system
	Egypt	Minimizing the utilization of chemical fertilizers by increasing fertilizer use efficiency, utilization of compound and organic fertilizers
	Congo	Development of varieties suitable for the main ecologies
	Burkina Faso	Introduction and test of agricultural equipments (for labor, seeding, transplanting, fertilizers application, etc.)
	Côte d'Ivoire	Market/competitiveness
	Uganda	Early maturing and aromatic varieties
	Mali	Study of irrigation water management
	Niger	Research on tolerant/resistant varieties to soil salinity
	Senegal	Biotic constraints related to pests, diseases, weeds, birds

Priority level	Countries	Major rice research questions (2011–2020)
	Central African Republic	Development of decision/management tools for irrigated rice perimeters, in particular humid lowlands
	Liberia	Socio-economics & marketing
	Sierra Leone	Reduction of field and post-harvest crop losses
	Mauritania	Economic profitability
	Nigeria	Dissemination of improved rice varieties, including NERICA
	Chad	Potential in surface and groundwater: 240 to 540 billions of cubic meters per year
	Togo	Improvement of cropping systems
	The Gambia	Water harvesting & small-scale irrigation
4	Benin	Fighting against diseases and pests (birds, rats, insects)
	Egypt	Develop drought, salinity and heat tolerance varieties tailored with high daily production to face the depleting of global warming
	Congo	Training
	Burkina Faso	Irrigation water management and follow up on short term activities
	Côte d'Ivoire	Breeder and Foundation seed production
	Uganda	Varieties efficient in nutrient use
	Mali	Development of integrated management of bacterial leaf blight and RYMV
	Mauritania	Water management
	Niger	Impact and adoption studies of new varieties
	Senegal	Financial and socio-economic studies
	Central African Republic	Improvement of post harvest techniques
	Sierra Leone	Development of appropriate/sustainable market systems for farmers
	Nigeria	Release of improved and high yielding rice varieties
	Togo	Fight against diseases and pest
	The Gambia	Improve productivity of problem soils
5	Egypt	Develop rice lines that are resistant to various types of rice diseases
	Burkina Faso	Crop protection and follow up on short term activities
	Uganda	Bio-fortification of rice
	Mali	Development of techniques for integrated management of weeds

Priority level	Countries	Major rice research questions (2011–2020)
	Niger	Irrigation water management at plot level
	Nigeria	Conduct market oriented applied research
	Togo	Support for the development of land suitable for rice production
Other Priorities	Egypt	Minimize the utilization of chemicals fertilizers by increasing fertilizer use efficiency, utilization of compound and organic fertilizers
		Develop rice lines that are resistant to various types of rice diseases
		Develop drought, salinity and heat tolerance varieties tailored with high daily production to face the depleting of global warming
	Nigeria	Provide technical services to the private sector and other stakeholders
		Establish public-private partnerships in the rice value chain
	Togo	Promote rice commercialization and handling
	Mali	Studies of crop management and post harvest field operations for rice quality improvement
	Niger	Develop an inventory of lowlands and add value to them
		Collection and agro-morphological and molecular characterization of <i>O. glaberrima</i>
		Research on weed competitiveness of rice varieties

## 9 AfricaRice’s major roles in supporting major research questions formulated by countries

**Table 27:** Major AfricaRice roles

Countries	Major AfricaRice roles
Benin	AfricaRice should implement the short-term recruitment plan adopted at COM meeting held in Abuja in September 2007
	Support NARS in developing bilateral projects proposals and raising funds for their implementation
	Develop in collaboration with NARS a program for the production of breeder and foundation seeds to support CBSS activities in order to cope with the expected boost of rice production induced by current on-going actions
	Support for the establishment of the national varietal release committee and the a sustainable mechanism for its functioning
Burkina Faso	Support for genetic resource conservation and for breeder and foundation seeds production
	Coordination of the regional rice research activities and organization of periodic scientific meetings (regional rice research review)

Countries	Major AfricaRice roles
	Development of multi-country collaborative research activities involving AfricaRice and NARS within the framework of true partnership, i.e. a cooperation at all levels including the definition of roles and responsibilities, planning of activities, budget and resources allocations
	Strategic vision in relation to the most crucial problems facing the rice sector and concerted efforts to tackle the problems (for example the current food crisis)
Cameroon	Reinforce technical cooperation for the implementation of research projects
	Support for resource mobilization
	Increase biodiversity through the introduction of more NERICA varieties
	Contribute to reinforce the capacity of researchers and local actors
Central African Republic	Direct support and/or advocacy to reinforce rice research
	Training of researchers and technicians
	Transfer of technologies appropriate for irrigated rice perimeters conditions
	Capacity building in technology transfer
Congo	Technical assistance
	Advice
	Facilitation
	Support
Côte d'Ivoire	Technical and scientific information exchange
	Genetic material exchange
	Human capacity building (number of scientists and support staff)
Egypt	Develop varieties tolerant to biotic & abiotic stresses
	Increase the level of disease resistance either by classical or innovative methods of breeding
	Establish shuttle breeding system between AfricaRice and Egypt following a quarantine system and MTA
	Human resources capacity building for Egyptian and African rice scientists
The Gambia	Building the capacity of NARS, especially in areas of emerging sciences
	Helping to strengthen stakeholder partnership in the research and development continuum
	Increasing advocacy for increased state investment in rice research and development
	Providing elite materials to facilitate NARS efforts in climate change adaptation
Guinea	Genetic material exchange
	Institutional capacity building : Training Technical and scientific information Exploitation of research results Reinforce partnership Resource mobilization

Countries	Major AfricaRice roles
Mali	Reinforce collaboration in various domains : Development of collaborative projects Resource mobilization for sustainable long term funding in order to take into account major research concerns Backstopping missions
	Intensify training in the different research domains.
	Reinforce infrastructure and equipment capacities
Mauritania	Develop methods and techniques of irrigation for a better water resource management
	Development of new technical field operation favoring rice intensification
	Promote new technologies and new varieties that can contribute in reducing cost of production, increase productivity and profitability of rice producing households
	Breeding of rice varieties with resistance to diseases, salinity and high temperatures
Niger	Provide support to NARS in acquiring modern equipment
	Resource mobilization to constitute provision for regional collaborative projects
	Reinforce researchers' capacity (short training in various domains such as biotechnology)
	Reinforcement and support to ROCARIZ initiatives (4 Rs, monitoring tours, etc.)
Nigeria	Provision of fellowships through training of scientists and technicians to acquire new skills or improve their skills
	Continuous germplasm exchange
	Distribution and exchange of information and literature
	Provision of small grant funding for collaborative research through ROCARIZ, IVC, CFC, etc.
Senegal	Concerted efforts to tackle rice production constraints in collaboration with AfricaRice Saint-Louis research team
	Development and joint submission of collaborative research proposals that will address the constraints identified through the concerted efforts
	Training of researchers team to fill research needs
Sierra Leone	Facilitate development of information/communication systems to enhance technology transfer within the country
	Facilitate the production of breeder and foundation seeds, and collaboration in the development of projects to meet specific research objectives
	Provide access to new improved germplasm to meet the demand for increased productivity at relatively low input levels in the country. This is a major component of the research agenda at the Rokupr Agricultural Research Center
	Stronger collaboration in national research projects, particularly in facilitating expertise for executing the research needed, through training personnel
Togo	Technical support for seed production
	Technical support for writing collaborative research/development project proposals
	Contribute in the reinforcement of technical and scientific capacities of researchers
	Continuation of AfricaRice's activities related to varietal development for the benefit of NARES



## 10 Current policy to encourage local rice production

**Table 28:** Current policy to encourage local production

Countries	Current policy to encourage local production
Benin	Promote the production of certified seed during the dry season in the irrigated rice perimeters of Malanville, Ouémé valley, and Zou valley in collaboration with the private sector, state companies and NGOs.
	Partial subsidization of inputs such as seeds
	Lowland development with irrigation infrastructure during the dry season (10,000 ha are planned in 2008 )
	Initiate an emergency program covering 7,500 ha in 2008 to provide support to the producers for the acquisition of agricultural inputs
Cameroon	Development of technical field operations appropriate for the socio-economic conditions of the producers
	Large scale seed production of high performing varieties
	Training and technical assistance provision to local seed producers
	Facilitate small scale producers access to agriculture inputs (fertilizers, herbicides, pesticides, etc.)
Egypt	Continue support to multi-disciplinary research approach for developing high yielding varieties with better response to fertilizers and less water.
	Intensify research on integrated crop management
	Supporting the technology adoption system to disseminate new information from researcher to farmer
	Increase the role of private sector in rice seed industry
	Support the technology adoption system to disseminate new information from researcher to farmer
	Increase the role of private sector in rice seed industry
	Increase the coverage percentage by high quality seeds
	Improve the productivity of poor/low fertile and saline soils
	Spread package of recommendations to improve rice productivity
	Maximize use of rice bi-products
Congo	With the cooperation of the republic of China, rice production in lowland system was made possible
	The government took the decision to reduce import taxes on basic food commodities including rice
	Since October 2008, CRAL has started the multiplication of NERICA seeds and other local rice varieties in bimodal Savannah zone; the seeds are distributed to agriculture services and to seeds producers.
Burkina Faso	Increase cultivated areas (lowland development/rehabilitation, expansion of irrigated rice perimeters, introduction of upland rice in cotton-based systems).
	Support services provision to re-organize the rice sector

Countries	Current policy to encourage local production
Côte d'Ivoire	Upland rice : Support service provision for the organization and management of cooperatives One-off basis program
	Irrigated rice: Development of irrigated rice schemes Support service provision for the organization and management of cooperatives Support service provision for the mechanization of rice production system Supply of fertilizers
Mali	A real political will to make of the country a net rice exporter by 2012 by taking the following steps : A large land development program involving 50,000 hectares per year for irrigated rice production, development of 100,000 hectares by CEN/SAD Rice Initiative to produce 1,600,000 tonnes of paddy rice Implementation of a research support program in the framework of World Bank WAAP to make of Mali a center for rice production specialization
Niger	No specific rice policy for the time being despite the multitude of studies conducted by several development projects operating in the rice sector that showed the competitiveness of locally produced rice in comparison to imported rice. The local rice tastes better and has better nutritional qualities (PAFRIZ, 2006).
Senegal	A national program for rice self-sufficiency (PNAR) by 2015 has been established by the Senegalese Government
	The PNAR is reinforced by a new initiative called the 'Great Agriculture Endeavor for Food and Abundance' (GOANA). The major component of the initiative has an objective of producing 350,000 tonnes of milled rice (515,000 tonnes of paddy rice) from 132,500 ha of which 70,000 ha in upland and 62,500 ha in irrigated ecosystems.
Central African Republic	Rice is a priority commodity in crop diversification within the poverty reduction strategy document adopted during the donors roundtable held in October 2007 in Brussels
	Support for the organization of rice producers involving several women organization
	Support services provided to rice producers organization by the Chinese Technical Cooperation and other NGOs (technical assistance, training, inputs supply)
Liberia	Assist smallholder farmers increase their production (seeds, inputs, machines, etc.)
	Greater market access for smallholder farmers (rural infrastructure)
	Encourage large-scale commercial rice production
Sierra Leone	The current policy to encourage local rice production in Sierra Leone includes the following:  Tax exemption for the importation of inputs for rice production  Farm machinery support to local producers. This entails provision and servicing of tractors for tillage and seed harrowing
Mauritania	Rehabilitation of irrigated rice perimeters
	Supply of agriculture inputs to producers at affordable prices (fertilizers and seeds)
	Flexibility in the agriculture credit loan procedures
	Establishment of a grant / prize system as an incentive measure to promote best producers

Countries	Current policy to encourage local production
	Establishment of a fund for the procurement of local production
Guinea	Establishment of seed policy
	Establishment of land policy
	Irrigation and water management
	Mechanization
	Promote private investment
	Facilitate small scale producers' access to credit and inputs
Nigeria	Imposition of 100% rice levy on imports
	Increase in tariffs for the importation of rice
	Launch of Presidential Initiative on Rice Production, Processing and Export
	Encouraging farmers to form cooperatives for allocation of credit facilities
	Provision and subsidizing fertilizers for farmers
	Timely provision of inputs
	Training of farmers on the best practices for rice production
Togo	Public sector (PARTAM project, Agome Glozu project, support services for seed production)
	Private sector (Improve product handling and presentation for marketing purposes)
The Gambia	Presidential backing to the land initiative
	Operation Feed the Nation/Yourself
	Extensive media sensitization campaign
	Provision of farm machinery and inputs

## 11 Concrete actions taken to reduce impact of 2008 rice crisis

**Table 29:** Concrete actions taken to stem the present rice crisis

Countries	Concrete actions taken to stem the present rice crisis
Benin	Government support through development projects and national budgets to produce 2000 tonnes of certified seed (based on the foundation seed that is currently under production) by March 2009
	Training of trainers of extension services, projects, and programs. The training will be conducted by research staff with the technical support of FAO, AfricaRice, IFAD, GTZ, and AfDB
	Initiation of a project that aims at establishing a national center for foundation seed production; the project is submitted to FAO for funding
	Staff recruitment on-going to reinforce rice research division
	Involvement of the Japanese NGO, JAICAF, in the selection process of lowland NERICA varieties in order to supply by 2009 clean varieties seeds to producers to improve their production
	Sensitization of the different communities of rice producers to increase upland rice cultivated area

Countries	Concrete actions taken to stem the present rice crisis
Cameroon	5 Tons of seed produced during the last three years
	Establish the centers of rice seed production near the major rice production zones
	Revitalize rice producers organizations
	Training of extension agents
Egypt	Reducing the amount of rice exports as well as increase the tariff or taxes on the exported rice to saturate the local market
	So far, rice export is banned till April 1, 2009
	The Egyptian initiative to collaborate with AfricaRice and other African Countries to help produce more rice for African People
	The Rice Research Program is seeking effective relation with AfricaRice liaison office based in Cairo
	Suggesting the Rice Research Program to act as a sub regional rice research center in Eastern Africa under the mandate of AfricaRice.
	The Rice Research Program is organizing a workshop from August 23-26, 2008 in order to discuss the future collaboration with Japan
Burkina Faso	Activities conducted under the overall coordination of the Ministry of Agriculture
	Measures taken for the distribution of seeds and fertilizers to producers during the wet season 2008
	Training / skills upgrading of extension agents (of the irrigated rice perimeters and lowland) in rice production intensification techniques
	Monitoring during the wet season 2008 of the extension agents who benefited from the training session
	Elaborate a program of foundation and certified seed production
	Facilitate provision of post-harvest agricultural equipment to producers (threshers, blowing machine, milling machines)
	Price incentives to stimulate production
	Rice sector organization
Côte d'Ivoire	Reduction of tariffs/taxes on rice imports
	Emergency program to boost local rice production (200,000 tonnes in 2008-2009 and 500,000 tonnes in 2010-11)
	Breeder and foundation seed production
	Seed production by professional seed producing farmers
	Provide support for the organization and management of cooperatives
	Development of irrigated rice perimeters
	Provide support to rice production mechanization
	Facilitate the purchase of inputs
Uganda	Upgrade and develop facilities for drought screening and phenotyping, cold storage and irrigation
	Multiply and maintain seed of released varieties
	Build capacity for rice research (training and staff recruitment)
	Assess impact pathways and smallholder adoption patterns

<b>Countries</b>	<b>Concrete actions taken to stem the present rice crisis</b>
Mali	Fertilizers and seed price subsidies involving all rice production systems with a particular focus on upland rice intensification using NERICA 4 (3,500 tonnes),
	Recruitment of 102 new staff to insure better provision of technical assistance to producers
	Provision of equipments to producers
Niger	Reduction and suppression of value added tax (VAT) on rice imports
	Facilitate availability of NERICA and other improved rice varieties produced at the SADDIA seed production farm
	Technical assistance and advice to producers relating to good crop management practices
Senegal	Proposition of a multi-actors' research program in support of the government programs involving ISRA, AfricaRice, and other actors.
	Effective involvement of research staff in the implementation of the National Rice Self-Sufficiency Program by 2015 through: seed production, producers' capacity building, and technology transfer
	Involvement of research staff in the Great Agriculture Endeavor for Food and Abundance (GOANA)
Central African Republic	On-going consultation with donors for financing the agriculture sector
	Improvement of the social environment (peace, security) in the economic regions under conflict
	Central African Republic is member of a consortium of three Central African countries (Cameroon, Chad, and Central African Republic) in the framework of the NERICA project financed by CFC under AfricaRice's supervision
	Central African Republic became a AfricaRice member State in September 2007.
Liberia	January 2008: Duty suspended on rice
	March 2008: Duty suspended on agricultural inputs, machines & equipment
	May 2008: Task Force established (Special Presidential Rice Initiative)
	June 2008: "Back to the Soil" campaign launched
Sierra Leone	So far, the Ministry of Agriculture, Forestry and Food Security (MAFFS) in Sierra Leone has indicated a shift in support from subsistence farmers to large scale producers
Guinea	Ban of rice exports
	Rice imports by government
	Suppression of duties on rice imports
	Fertilizers subsidy
	Promotion of private investment
	Support services provision to the rice sector as part of an overall policy framework
	Support services provision to producers' organization and research / development
	Priority given to agriculture in national economic development program

Countries	Concrete actions taken to stem the present rice crisis
Nigeria	Train the trainer program on rice production and processing in the six agro ecological zones of the country
	Promotion of commercial agriculture through public-private partnership
	Aggressive production of breeder and foundation seeds of rice
	Production of rice production and processing guides for rice farmers
	Plans to import processed rice in the interim
	Release of rice into the market from the strategic grain reserves
Chad	Lowland development of about 2,000 hectares to increase cultivated area
	Increase of small-scale irrigated rice perimeters on potential sites
	Subsidize costs of agriculture equipment
	Reduction on fertilizer import taxes
Togo	National workshop to revitalize agriculture production
	Project proposal submitted to UEMOA fund
The Gambia	Promote community based seed production
	Promote local production of farm equipment
	Provide high yield and input efficient varieties

### *Additional tables*

**Table A:** Number of scientists by country and by speciality

Sex	Country	Specialty						Total
		Breeding	Economics	IPM	NRM	S/TT	Other	
Male	Benin	4	0	0	0	0	0	4
	Burkina Faso	2	1	8	1	0	0	12
	Cameroon	12	0	3	0	1	0	16
	Central African Republic	2	3	2	0	0	0	7
	Congo	1	0	1	0	0	1	3
	Côte d' Ivoire	4	2	2	0	0	0	8
	The Gambia	4	1	4	3	0	0	12
	Mali	12	2	9	3	1	0	27
	Mauritania	3	0	2	2	0	1	8
	Niger	1	1	3	2	0	0	7
	Nigeria	6	4	8	6	1	2	27
	Senegal	3	1	1	1	1	0	7
	Sierra Leone	6	1	4	3	4	0	18

Sex	Country	Specialty						Total
		Breeding	Economics	IPM	NRM	S/TT	Other	
	Uganda	7	0	1	0	1	0	9
	Egypt	31	0	8	9	2	0	50
	RDC	5	1	2	0	2	0	10
	Guinea	5	1	0	1	1	0	8
	Ghana	7	2	2	8	1	0	20
	Chad	3	0	0	1	0	0	4
	Total	118	20	60	40	15	4	257
Female	Burkina Faso	0	1	0	1	0	0	2
	Cameroon	2	0	0	0	0	0	2
	Gambia	0	0	0	0	1	0	1
	Mali	1	0	0	0	0	0	1
	Nigeria	0	1	1	0	0	0	2
	Sierra Leone	1	0	0	0	1	1	3
	Egypt	0	0	1	0	0	0	1
	Guinea	2	0	0	0	0	0	2
	Ghana	0	0	0	0	1	0	1
	Total	6	2	2	1	3	1	15

Legend: IPM = Integrated Pest Management; NRM = Natural Resource Management; S/TT= Social Science and Technology Transfer. Other = Food technology, Nutrition, Agro-Meteorology.

**Table B:** Degree and specialty of NARS scientists by country

Country	Speciality	Degree			Total
		BSc	MSc	PhD	
Benin	Breeding		4		4
	Total		4		4
Burkina Faso	Breeding		0	2	2
	Economics		2	0	2
	IPM		2	6	8
	NRM		1	1	2
	Total		5	9	14
Cameroon	Breeding		9	5	14
	IPM		1	2	3
	S/TT		0	1	1
	Total		10	8	18
Central African Republic	Breeding		2	0	2
	Economics		2	1	3
	IPM		2	0	2
	Total		6	1	7
Congo	Breeding	0	1	0	1
	IPM	0	0	1	1
	Other	1	0	0	1
	Total	1	1	1	3
Côte d' Ivoire	Breeding		3	1	4
	Economics		0	2	2
	IPM		1	1	2
	Total		4	4	8
The Gambia	Breeding		3	1	4
	Economics		1	0	1
	IPM		1	3	4
	NRM		2	1	3
	S/TT		1	0	1
	Total		8	5	13
Mali	Breeding	1	6	6	13
	Economics	0	2	0	2
	IPM	0	6	3	9



Country	Speciality	Degree			Total
		BSc	MSc	PhD	
	NRM	0	3	0	3
	S/TT	0	0	1	1
	Total	1	17	10	28
Mauritania	Breeding		3		3
	IPM		2		2
	NRM		2		2
	Other		1		1
	Total		8		8
Niger	Breeding		0	1	1
	Economics		0	1	1
	IPM		3	0	3
	NRM		2	0	2
	Total		5	2	7
Nigeria	Breeding		0	6	6
	Economics		2	3	5
	IPM		2	7	9
	NRM		1	5	6
	S/TT		0	1	1
	Other		1	1	2
	Total		6	23	29
Senegal	Breeding		2	1	3
	Economics		0	1	1
	IPM		1	0	1

Country	Speciality	Degree			Total
		BSc	MSc	PhD	
	NRM		0	1	1
	S/TT		0	1	1
	Total		3	4	7
Sierra Leone	Breeding		6	1	7
	Economics		1	0	1
	IPM		1	3	4
	NRM		2	1	3
	S/TT		5	0	5
	Other		1	0	1
	Total		16	5	21
Uganda	Breeding	4	1	2	7
	IPM	0	0	1	1
	S/TT	0	1	0	1
	Total	4	2	3	9
Egypt	Breeding			31	31
	IPM			9	9
	NRM			9	9
	S/TT			2	2
	Total			51	51
Democratic Republic of Congo	Breeding	1	4		5
	Economics	0	1		1
	IPM	0	2		2
	S/TT	1	1		2
	Total	2	8		10
Guinea	Breeding	5	1	1	7
	Economics	1	0	0	1
	NRM	0	0	1	1
	S/TT	1	0	0	1
	Total	7	1	2	10
Chad	Breeding	0	1	2	3
	NRM	1	0	0	1
	Total	1	1	2	4

## **ANNEX IV**

### **2010–2015 Draft AfricaRice Strategic Plan**

#### **Introduction**

The Africa Rice Center (AfricaRice) Strategic Plan is being revised to take account of the changing situation in Africa – both due to the influence of global external factors such as rising food prices, declining global rice stocks, and climate change; and continental changes such as changes in demographics and the rising sophistication of urban consumer demands. It is also a direct response to the 2007 EPMR and the recent enlargement of AfricaRice's geographic mandate with the admission of four Eastern and Central African countries as members (Central African Republic, the Democratic Republic of Congo, the Republic of Congo and Uganda). The total number of AfricaRice member states as of February 2008 is 21. In March 2008, AfricaRice's Board commented on and approved the skeleton plan. AfricaRice's research staff provided inputs during a general research meeting held in May.

#### **1. Projected timetable**

March–September 2008: Proceed with the preparation of support papers (data on biotic and abiotic stresses, concurrent surveys in NARS and knowledge on ecologies per country) for scientific justification of the revised Strategic Plan. Detailed timetable is attached as Appendix B.

June 2008: NEC meeting briefed where the national experts provide inputs to the skeleton plan through survey forms.

June–December 2008: Informal consultations will be undertaken with the Science Council of the CGIAR following revisions based on Board and NEC inputs.

September/October 2008: A Consultation Workshop will be held for key African rice stakeholders [SROs (CORAF, ASARECA, SADC, FARA, NEPAD); CGIAR Centers (IRRI, CIAT); ROPPA; ARIs].

December 2008: Informal discussion with Science Council members at the CGIAR AGM

March 2009: Strategic Plan submitted to AfricaRice Board for final consultation and approval.

August 2009: Key Plan support papers and data (but not the Plan itself) will be presented at the 2nd Africa Rice Congress.

September 2009: Finalized Plan submitted to Council of Ministers for approval.

November 2009: Copies printed and made available for the CGIAR AGM.

## **2. Working titles**

Shaping Africa's Rice Bowl to meet the Global Food Challenge

Rising to Africa's rice challenge

## **3. Content**

### **Preface**

This Strategic Plan is designed to comply both with the Center's analysis of the rapid changes taking place in the global and African contexts since the last plan was formulated in 2003 and to provide a framework for the flexibility and responsiveness demanded by the fluid and dynamic forces at work in Africa and in the rice sector.

AfricaRice itself seeks to be a driving and dynamic force in assuring rice's pivotal role in alleviating poverty, attaining food security, social equity, healthy livelihoods and environments that will help build peace and prosperity in Africa. This refocused Strategic Plan therefore recognizes the impact expected from climate change on Africa and other rice sector economies, the long-term restructuring of the global rice market, and the necessity for the CGIAR centers concerned with rice to generate synergies to deal with change without losing sight of their overall missions.

As the center of excellence for rice research in Africa, AfricaRice is as never before the driving force for rice research and development on the African continent. Its leadership has been fully mandated in the report of the Center's Fifth EPMR in 2007 in which it was noted that AfricaRice has rice research programs in three ecosystems and works closely with its regional and national partners as well as increasingly profiting from the relationship with IRRI and CIAT. Expansion of the rice sub-sector has been recognized by SROs such as CORAF/WE CARD (Strategic Plan 2000) by ECOWAS and in a study by IFPRI-IITA/ CORAF/WE CARD as potentially the best driver of development for sub-Saharan Africa. In the words of the EPMR panel, providing "the locomotive that will pull growth and poverty reduction in the sub-region".

Since its inception AfricaRice has brought a determined focus on rice research and rice-related issues in close collaboration with its partners in the NARS. That collaboration

continues to increase, particularly with the expansion of AfricaRice membership to include countries in eastern and central Africa. AfricaRice research has pinpointed the impact of unique constraints to rice production in Africa that make it imperative to site basic research and technology evaluation in the region where the impacts are being felt.

Africa is demonstrably different in its positioning within the global rice sector –at all levels from production to market. AfricaRice’s holistic research program – in alignment with other CGIAR centers and System Priorities as well as its global and SSA partners – aims at turning the rice sector into a thriving farm-to-plate continuum that provides the nutritional and food requirements of a young and expanding population, and breaks the chains of poverty by generating capacity for local production, processing and marketing of rice and rapidly decreasing dependence on world markets. This success story will contribute substantially to achievement of the Millennium Development Goals of the United Nations.

## **Changing external environment**

Change is radically altering AfricaRice’s operational and research environments. Rice is clearly set to remain the world’s most-consumed cereal and the product of mostly small-scale farm enterprises. Demand has risen at an average 3.4 percent per annum over the 45 years to 2005, according to FAO. However, this has now created a global situation in which rice consumption has outstripped production since 2000, leading to the depletion of world rice stocks to their lowest in 25 years – some 10.5 million tonnes in 2007, or around two months of supply.

At the same time, increasing wealth in India and China has resulted in a heavier demand for meat, thereby drawing maize increasingly into the animal food market. The result has been steadily rising world cereal prices – the upward trend in the rice price started in 2003. There has been a simultaneous emergence of Africa as a major player in the world rice market where it now accounts for 32 percent of the rice traded globally. In Africa, rice has shifted from being perceived as a luxury food to a staple part of the diet in urban areas affected by population shift and rising incomes.

Some influences on world cereal prices may be transient, i.e. demand for ethanol from maize, but the long-term outlook for rice production in Africa is bolstered by the signs that Asia’s consumption will outstrip its capacity to produce. Asia currently accounts for 88% of consumption and 77% of exports. Africa has land with the capacity to produce enough to feed its own population and generate export revenues by making up shortfalls in global supply of rice.

Rice offers the donor community an opportunity to see R4D translated directly into improved nutrition and well-being – particularly for children and women – at the producer-family level, and to see quality food products contributing to the establishment of a thriving rice chain with consequent economic benefits at national and sub-regional levels. Efficient and profitable rice production and processing means more money is spent on education and health care by poor farming families.

Africa is one of the lesser-researched continents in terms of the potential consequences of global warming – in particular West Africa, where the rice sector is the most important in sub-Saharan Africa. However, water valorization and management will be a major issue in all climate models being developed. The competing needs of agriculture and expanding urban populations will become increasingly evident, as will the need to underpin agricultural expansion with methodologies that fully embrace sustainability.

AfricaRice is fully engaged in the application of biotechnology in the African context and in capacity building with NARS partners without going down the politically-sensitive route of genetic modification. Should, however, Africa's policymakers, farmers and consumers seek to embrace the GM revolution, Africa's own rice research center is ideally placed to bring its expertise instantly to bear.

The rapid development of ICT in sub-Saharan Africa will offer exciting new opportunities for AfricaRice and partners to provide information that is demand-driven and tailored to specific needs, while enhancing the communication and innovation capacity of farming communities and processors.

## **Achievements by AfricaRice**

Rice research in Africa is particularly well-served by the partnership approach adopted by AfricaRice. This will continue throughout the period of this Strategic Plan to bring together the knowledge and capacities of the collaborating CGIAR Centers and ARIs so that it is adapted by NARS partners to provide solutions tailored to the multiplicity of African conditions. As recommended in the fifth EPMR, AfricaRice is undertaking a phased expansion in central, eastern and southern Africa in response to demand from those regions, but all the while retaining critical mass in West Africa.

Since 2000, AfricaRice has developed and released 18 upland, 60 lowland and 3 irrigated varieties of NERICA (New Rice for Africa), along with several additional *Oryza sativa* varieties. At the same time the genetic diversity of *O. glaberrima* has been steadily revealed and the success rate for interspecific crossing between *O. glaberrima* and *O. sativa* – the parents of the NERICA varieties – has been greatly improved.

Many of these successes have been achieved in close partnership with NARS. The tools and methodologies developed at AfricaRice are now being extended to the NARS through capacity-building initiatives that underpin the sustainability of R4D and extension in SSA. The advent of the NERICA varieties, backed by new technologies for rice production, has contributed markedly to the increased area of land devoted to rice in SSA. According to OSIRIZ (CIRAD's Observatory of International Rice Statistics), Africa cultivated about 9 million hectares of rice in 2006, and production which surpassed 20 million tonnes for the first time, is expected to increase by 7% per year.

## **AfricaRice's mission**

AfricaRice is positioning itself within the wider development and innovation context for sub-Saharan Africa as advocated by the Comprehensive Africa Agricultural Development Program (CAADP) of AU-NEPAD and will be contributing to Pillar IV, led by FARA. The CAADP target of a 6% annual increase in agricultural output over 20 years is an achievable one, given the scientific underpinning necessary for long-term productivity and competitiveness and to address agricultural research, technology dissemination and adoption. The strategic direction of FARA and the sub-regional inputs from CORAF/WECARD, ASARECA and SADC to improve cross-border collaboration will have a synergistic effect in enabling AfricaRice to contribute to achievement of the Millennium Development Goals. By tackling head on the inadequate agricultural production that combines with rapid population growth to drive down the human development index (HDI) in Africa, AfricaRice will contribute to eliminating the extreme poverty and food insecurity that is indicated by the HDI and raise the social well-being of millions of poor people.

Africa's cities need to be spared the worst impacts of rising global food prices through local production. The rural agricultural poor need to be enabled to substantially improve their nutritional and health status as well as finance better education that will give the next generation greater opportunities to break the remaining shackles of under-development. Development of the rice and related sectors will have considerable impact on the competitiveness of African economies and reduce the need to divert valuable foreign currency exchange to the import of staple foods such as rice. In time, the achievement of food security in the continent's major rice-producing countries and their near neighbors through regional trade in surpluses may lead to global export earnings for Africa's rice chain.

AfricaRice strongly believes in the importance of shared demand articulation and agenda setting to create regional and international public goods, and develop knowledge and innovation capacity within Africa. This will be realized through pro-active contributions to the development and implementation of the regional plans for collective action in West and

Central Africa and East and Southern Africa. AfricaRice will also actively promote further alignment and integration of research activities with CIAT and IRRI within the new sub-Saharan Africa Rice Consortium, building on AfricaRice's strong partnership with NARS within the ROCARIZ and ECARRN networks. AfricaRice will also enhance its collaboration with advanced research institutes to complement the range of expertise needed to tackle the key research for development questions in sub-Saharan Africa. AfricaRice wishes to significantly increase the quality, usefulness and availability of knowledge and technology within the rice sector to support and improve the well-being of the poor in Africa and to become the primary source of information on rice in Sub-Saharan Africa.

### **Draft revised AfricaRice mission statement**

To be a proactive world-class R4D force responding to rapidly-changing challenges and opportunities to realize rice's pivotal role in alleviating poverty, attaining food security, social equity, healthy livelihoods and environments.

### **An audit of R&D challenges and priority setting**

This section will address the major questions related to research and development and the framework within which R&D is to be applied (capacity building, dissemination). The outstanding challenges for the African rice sector will be identified and ranked for prioritization in AfricaRice's future research program (the preliminary list of key issues included in Appendix A).

Key problems of regional agricultural development are deterioration of the natural resource base, man-made and natural disasters, weak institutions and generally unfavorable policies for agricultural growth and rural development. Research is crucial for realization of the region's huge potential to meet the expected food needs.

Scenarios will be explored taking account of key issues such as cost of expansion, intensification and focus on ecologies.

### **A fresh strategy**

AfricaRice's revised research strategy will be based on the research prioritization exercise, i.e. identification of key R4D challenges (based on themes, regions, demographic trends and ecologies); the regions to be targeted and the enabling partnerships to be forged for a changing pan-African environment (survey template in Appendix B).



The overall strategy will still be anchored in the alleviation of poverty through rice R&D (mission) and – given the lifespan proposed for this Strategic Plan – geared towards an important contribution to achieving the MDG (vision). The development and dissemination of the international public goods will be primarily through strategic partnerships.

## **Action perspective**

This section will spell out how AfricaRice sees its positioning along the R&D continuum and its continuing role in the overall effort to defeat the inhibiting impacts of poverty and how the Center proposes to turn strategic planning into action.

Emphasis will be again placed on AfricaRice's 'open house' policy and its avowed aim of implementing through partnerships at the development and dissemination points.

To reinforce AfricaRice's leading role in rice research in Africa and enable implementation of the Strategic Plan there will be emphasis on achieving parallel growths in budget and scientific capacity.

Particular attention will be paid to the geographic positioning of research; to the establishment of a project mode mechanism to stimulate sustainable capacity; and to the development of a Rice Information Gateway for Africa (RIGA) to enhance sharing of knowledge and technologies.

## 4. Appendices

### Appendix A

#### An audit of R&D challenges

Challenge	Continental	West	Central	Eastern	Southern
Population					
Population growth					
HDI index					
Food deficit					
Labor productivity					
Land & water productivity					
Climate change					
Marketing failure					
Poor policy environment					
Institutional failure					
Human disease (HIV/malaria etc.)					
Political instability & social inequity					
Sensitization of governments/ policymakers					

#### Rice

Challenge	Continental	West	Central	Eastern	Southern
Demand (million tonnes per year.) 2010					
Demand increase (in tonnage and percentage)					
Domestic supply (MT)					
Supply trend					
Current supply gap					
Future supply gap					
Rice price trend					

## Ecologies

Ecology	West	Central	Eastern	Southern	Northern
Irrigated					
- Surface area					
- Potential area					
- Actual yield					
- Potential yield					
- Actual production					
- Actual rice farm population.					
- Water availability					
- Water use potential					
- Water productivity					
- Labor productivity					
- Rice production costs (total and per input)					
- Actual price					
- Producer price					
- Actual cropping intensity					
- Potential cropping intensity					
Ecology	West	Central	Eastern	Southern	Northern
- Costs of development					
- Management & maintenance costs					
Rainfed upland					
Lowland					

## Appendix B

### Addressing the major questions of R&D (capacity building, dissemination)

#### Survey timetable

- General questionnaire for feedback on vision and mission statements based on keywords drawn from the statements (see priority setting paper-Diagne et al.) – Diagne: April 2008–September 2009
- Farmer and village level survey on constraints and opportunities (biophysical and socioeconomics) – Diagne: March–September 2008
- Continuous updating of the tables used in BMGF project – PMC
- Processing and analysis of data: September–December 2008
- Tabulation and interpretation of data
- Priority setting – PMC: January 2009 retreat
- Final decision – EMC: February 2009
- Presentation to Board – March 2009

#### Major research questions

- Achieving rice self-sufficiency: Policy and technological tools needed
- Institutional innovations
- Strengthening stakeholder structures and interactions;
- Innovation trajectories (process analysis & intervention)
- Social inclusion mechanisms (women/youth/marginalized groups)
- Information & knowledge management
- Rural learning (methodologies, power relations, facilitation, local knowledge systems, financing mechanisms)
- Linking farmers and consumers to research agenda (farmers→markets; consumers→quality; research→variety development)
- Innovations for value addition, marketing and market development
- Refined uptake pathways and scaling-up mechanisms
- Links between informal and the formal systems (land/water/labor)
- Seed systems
- Post-harvest and grain quality management system
- Input markets

#### Resource management

- Optimization of resource use in intensified systems (natural resources, labor, mechanization, capital)
- Sustainable intensification of low-input systems (including appropriate mechanization)

- Diversification (temporal-spatial interactions, integrated systems, ecology use balancing)
- Water resources productivity
- Virtual water (reduction in absolute water use)
- Reducing carbon footprint in rice systems (methane, slash-and-burn, whole-crop use)
- Valuation of environmental services
- Management of common resources
- Soil health and crop health
- Environmentally-sound management (land and crop husbandry)
- Climate change (risk management, mitigation and adaptation to evolving ecologies, coping strategies, climate proofing)
- ‘Smart’ research methods
- Ecologies re-definition

#### Technology

- Agro-biodiversity (ex situ and in situ conservation and use, strong core collection)
- Exploitation of Africa’s genetic singularities
- Yield potential enhancement for varied or evolving ecologies
- Spatial and temporal yield stability (phenotyping biotic and abiotic stresses)
- Grain quality enhancement (marketability, nutrition, palatability)
- Seed quality (health, viability)

#### Policy

- Creating conducive policy environment for development of the rice sector
- Advocacy support
- Decision support systems for guiding public and private investment in the rice sector; Identify policy options and tools for increased production
- Up-to-date, reliable and relevant information on rice sector trends
- Predicting the impact of alternative policies, technologies and institutional changes – and external factors – on rice sector (scenarios including livelihoods, environment, stakeholders)
- Identification of policy options that favor the integration of smallholder farmers into markets
- Policy options for better functioning of input and output markets (failure issues) to benefit the poor
- Seed policies (release, IPR, legislation, normalization)
- Policy options to improve post-harvest performance
- Policy options to improve farmers’ access to and use of information

## Appendix C

### Checklist of key words for Strategic Plan content

Gender  
Participation  
Zooming in–zooming out  
MDGs  
Environmental sustainability  
Agro-biodiversity  
Social inclusion  
Climate change  
Public–private partnerships  
IPGs  
CGIAR system priorities  
Links with pan-Africa missions: CAADP (Pillar 4); FARA vision  
Rice crisis  
Value chain: Consumer preferences  
Institutional quality control emphasized: (MTP: ISO certification – laboratories)  
Post-harvest: grain quality  
Seed systems  
Food vs. energy/alternative land uses  
GMOs  
Africa rice potential for ecologies  
Africa's differences  
Poverty map  
Post-conflict  
Water (conflict, constraint, resource sharing...)  
Land tenure  
Inputs (credit, infrastructure, seed, fertilizer)  
Nutrition  
Innovation systems  
Institutional issues  
NERICAs to come  
Pan-Africa ecologies potentials (research foci, human and other resource factors, environmental services/functions, i.e. lowlands)  
Enhancing farmer knowledge and perceptions  
Rice's pivotal role in the cropping system  
Carbon footprint of rice  
Virtual water: efficiency  
Changing demographics: rural–urban drift  
Scaling-up

# ANNEX V

## Draft AfricaRice MTP 2009-2011

### **Program 1: Bridging genetic diversity and breeding to produce rice genetic resources adapted to changing environments**

#### ***Rationale***

Rice yields in Africa are affected by a large number of abiotic and biotic stresses. The major abiotic stresses addressed through this program are drought, acidity, salinity, iron (Fe) toxicity and extreme temperatures. The major biotic stresses that are considered are RYMV, BLB, blast, African rice gall midge, stemborers and termites. In this project both conventional breeding and biotechnology will be used to exploit the rich reservoir of genetic resources present in the indigenous germplasm pool of African rice *O. glaberrima*, its wild relatives *O. barthii* and *O. longistaminata*, and Asian rice *O. sativa* landraces. These have high potential for use as a source for resistance to major stresses in rice as well as a source for high nutrient content. Because the African rice landraces have been neglected and under-utilized in the past, very little information is currently available. Biotechnology tools can unlock the diversity of genes conferring stress-resistance and other agronomically-useful traits thought to be hidden in the *Oryza* spp. and identify molecular markers to exploit their transfer through marker-assisted selection. Interspecific crosses are generating progeny that can be tested at hot spots for major stresses. Biotechnology can also assist in overcoming sterility barriers in crossing two different species. Farmers are instrumental in selecting varieties that fit to their local growing conditions and in providing feedback for breeders. Introduced interspecific varieties will strongly enhance the genetic diversity of farmers' fields.

#### ***Goal***

To improve the well-being of rice producers and consumers in Africa.

#### ***Purpose***

To provide farmers with superior germplasm adapted to local growing conditions and stresses and consumer preferences

#### ***Research approach to developing international public goods***

The development, testing, dissemination and uptake of improved lines and varieties for impact will require several activities related to germplasm characterization for biotic and abiotic stress resistance/tolerance and for yield performance and food quality. The Program will use AfricaRice's key strategic approaches in farmer participatory varietal selection (PVS) for

research, development and extension with NARS; and will implement its partnership model with NARS and with research and development networks (ECARRN and ROCARIZ), the African Rice Initiative and NGOs. Varietal development will include the use of key modern breeding and biotechnology tools, while testing of varieties will be done through regional yield trials to ensure spill over in similar agro-ecological zones across countries. Furthermore, the collaboration with numerous institutions in Africa, America, Europe and Asia will ensure that improved germplasm will be of use not only in Africa but also in other continents.

### ***Impact pathways***

The program will involve NARS partners at all stages of research. Farmer and end-user involvement will ensure that germplasm is relevant for the growing conditions in farmers's fields and consumer preferences and that research can profit from feedback on varietal performance. The participatory development and dissemination of improved lines and varieties to farmers through NARS will enhance income and food security in the major rice growing areas for millions of farmers and in fast-growing marginal and peri-urban areas. Development, testing and adoption of rice varieties will be facilitated through the ROCARIZ and ECARRN networks and the African Rice Initiative.

## **Output 1: Enhanced genetic diversity generated**

### ***Activities***

- 1.1 Identify, characterize, and add germplasm for performance evaluation in relation to environmental stresses and micronutrient composition to establish a core collection
- 1.2 Exchange and utilization of rice breeding resources in SSA through INGER
- 1.3 Characterize genes and molecular markers for superior germplasm

## **Output 2: Improved and stable rice lines and varieties with good grain quality available**

### ***Activities***

- 2.1 Characterize germplasm and develop breeding lines for yield, and resistance/tolerance to upland constraints
- 2.2 Characterize germplasm and develop breeding lines for yield and resistance/tolerance to lowland constraints
- 2.3. Develop genetically diverse intra- and interspecific lines
- 2.4. Enhancing nutritional quality of superior germplasm

## **Output 3: Enhanced knowledge of $G \times E$ interactions for abiotic and biotic stresses available**



### ***Activities***

- 3.1 Characterization of genes and molecular markers for biotic and abiotic stresses
- 3.2 Physiological and morphological characterization of germplasm and breeding lines to assist gene-finding for important traits
- 3.3 Determine spatial and temporal diversity of abiotic and biotic stresses

**Output 4:** Enhanced involvement of farmers in rice genetic resources development established

### ***Activities***

- 4.1 Participatory varietal selection of rice germplasm adapted to local conditions (rice garden)
- 4.2 Identification of gender-specific farmer and consumer preferences
- 4.3 Multilocation farmer-led evaluation of germplasm

## **5.0 Ex-post impact assessment**

- 5.1 Adoption and impact of NERICA and other improved rice varieties

### ***Output targets***

#### **2009**

- Inter- and intraspecific populations and lines with improved yield, resistance to major abiotic (acidity, Fe toxicity, salinity, drought, cold) and biotic stresses (blast, BLB, RYMV, AfRGM) developed
- Indigenous rice landraces and wild relatives collected and characterized in West, East and Central Africa
- Weed-competitive NERICAs for rainfed lowland available
- Genes/QTL associated with bacterial leaf blight (BLB) resistance and AfRGM resistance identified and MAS applied for resistance to BLB and AfRGM.
- Abiotic-stress-tolerant germplasm tested in farmers' fields

#### **2010**

- Knowledge enhanced on BLB pathogen diversity
- Elite drought-tolerant lines evaluated in West Africa and disseminated
- CSSL lines available to breeders for regional evaluation
- Improved lines with the pyramid of resistant genes for AfRGM, BLB and RYMV developed using molecular markers
- Superior lines tolerant to abiotic stresses (Fe toxicity, salinity, drought, cold) identified by farmers
- Main physiological and morphological mechanisms associated with abiotic stresses identified in key environments

## 2011

- QTLs associated with drought, salinity, cold and Fe-toxicity tolerance identified
- MAS applied for tolerance to drought, salinity, cold and Fe toxicity

### ***Beneficiaries***

Millions of smallholder rice farmers in the warm sub-humid and humid tropics of Africa, particularly women rice farmers, who will have access to improved upland rice technologies. Wider benefit accrues to private traders, large producers and processors, while national research and development partners will benefit from new approaches to increase rice production and productivity.

### ***System linkages***

Germplasm improvement 20%

Germplasm collection 15%

### ***Links to the Regional Plans for Collective Action in West and Central Africa (Programs) and in Eastern and Southern Africa (Flagships)***

Program 1: Promoting conservation and use of biodiversity

Project 1.1: Crop genetic resources conservation and use

Program 2: Using genetics and technology for food security

Project 2.1: Genetic improvement through applied genomics

Project 2.2: Enhancing nutritional quality

Flagship 2: Genetic resources: exploiting genetic diversity for improved crops, trees and livestock

### ***Partners and their roles***

- IRD, Natural Resources Institute, Cornell University, CIRAD and the John Innes Centre – development of genetic source materials for use in applied breeding programs and molecular analysis.
- IRRI, CIAT – rice germplasm exchange and genomics knowledge sharing.
- ROCARIZ and ECARRN, NARS – technology evaluation and adaptation, evaluation of germplasm, capacity building, PVS
- Farmer organizations and NGOs – technology evaluation and adaptation, evaluation of germplasm, capacity building, PVS
- Japan International Research Center for Agricultural Sciences (JIRCAS) – cooperative activities on development of inter-specific lines

- Nihon University – physiological evaluation of rice varieties
- ITA-Institut de Technologie Alimentaire (Sénégal), DTA Burkina Faso – laboratory support for grain quality

***Linkages to other Africa Rice Center (AfricaRice) programs***

- INGER-Africa: Germplasm exchange.
- IVC: Multi-scale characterization of inland valley systems

***Budget (US\$ million)***

To be estimated

**Program 2: Enhancing productivity of rice-based farming while protecting ecosystem services**

***Rationale***

In sub-Saharan Africa, rice is cultivated in four different ecologies: in rainfed uplands, in lowlands with varying degrees of water control, in deep water and in mangrove swamps. The last two ecologies, deep water and mangrove swamps are locally vital but have limited regional importance and, therefore, do not feature on AfricaRice's research agenda. The research mandate of these ecologies has been handed over to national researchers and is being backstopped by AfricaRice staff. The remaining two ecologies have mutual but also ecology-specific constraints and opportunities. Rice cultivation presently covers 6.7 million hectares, 2.7 Mha (or 37%) of which is devoted to upland ecosystems, mostly in the moist savanna and humid forest zones, and contributing 19% to the total rice production in SSA.

Yields in the uplands are constrained by frequent drought, low soil fertility (due to deficiencies of N & P) and soil acidity. Rice production is further hampered by biotic stresses such as blast disease, stem borers, termites and weeds. Lowland rice is produced on 4 Mha; three quarters of it is rainfed (contributing 48% to the total rice production in SSA), while one quarter is irrigated (contributing 33% to the total rice production in SSA). Irrigated rice and associated production systems are generally input intensive and market oriented. Rice yield gaps between attainable and actual yields are high, even in input-intensive systems. Attainable yields with full water control are in the range of 7–9 tonnes ha<sup>-1</sup>, while actual paddy yields on farmers' fields are 3–6 tonnes ha<sup>-1</sup>. The attainable yield without full water control is 4–5 tonnes ha<sup>-1</sup>, while the actual yield is typically 1–3 tonnes ha<sup>-1</sup>.

To close the yield gaps, improved crop and NRM options are being generated and adapted to address the major constraints of irrigated rice-based systems. Major constraints are a lack of water control, weed management, and to a lesser extent soil fertility, iron toxicity, African

rice gall midge (AfRGM), and rice yellow mottle virus (RYMV). The options for integrated crop and NRM management, targeting water-saving, labor-saving, gains in yield and product quality, reduced production costs, are developed with farmers at the farm and village levels. Improving water use efficiency can make dramatic contributions to increasing productivity and household food security, and enhance market opportunities. Moreover, increased water availability provides the opportunity to grow more than one crop per year.

However, land use intensification should not endanger environmental services of lowlands, such as the water buffering capacity and natural biodiversity. Intensification can also result in build-up of pests and diseases, while degradation of the resource base can lead to abandonment of the site. New challenges include competition for water with increasing demand from urbanization and expansion of irrigation schemes, and climate change, which may lead to a drop in water availability and increasing incidences of salinity and alkalinity. Finally, integrated systems, like rice and aquaculture, livestock, vegetables, and fruit trees offer an array of opportunities for intensification and diversification, leading to additional income and improved nutrition for the farming community.

### ***Goal***

Contribute to food security and well-being of rice producers and consumers in Africa.

### ***Purpose***

To enhance the output and productivity of rice-based systems through intensification and diversification, while minimizing potential negative effects on environmental services

### ***Research approach to developing international public goods***

The program takes a broad view of the development and innovation context of rice-based systems, in close collaboration with Program 3 and Program 4. At the regional and national level, challenges and opportunities for intensification and diversification of rice-based systems are identified, including current and potential rice-based systems performance, access to markets, water availability, soil quality etc. Multi-stakeholder platforms (MSPs) involving NARS partners and other stakeholders are formed to ensure joined research agenda setting and stimulate co-learning. Research activities are planned and implemented in partnerships with NARS partners, sister CG centers, and AROs in several countries and at strategically selected sites based on jointly identified research themes and priorities identified by the MSPs that fit within AfricaRice's Strategic Plan and MTP. The multi-country and multi-location approach ensures that results obtained are valid for a broad range of biophysical and socio-economic settings. It will also facilitate the development of IPGs, such as modeling tools of varying complexity, maps, databases, learning tools and resource management decision tools that can be used for up- and out-scaling of results and for ex-ante impact analyses.

### ***Impact pathways***

The four outputs of this project are highly complementary and aim to enhance output and productivity of rice-based systems, while minimizing potential negative impacts on environmental services and thereby improve food security and livelihoods in SSA. The tools and management options developed in Output 1 will be used by both farmers and NARS collaborators to analyze the relative magnitude of yield loss (spatial and temporal variability) and loss in profitability due to biotic stresses, identify decision tools for farmers to reduce the reliance on agrochemicals, and minimize the impact on the environment. Outputs 2 and 3 focus on developing knowledge and innovation capacity aimed to increase the efficiency of rice-based systems and explore possibilities for intensification and diversification. These will be used by policy- and decision-makers, NARS collaborators and multi-stakeholder platforms to enhance the output and productivity of rice-based systems. Output 4 will provide methodologies to assess the relative importance of various environmental goods and services and will develop management options to counter negative environmental impacts of rice-system development for direct and indirect (e.g. downstream) users.

### ***Outputs and activities***

#### **Output 1: Integrated management options for weeds, pests and diseases available**

##### ***Activities***

- 1.1 Develop IPM strategies for rice stem borers and African rice gall midge
- 1.2 Characterize and integrate management options for blast in rainfed ecosystems
- 1.3 Determine incidence and control options for parasitic weeds in rice
- 1.4 Develop technologies for integrated management of rice weeds, pests and diseases

#### **Output 2: Sustainable intensification options for rice-based systems developed**

##### ***Activities***

- 2.1 Assessment of constraints and opportunities for intensification of rice-based systems
- 2.2 Adapting rice-based farming to cope with the effect of climate anomalies on future outputs
- 2.3 Develop opportunities for intensification and income generation with resource-poor farmers
- 2.4 Increase resource-use efficiency of high input systems

### **Output 3: Profitable opportunities for diversification of the farmers' portfolio of enterprises made available**

#### ***Activities***

- 3.1 Assessment of constraints and opportunities for diversification of rice-based systems
- 3.2 Develop options to exploit temporal and spatial niches for inclusion of high value crops
- 3.3 Develop options to exploit temporal and spatial niches for inclusion of aquaculture

### **Output 4: Use of environmental services optimized and safeguarded for future generations**

#### ***Activities***

- 4.1 Development of water-resources productivity assessment methodology
- 4.2 Develop strategies for mitigation of environmental degradation due to rice farming
- 4.3 Develop multi-stakeholder processes methodologies for equitable use of shared resources

#### ***Output targets***

##### **2009**

- Blast pathogen lineage completed for all countries in West Africa
- Environment-friendly management options for termites disseminated to NARS
- Study on weed-competitiveness of NERICAs and parents published
- Options for integrated management of BLB in irrigated ecosystem adopted by NARS

##### **2010**

- Improved IPM strategies against RYMV and AfRGM with low input integrated soil fertility management options available and used by NARS
- Weed-competitive lowland NERICAs disseminated to NARS
- Study on integrated weed management in inland valleys in West Africa published
- Options for ICM adapted and evaluated for intensified irrigated lowland rice-based systems in 5 countries in the Sahel region

##### **2011**

- Upland NERICAs, parents and mapping populations characterized for resistances and tolerances against *Striga* spp.
- Conceptual model for water-resources productivity assessment published

### ***Beneficiaries***

Millions of smallholder upland rice farmers in the warm sub-humid and humid tropics of Africa, resource-poor lowland rice farmers cultivating inland valleys, as well as the rice-farming households and farmer organizations along the intensive lowland-irrigated continuum, particularly those with access to purchased inputs. Rice farmers are predominantly women, who will have access to improved rice technologies. Wider benefit accrues to large producers, processors, and traders, while national research and development partners will benefit from new approaches to increase rice production and productivity.

### ***CGIAR System research priorities***

#### **Priority area 3 – Reducing rural poverty through agricultural diversification and emerging opportunities for high-value commodities and products**

3a – Increasing income from fruit and vegetables – HIGH

3b – Increasing income from livestock – LOW

3c – Enhancing income through increased productivity of fisheries and aquaculture – HIGH

3d – Sustainable income generation from forests and trees – LOW

#### **Priority area 4 – Promoting poverty alleviation and sustainable management of water, land and forest resources**

4a – Promoting integrated land, water and forest management at landscape level – HIGH

4b – Sustaining and managing aquatic ecosystems for food and livelihoods – MEDIUM

4c – Improving water productivity – HIGH

4d – Promoting sustainable agro-ecological intensification in low- and high-potential environments – HIGH

### ***Links to the Regional Plans for Collective Action in West and Central Africa (Programs) and in Eastern and Southern Africa (Flagships)***

Program 2: Using genetics and technology for food security

Project 2.3: Integrated management of crop, insect pests, diseases and weeds

Program 3: Reducing rural poverty through agricultural diversification and emerging opportunities for high-value commodities and products

Project 3.1: Intensification of vegetable production

Program 4: Alleviating poverty through intensification and better productivity

Project 4.1: Integrated land, water and forest management

Project 4.2: Sustainable agro-ecological intensification in low and high potential areas

Project 4.3: Water productivity improvement for poverty alleviation

Flagship 1: Integrated natural resources management

***Linkages to other Africa Rice Center (AfricaRice) programs***

- Program 3: Technology generation and testing with the ROCARIZ Taskforce on NRM, IPM and Innovation Systems.
- Program 4: Promoting favorable policies, effective institutions and programs
- IVC: Multi-scale characterization of inland valley systems; development of low cost water management options; transfer and testing of crop and resource management technologies in specific environments.

***Partners and their roles***

- CIRAD (France): Joint project on adaptation to climate change, seconded vegetable entomologist and vegetable agronomist
- Gaston Berger University (Senegal): Validation of simulation tools, training
- University of Hohenheim (Germany): Joint project on adaptation to climate change
- IRD (France): Seconded plant pathologist working on BLB
- ROCARIZ and ECARRN Task Forces; NARS, farmer organizations and NGOs: evaluation and adaptation of rice and ICM technologies
- Natural Resources Institute, UK: Management of weeds, nematodes and RYMV
- Wageningen University (the Netherlands): Adaptation of simulation tools and environmental degradation, training
- University of Georgia (USA), University of Florida (USA): Adaptation of simulation tools

***Budget (US\$ million)***

To be estimated



### **Program 3: Creating windows of opportunity through partnerships, learning and innovation systems**

#### ***Rationale***

The importance of partnerships in both technology generation and dissemination is commonly recognized. Meeting CGIAR System Priorities without strong collaborative input to bolster AfricaRice's initiatives will be near impossible whether these involve the conservation of under-utilized genetic resources and of biodiversity (SP1a), using genetic improvement to produce food at lower cost or bringing about the institutional change and policy improvements essential to underpin sustainable reduction in poverty and hunger (SP5). To improve the overall effectiveness of the rice innovation system, complementarities in skills, knowledge and expertise needs to be strived for. Despite this recognition, a better understanding of forces shaping institutional relationships will help in carving out future R&D strategies for pro-poor development (SP5a, 5c, 5d). Impact studies revealed that the relatively low adoption rate of NERICA is mainly due to farmers' limited access to seed, which in turn is due to weak national capacities and a range of social, institutional and policy-related factors. Organizational models need to be developed and tested to improve the formal and informal seed sector, and their interactions. Given that few analyses exist on which intervention strategies can be shaped, the documentation of local and national rice seed systems in Africa deserves urgent attention. Also, the role of marginalized youth and women in the generation and dissemination of technologies, especially in post-conflict countries, needs to be studied and strengthened.

Over the recent years, rice production in SSA has increased at a rate of 6% per annum. As more and more farmers start growing rice, the demand for technologies, information and training is on the rise. The national extension services and NGOs have to cope with the complexity of the agro-ecological and socio-cultural environments, which contribute to the inadequacy of top-down extension approaches. Since 2001, AfricaRice has developed the Participatory Learning and Action Research (PLAR) methodology to enhance social learning around inland valley rice production. Its impacts on farmers' livelihoods needs to be further assessed and mechanisms for fine-tuning, scaling-up and scaling-out need to be developed. Furthermore, the potential for merging participatory approaches with technology-mediated learning will be of value to policymakers, donors and development agencies. Apart from enhancing learning about seed and crop management, the rice post-harvest sector equally needs to be reinforced in order to improve the quality of local rice. While the market and policy environment is assessed elsewhere within AfricaRice, this program will mainly develop strategies and tools to improve partnerships and institutions in technology development and dissemination. The proposed Rice Information Gateway for Africa (RIGA) will be crucial to enhancing the efficiency of and impact on the entire rice sector in the region, thereby responding to recommendations made by AfricaRice's fifth EPMR.

Through networking and the RIGA platform, resource-use and research efficiency will be enhanced, capacity building improved, and rapid and efficient technology dissemination to end-users made easier. Also, investors in the sector will be able to make better-informed decisions. Africa Rice Center (AfricaRice), in partnership with ASARECA, has launched the East, Central and Southern Africa Rice Research Network (ECARRN), with a coordinator based in Dar es Salaam, Tanzania. ROCARIZ is a AfricaRice/CORAF (WECARD)/NARS rice research and development network for West and Central Africa. In 2000, AfricaRice's regional taskforces merged with CORAF/WECARD's rice networks to form ROCARIZ, which is now well established as the primary mechanism for regional collaboration in rice research and development. The African Rice Initiative (ARI) was created to ensure a rapid dissemination of NERICAs and complementary technologies to meet the increasing demand for rice across SSA. Central to ARI is the establishment of stakeholders' platforms and new forms of partnerships to put rice producers, processors and retailers in direct contact with research and other actors within the rice development sector.

The Science Council of the CGIAR appreciated AfricaRice's partnership approach and the increased involvement of the region's universities, but it asked about the effectiveness of partnerships and how they can contribute to the CGIAR SPs. Networks and partnerships are operational structures within the broader innovation system, hence Program 3 uses an innovation systems research approach to help shed light on their role and relevance. With more and more actors entering the rice sector in Africa, increased understanding of the changing roles and patterns of interactions will help improve overall system performance. The research approach taken in Program 3 delivers outputs that directly feed into SP5 (Improving policies and facilitating institutional innovation to support sustainable reduction of poverty and hunger). AfricaRice's Program 4 targets mainly policy and impacts, while Program 3 mainly investigates actors, institutions and mechanisms with an emphasis on seed, learning and value chains.

### ***Goal***

To improve livelihoods in rural and urban populations through strengthened partnerships, effective learning mechanisms and better functioning rice innovation systems.

### ***Purpose***

Increase the effectiveness of processes shaping the development and dissemination of sustainable technologies.

### ***Research approach to developing international public goods***

This program has a large development component and allows for some very particular research to be conducted on processes shaping these activities, networks and partnerships. To achieve this, the program will draw heavily on innovation systems research approaches, and

IPGs developed under this program are mainly knowledge-oriented. The research networks contribute to outputs of all other AfricaRice programs, but in Program 3 they will mainly be considered as one of the actors (or mechanisms), and hence become research subjects themselves within the innovation systems perspective. Partnerships will be assessed in terms of their contribution to the effective development and dissemination of rice technologies. The Rice Information Gateway for Africa (RIGA) will be a key IPG for AfricaRice in generations to come, and will fully capitalize on and strengthen AfricaRice's partnership base and *modus operandi*.

To analyze seed systems, actor analysis will be conducted as a starting point. Types and effectiveness of linkages will be identified and institutions shaping partnerships and networks analyzed. Participatory reflection and documentation workshops will be organized to help national teams develop an analytical spirit, ultimately leading to a learning culture. To study rice seed systems, their poverty relevance and the effectiveness of various participatory approaches in technology development and dissemination, a technographic research approach will be used in partnership with advanced research institutes, national universities and NGOs.

Econometric tools, sustainable livelihood analysis and other social science methods will be used in learning about social inclusiveness of delivery systems of more tacit technologies (e.g. ICM, seed and post-harvest handling) and institutions shaping rice value chains.

Knowledge generated will build on and feed into other AfricaRice programs. Outputs will also link to the REPCA and contribute to priorities set by FARA and the CGIAR (System Priorities 5A and 5C).

The expected IPGs from Program 3 are: (1) a Rice Information Gateway for Africa (RIGA); (2) knowledge on the role and effectiveness of networks and partnerships in the rice innovation system; (3) strategies for effective production and dissemination of quality seed from national to farmers' level, including mechanisms to link formal and informal seed systems; and (4) a peer-reviewed reference book with case studies of rice seed systems in Africa. These will be presented alongside more generic chapters related to seed policy, socio-cultural and other main factors influencing this sector; (5) insights in effectiveness, gender relevance and social equity issues of various learning and scaling-up methods; and (6) capacity building tools and strategies to strengthen the rice value chain.

### ***Impact pathways***

Networks are acting as brokers between research and end-users. As per their constituency, the networks are highly focused on capacity building, with the NARS being the direct beneficiaries. Knowledge on rice varieties, rice-growing ecosystems, actors, networks, institutions and policies will be embedded in the Rice Information Gateway for Africa

(RIGA) and will influence the wider research community and various actors in the rice sector, including policymakers and the private sector (Output 1).

The importance of mechanisms to develop pro-poor seed systems (Output 2) is dual in nature: it concerns both the development and dissemination of improved varieties, including NERICAs, as well as the creation of knowledge about the functioning of formal and informal seed systems. NERICA seed and passport data are shared with the international community. By transferring improved technologies such as NERICA to farmers, networks are contributing to the improvement of farmers' livelihoods. NERICA also offers additional market opportunities, especially for women seed producers, with the income generated used for educating children and alleviating poverty. Expanded know-how in seed production and delivery, as well as a better understanding of effective entry points in rural communities, will improve resource-poor farmers' access to seed with positive impacts on their livelihoods.

Output 2 will be of direct use to policymakers, the private sector and NARES. Knowledge about developing pro-poor seed systems is of global relevance. Lessons learnt from CBSS will benefit intermediary organizations and farmers, as well as inform AfricaRice breeders. Outputs link to SP1 and feed into REPCA Project 1.3 (Community-based management of genetic resources for better livelihood strategies). Agricultural education tools and learning pathways leading to effective rural learning systems (Output 3) will be shared with a wide range of development agencies and national extension services. The videos and related publications on their production, scaling-up and impact are currently used as lecture material in many of the leading internationally-respected universities and will be further shared with African universities. The question of how to scale up participatory approaches and enhance rural learning is a pertinent one for policymakers, academics and practitioners. Lessons learnt will be shared with the Commonwealth of Learning. As this output relates to SP 5C it will also be of interest to the wider CGIAR community. Strategies and tools to enhance the rice value chain (Output 4) will be of main interest to the private sector and the multiple development organizations aiming at strengthening the rice value chain.

### ***Outputs and activities***

#### **Output 1: Partnerships and networks to promote rice sector development**

##### ***Activities***

- 1.1 Catalyze the formation of national rice stakeholders' platforms
- 1.2 Enable interactions within and between networks for knowledge sharing and programmatic alignment
- 1.3 Develop a Rice Information Gateway for Africa (RIGA) to enhance the effectiveness and impact of research and development

## **Output 2: Mechanisms for pro-poor seed system development**

### ***Activities***

- 2.1 Improve the dissemination of breeder and foundation seed of improved rice varieties
- 2.2 Test mechanisms bridging the formal and informal rice seed systems, including CBSS
- 2.3 Evaluate farmers' innovations and role in plant genetic resource (PGR) management and conservation
- 2.4 Assess social inclusiveness of institutions and policies affecting seed systems
- 2.5 Document African rice seed systems

## **Output 3: Agricultural education tools and learning pathways**

### ***Activities***

- 3.1 Assess the social inclusiveness and effectiveness of participatory learning approaches
- 3.2 Explore mechanisms to institutionalize and scale up local knowledge and innovations
- 3.3 Build national capacities to develop and use PLAR, video and rural radio programs
- 3.4 Strengthen the functioning of agricultural training institutes and rural learning centers

## **Output 4: Strategies and tools to strengthen the rice value chain**

### ***Activities***

- 4.1 Assess factors affecting the dissemination and adoption of post-harvest technologies
- 4.2 Explore income-generation opportunities and develop local capacities for value addition
- 4.3 Develop analytical and decision-making tools, such as the Enterprise Web
- 4.4 Facilitate and document institutional innovations in the post-harvest innovation system

## **5.0 Ex-post impact assessment**

- 5.1 Impact of CBSS
- 5.2 Impact of PLAR
- 5.3 Impact of video-supported group learning

## ***Output targets***

### **2009**

- A Rice Information Gateway for Africa (RIGA) initiated
- NERICA passport data and complementary technologies published
- Multi-media kit on breeder and foundation seed production developed
- Community-based seed systems analysed in two countries
- Technical and institutional impacts of PLAR and video-mediated learning assessed
- Rice videos translated into three new languages and 100,000 farmers reached
- Two videos on key PLAR modules produced
- Local rice innovations identified, documented and catalogued
- Case study on post-harvest technology development and dissemination published

### **2010**

- Partners in six countries engaged in developing and upgrading content of RIGA
- Five countries capable of producing their own breeder and foundation seed
- National rice platforms functional in at least five countries
- Strategies for effective rice seed systems at national and local levels developed
- PLAR and video-supported group learning used in at least 15 countries
- Open and distance learning materials developed and used in at least five countries
- Institutional innovations in the post-harvest innovation system documented

### **2011**

- Three more countries engaged in developing and upgrading content of RIGA
- Public-private sector funding mechanisms identified to expand RIGA
- Three more countries capable of producing their own breeder and foundation seed
- Book on African rice seed systems published
- PLAR and video-supported group learning used in at least 20 countries

## ***Beneficiaries***

The beneficiaries are smallholder rice farmers; seed producers and dealers; small-, medium- and large-scale processors; rural and urban dwellers; NGOs/CBOs, universities, vocational training centers and NARS throughout Africa.

## ***Partners and their roles***

- National institutions, ANADER, CNRA, OVDL, NARI, LADEP, CRI, MOFA, IRAG, SNPRV, INRAB, INERA, IRAD, DGRST, IRAF, NARI, CSIR, SARI, IRAG, INPA, IER, CNRADA, INRAN, NCRI, ISRA, NARCC, RRS, ITRA, FOFIFA, NARO, KARI, NARS: develop national capacities in seed production; monitor and evaluate activities; and conduct research into seed system functioning and rural institutions.

- Rice farmer groups: Influencing research agenda by taking part in various participatory research and learning modes (PVS, CBSS, PLAR and video).
- NGOs: Develop local capacities in seed and rice production and processing; scale out and evaluate participatory learning approaches.
- Private sector in SSA: Provision of facilities, financial and human resources for technology testing and methodology approaches.
- Universities: Contribute to social science research and high-level capacity building, testing of open and distance learning materials.
- SROs (FARA, CORAF, ASARECA): Facilitation of the policy framework for research and dissemination.
- International and intergovernmental organizations (IRRI, CIAT, CABI, COL): Knowledge management and learning networks.

### ***System Linkages***

Germplasm improvement 10%

Sustainable production systems 15%

Policy 10%

Enhancing Institutions 65%

### ***Links to the Regional Plans for Collective Action in West and Central Africa***

Program 1: Promoting conservation and use of biodiversity

Project 1.3: Community-based management of genetic resources for better livelihood strategies

### ***Linkages to other Africa Rice Center (AfricaRice) programs***

Program 1: Bridging genetic diversity and breeding to produce rice genetic resources adapted to changing environments

Program 2: Enhancing productivity of rice-based farming while protecting ecosystem services

Program 4: Rice policy and technology impact on food security and poverty reduction

### ***Budget (US\$ million)***

2009 \$2.0

2010 \$3.0

2011 \$3.5



## **Program 4: Rice Policy and Technology Impact on Food Security and Poverty Reduction**

### ***Rationale***

The strategy for increasing rice production in most of Africa has traditionally focused on increasing yield, while neglecting the roles of policies, markets and institutions in the development of whole rice market value chains. The importance of changes in national and international trade policies and their effects on domestic rice competitiveness as well as the contribution of rice sector to income and employment generation, food security and welfare have not previously been given the attention they deserved. A deeper understanding of the policy, social, institutional and market environment in which rice production and trade is taking place is vital in developing strategies for competitive rice sectors within a background of continuously growing demand for rice. Likewise, given the relative importance of rice imports in sub-Saharan Africa (SSA) and the requirements of bringing the quality of locally milled rice to conformity with imported rice to satisfy consumer demand, it is imperative to integrate these factors in the rice research for development program in order to propose evidence-based policy options for a sustainable domestic rice sector to decision-makers. Equally important is the need to understand and take proper account of the important role of women in the development of the rice sectors in SSA.

Furthermore, with less than eight percent of world rice production being traded in international markets, and with major exporting countries in Asia undergoing structural changes, a dependence on imports to satisfy rice consumption needs in SSA will be exposed to unpredictable external supply and price shocks. Hence, there is an urgent need to develop a much deeper understanding of the likely scenarios for rice sector development in the region, and their poverty, social, economic and environmental implications [CGIAR System Priorities (SP) 3a, 4c, 4d]. Such analysis would help in prioritizing alternative research and development investments to promote strategies for building market-driven and sustainable rice sector development in Africa (SP5b). Allied directly to this is the need to systematically assess the impacts of technical and institutional changes within the rice sector (SP5a), with particular emphasis on productivity, profitability and poverty at the individual, community and national levels (SP3a, 5c, 5d).

### ***Goal***

To enhance income and food security in Africa through sustainable rice sector development through the widespread adoption of rice technologies, improved farming practices, favorable policies, effective institutions and programs.



### ***Purpose***

Generate evidence-based knowledge and information that supports development of demand-driven rice technologies, policies and institutions to improve livelihoods, nutrition and economic development.

### ***Impact pathways***

The three outputs from this project reinforce each other and together contribute to the generation of knowledge, methodologies and strategies that support development of competitive rice production systems in SSA and thereby improve food security, incomes and economic development. The tools developed in Output 1 will be used primarily by AfricaRice researchers and their NARS collaborators in the national agricultural research institutes, universities and ministries to set research and development priorities, assess impact of agricultural research, development projects and policy and institutional changes, and to forecast the likely scenarios for rice sector development in the region, and their poverty, economic and environmental implications. The capacity building component of Output 1 will be implemented by sharing knowledge and expertise in policy analysis and impact assessment with the NARS collaborators through networking, organized group trainings, visiting scientist schemes, co-supervision of student theses, backstopping (physically and by e-mail) and joint implementation of studies and publications. The outcome of this multifaceted capacity enhancement platform will be the availability of a critical mass of NARS researchers and policy analysts in the region with the broad set of skills and expertise required to implement the social science research agenda in the various national and regional agricultural research medium term plans. Furthermore, with the capacity enhancement platform of Output 1, the methodologies, tools and models developed in Output 1 can be widely tested, validated and used by NARS collaborators who will also be the key collaborators in the studies in Outputs 2 and 3.

Output 2 provides knowledge on the micro and macro effects of international and regional trade policies on domestic rice production, commercialization and trade. It also assists in identifying production and trade policies, and institutional and structural arrangements to promote the competitiveness of rice grown by smallholders. Similarly, *ex-ante* and *ex-post* impact assessment of improved post-harvest technologies generates knowledge and methodologies for scaling-up and scaling-out of innovations. Knowledge generated through this output will be utilized by farmers, NGOs, national extension agencies, rice millers and traders for improving post-harvest interventions, commercialization and investment decisions.

All the research outputs of this project will be disseminated through publications, policy briefs, seminars and workshops targeted at policymakers in sub-regional and regional organizations (ECOWAS, UEMOA and AU) as well as the international scientific community. Furthermore, appropriately packaged relevant research outputs will be made available to organized

farmers' organizations (ROPPA, Rice Farmers' Associations) to assist policy advocacy to enhance sustainable domestic rice production and trade. The knowledge generated directly and indirectly by the three outputs will lead to the formulation and implementation of better policies and the emergence of better market and non-market institutions that stimulate public and private investments in the sustainable development of the rice sectors, create new market opportunities for locally-produced rice, increase the market participation of poor rice farmers in general and women farmers in particular, increase the national food supplies of SSA countries, reduce dependence on rice imports, create value-adding employment opportunities within and outside the rice sector and in rural and urban cities. These outcomes when realized will in turn promote food security and poverty reduction in SSA and thereby contribute significantly to the achievement of Millennium Development Goals (MDGs) in SSA.

### ***Research approach to developing International Public Goods***

Research and capacity building activities within this project are identified based on constraint analysis and rigorous prioritization exercises involving the NARS partners and other stakeholders. This approach involves the end-users of policy research in the problem identification as well as the research process. Each research activity is planned and implemented in several countries based on research themes and priorities defined in the AfricaRice Strategic Plan and MTP using a common conceptual framework and data collection and analysis methodologies. All the studies are implemented by the NARS with AfricaRice providing funding, training, backstopping and coordination. The multi-country and multi-location approach to data collection adopted ensures that 1) results across countries and locations will be comparable and easily aggregated across countries; 2) findings and lessons learned from the studies can be generalized outside the study countries; and 3) that recommendations from the project can be scaled-up and scaled-out to appropriate recommendation domains. Such domains could be, for example (a) production ecology (upland, lowland and irrigated), (b) scale of production (small-, medium- and large-scale) and (c) policy groupings (UEMOA and non-UEMOA countries).

Through this platform for close collaboration with NARS combining capacity building and joint implementation of research activities and its direct access to the policy making process through the Council of Ministers, AfricaRice is in a position of comparative advantage to lead the implementation of rice policy research at the regional and continental levels with the aim of producing practical long-term agricultural and rice sector development strategies in SSA that ensure the uptake of policy research outputs.

## ***Output and activities***

### **Output 1: Tools, methods and enhanced capacity for impact assessment, policy analysis and priority setting**

#### ***Activities***

- 1.1 Develop tools and methods for impact assessment, policy analysis and priority setting
- 1.2 Projection of demand and supply patterns of rice in Africa under various policy and trade scenarios
- 1.3 Ex-ante assessment of the social, economic and environmental impacts of rice-based technological changes at the national and regional levels
- 1.4 Enhanced NARS capacity in policy analysis and impact assessment

### **Output 2: Rice policy options and institutions for competitive domestic rice production**

#### ***Activities***

- 2.1 Identify policies and institutions that increase the market participation and benefits from rice commercialization of poor farmers and women groups
- 2.2 Identify policies and institutions that improve the smallholder rice farmers' access to agricultural input markets
- 2.3 Analyze agricultural trade policies and their effects on the livelihoods of smallholder rice farmers and on the development of the rice sector and national economies of sub-Saharan African countries

### **Output 3: Improved post-harvest systems for competitive domestic rice production**

#### ***Activities***

- 3.1 Assess post-harvest systems and identify institutions for promoting markets for quality rice
- 3.2 Assess the rice value chain and develop strategies for stimulating investment in the rice sector and the emergence of small-scale rice processing enterprises
- 3.3 Ex-ante impact assessment of improved rice post-harvest systems and grain quality on local rice competitiveness and poverty

### **4.0 Ex-post impact assessment**

- 4.1 Adoption and impact of improved post-harvest technologies
- 4.2 Impact of rice commercialization on gender and poverty
- 4.3 Impact of rice domestic and international trade liberalization on rural livelihoods, poverty and agricultural growth

## **Output targets**

### **2009**

#### **Output 1:**

- A model for forecasting demand and supply of rice in Africa under various policy and trade scenarios developed.
- At least 15 NARS scientists trained in impact assessment methods
- At least 10 NARS scientists trained in policy analysis methods.

#### **Output 2:**

- The nature and scope of gender inequity in irrigated rice systems documented for three countries
- Agricultural trade policies and their effects on the rice sector and national economies analyzed for three countries

#### **Output 3:**

- Ex-ante assessment of the impact of improved grain quality on domestic rice competitiveness completed for one new country

#### **Ex-post impact assessment:**

- Adoption and impact of the NERICA varieties assessed for four new countries (link to project 1).
- Impact of the AfricaRice-NISER 2002-2004 policy research in Nigeria assessed

### **2010**

#### **Output 1:**

- Econometric tools for impact assessment extended and made available to the larger research community through the internet
- At least 15 NARS scientists trained in impact assessment methods
- At least 10 NARS scientists trained in policy analysis methods.

#### **Output 2:**

- The nature and scope of gender inequity in irrigated rice systems documented for two new countries
- The nature of the market failures in rice seed systems in West and Central Africa analyzed and policy and institutional arrangement options for developing national and regional seed systems proposed.

Output 3:

- Ex-ante assessment of the impact of improved grain quality on domestic rice competitiveness completed for one new country

**Ex-post impact assessment:**

- Adoption and impact of the NERICA varieties assessed for the whole of sub-Saharan Africa (link to project 1).
- Impact of video-facilitated learning tools on the diffusion and adoption of agricultural innovations assessed for two countries (link to project 6).

**2011**

Output 1:

- A framework for assessing the impact of stimulating demand for country-of-origin and branded products on producer and consumer welfare
- At least 15 NARS scientists trained in impact assessment methods
- At least 10 NARS scientists trained in policy analysis methods

Output 2:

- Policy options for SSA countries in the face of a highly distorted and thin global rice market
- Assessment of the impact of access to credit and inputs on time for irrigated rice farming systems

Output 3:

- Ex-ante assessment of the impact of improved grain quality on domestic rice competitiveness completed for one new country

**Ex-post impact assessment:**

- Update and refine the assessment of the adoption and impact of the NERICA varieties in sub-Saharan Africa (link to project 1).
- Impact of video-facilitated learning tools on the diffusion and adoption of agricultural innovations assessed for two countries (link to project 6).

System linkages

Germplasm collection 0%

Germplasm improvement 0%

Sustainable production systems 15%

Policy 75%

Enhancing institutions 10%

***Links to the Regional Plans for Collective Action in West and Central Africa (Programs) and in Eastern and Southern Africa (Flagships)***

Program 5: Harnessing the power of the marketplace to help WCA farmers

Project 5.1: Policy and institutional options to improve agriculture-related governance (methods, tools and mechanisms)

Project 5.2: Policies, institutions for better functioning domestic and regional markets, global trade and smallholder-friendly supply chains

Flagship 3: Information and knowledge to improve policy and strategy formulation for higher income and productivity growth

***Linkages to other AfricaRice programs***

- Program 1: Assessment of the adoption and impact of improved varieties.
- Program 2: Identification of social, economic, policy and institutional factors influencing natural resource management
- Program 3: Assessment of post-harvest practices on rice value chain
- IVC: Collaborating on technology transfer using PLAR methodology

***Partners and their roles***

- Economics Task Force of ROCARIZ in member countries: Implementation of multi-country studies
- NARS, CORAF, UEMOA, ECOWAS: Regional policy studies, and scaling up of ‘best policy practices’
- Planning bureaus in member countries: Implementation of multi-country studies and uptake of national policies
- National universities: UCA – National studies on dissemination pathways of post-harvest technologies
- Advanced Research Institutes: CIRAD, McGill University, Wageningen University – Development of research methodologies, models and joint publications
- FAO and USAID: National and regional studies, organization of relevant policy workshops
- CGIAR Centers: IFPRI, IITA, ICRISAT, IRRI – Joint research activities, workshops and publications
- Oxfam Canada and ROPPA, Cotonou: Policy advocacy at national, regional and WTO levels

***Budget (US\$ million)***

2009	\$0.8	2010	\$0.8	2011	\$0.8
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## **The Consortium for the Sustainable Development of Inland Valley Agro-ecosystems in Sub-Saharan Africa (IVC)**

### ***Introduction***

The Consortium for the Sustainable Development of Inland Valley Agro-ecosystems in Sub-Saharan Africa or the Inland Valley Consortium (IVC) was established in 1993 to respond to social and environmental challenges in West Africa related to poverty and food security on the one hand and degradation of the natural resource base on the other. It was one of the first eco-regional programs of the CGIAR. IVC became fully operational in 1994 with the arrival of a full-time coordinator. Membership grew gradually from an initial seven to a total of 12 West African countries [Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Ghana, Guinea, Mali, Nigeria, Senegal, Sierra Leone, The Gambia and Togo]. Presently, five CG centers are involved [Africa Rice Center (AfricaRice), International Institute for Tropical Agriculture (IITA), International Livestock Research Institute (ILRI), International Water Management Institute (IWMI), and the WorldFish Center] as well as five international research and development institutions [West and Central African Council for Agricultural Research and Development (CORAF), Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), United Nations Food and Agriculture Organization (FAO), Wageningen University and Research Center (WUR) and the World Vegetable Center (AVRDC)].

During Phase 1 of the IVC (1994–1999), extensive biophysical and socio-economic characterization work was executed at 18 key sites. In 2000, the second phase of the Consortium started. In this phase, IVC project activities were integrated into Africa Rice Center (AfricaRice) Program 3 (Rice Policy and Development). Research objectives in Phase II (2000–2005) focused on four main themes: characterization of inland valley land use dynamics; development and evaluation of technologies for improved production systems and natural resources management; socio-economic and policy aspects of improvements in inland valley land use systems; and technology dissemination processes and impact pathways for inland valley development.

In September 2004, IVC was evaluated externally for the third time in its history. Recommendations from this Center-commissioned External Review (CCER) served as a guideline for the framework of the Strategic Plan for IVC Phase 3. The stakeholders used the CCER recommendations as guidelines for drafting the new strategic plan at the annual workshop in April 2005. The draft was presented to the Consortium Management Committee in September 2005. The stakeholders identified four main research themes for Phase 3: 1) increasing inland valley productivity; 2) mitigating negative impacts affecting ecosystem services; 3) benefits from past achievements and transfer of technologies, including

local innovations; and 4) systematic stakeholder capacity building. The new MTP outputs presented below are based on these research themes. The draft of the new stand-alone MTP was presented at the annual workshop in Serekunda, The Gambia, in May 2006, and approved by the Consortium Steering Committee.

### ***Rationale***

More than two thirds of sub-Saharan Africa's 725 million people earn less than US\$2 per day. With the rate of population growth exceeding the growth rate of regional food production, the future for Africa's poor remains precarious. Besides food insecurity and widespread poverty in SSA, environmental problems are becoming increasingly dramatic, exacerbated by the depletion and degradation of natural resources. Cultivated soils are losing their inherent fertility and are subject to erosion due to over-exploitation and inappropriate land management practices. Tropical forests are being destroyed at an alarming rate to meet the increasing demands for arable land, fodder and fuel wood. However, a promising and largely unexploited land resource is the estimated 190 million ha of inland valleys (also referred to as bas-fonds, wetlands, dambos, swamps, fadamas, vleis etc.), which are the upper reaches of river systems. An inland valley comprises valley bottoms and minor floodplains, which may be submerged for part of the year, and their hydromorphic fringes and contiguous upland slopes and crests that contribute runoff and seepage to the valley bottom. Depending on the country, only about 10–25% of these inland valley lowlands are currently used for agricultural production. Since its inception 12 years ago, IVC has gained substantial experience in understanding and managing the inland valleys in WCA. Considerable progress has been made in documenting low-cost water management technologies and developing information systems and decision support tools for the exploitation of inland valleys (SP5d). The time is opportune to benefit from this experience and concentrate on transfer of the acquired knowledge. For technology transfer IVC adopted the Participatory Learning and Action Research (PLAR) methodology, which was developed through consultation with an IFAD-supported project (Participatory Adaptation and Diffusion of technologies for rice-based Systems). IVC continues to collaborate with Africa Rice Center (AfricaRice) on PLAR methodology development with special emphasis on integrated natural resource management. This provides a strong foundation for expanding IVC activities into east and southern Africa with the benefit of continued political will and a willingness of communities to work cooperatively in the exploitation of inland valleys and wetlands. A wise and sustainable use of natural resources and functions of wetlands offers a prime opportunity to assure the food and environmental security of significant numbers of the rural poor (SP3, 4). IVC has comparative advantage, and is playing a role in the Challenge Programs on SSA as well as Water and Food. In the next five years IVC will continue to focus on value-adding integrated systems such as crop-livestock, rice-fish culture, rice-vegetables (SP3), and to pay greater attention to biodiversity issues (SP1) with the continued active participation of the NARS and the donor community.



### ***Goal***

To improve the livelihood of rural communities through the adoption and use of sustainable technologies that will fulfill the production potential of the inland valleys in SSA.

### ***Purpose***

Develop appropriate technologies helping farmers to profitably increase productivity of inland valleys, while conserving the environment and biodiversity.

### ***Research approach to developing international public goods***

The international public goods (IPGs) from the IVC can be classified in six general categories: (1) decision-making tools, (2) policy recommendations, (3) databases, (4) agricultural technologies, (5) manuals, (6) training modules and fact sheets, and (6) scientific publications.

The decision-making tools and policy recommendations apply (IPGs 1 and 2) to the complex issues of inland valley development. They involve various disciplines (e.g. from hydrology to economics) and hierarchical levels (from farm household to the central government) and require fundamental considerations (e.g. natural biodiversity versus crop intensification; complete or partial development). These tools and recommendations will be the principal outcomes of various research endeavors and symposia and workshops with national and international participation.

Through field studies, inland valleys of different agro-climatic zones are selected and farmers, village chiefs, local or regional decision-makers, professionals from NGOs, NARS and bilateral development agencies are interviewed and confronted with different scenarios. By means of geographic information on inland valleys, potentially suitable or vulnerable valleys may be identified. This GIS database can be combined with information on perceptions of stakeholders and development trajectories to create a powerful tool. Tools and recommendations will be made public through symposia, websites and dissemination of publications and CDs.

The databases (IPG 3) are the results of biophysical and socio-economic characterizations of inland valleys carried out by national consortium members, geographic information from satellite images and GPS measurements, and meteorological information from partner institutes. These databases can be made publicly available through the IVC website.

Agricultural technologies (IPG 4) and improved farm practices will be developed, tested and validated through various experimental studies. For the development and testing of these technologies, participatory on-farm research will be backstopped by controlled on-station experiments. The technologies will be validated through multi-location, on-farm trials with a broad selection of farmers. The principal methodology used throughout this process will be

the Participatory Learning and Action Research (PLAR) developed by Africa Rice Center (AfricaRice). The new and validated technologies and farm practices will be disseminated through manuals, (PLAR) training modules, fact sheets, workshops, symposia proceedings and scientific publications (IPGs 5 and 6). Those materials will be made easily available to farmers, extension services and research centers.

### ***Impact pathways***

Four outputs are used to demonstrate maximum impact of the consortium activities. The outcome of the increase in inland valley agro-ecosystems productivity (output 1) is adoption of more profitable technologies leading to food security and poverty alleviation. The mitigation of negative impact on environmental services (output 2) has the adoption of recommendations for an environmentally-sound inland valley management as outcome, leading to a more sustainable environment. The transfer of past achievements and local innovations (output 3) capitalizes on available knowledge within IVC as well as within the inland valley communities optimizing the impact through the availability of appropriate and familiar land use technologies and inland valley development options. Capacity enhancement of inland valley stakeholders (output 4) is safeguarding the sustainability of the project efforts through increased expertise on inland valley development.

### ***Outputs and activities***

#### **Output 1: Options for increased productivity in the inland valley agro-ecosystems available**

##### ***Activities***

- 1.1 Developing improved crop and natural resource management technologies
- 1.2 Optimising natural resource use through adoption of integrated systems
- 1.3 Improved income security through farm diversification
- 1.4 Formulating policies for sustainable inland valley development

#### **Output 2: Methods for mitigating negative impacts affecting ecosystem services developed**

##### ***Activities***

- 2.1 Evaluating local management of biodiversity as a common resource
- 2.2 Testing alternatives for agrochemical use and their impact
- 2.3 Anticipating the effect of climate change on inland valley management
- 2.4 Formulating policies for environmentally-sound inland valley practices

### **Output 3: Repositories of past achievements and local innovations generated**

#### ***Activities***

- 3.1 Disseminating project results for adding value to past achievements
- 3.2 Developing databases and decision making tools for inland valley development
- 3.3 Promoting participatory learning and action research for INRM in inland valleys
- 3.4 Identifying, testing and scaling up of promising local innovations

### **Output 4: Capacity of inland valley stakeholders enhanced**

#### ***Activities***

- 4.1 Strengthening collaboration between NARS and international institutes
- 4.2 Organizing capacity enhancing training workshops
- 4.3 Promoting systematic degree training of IVC stakeholders

#### ***Output targets***

##### **2009**

- Conceptual model for water-resources productivity assessment published
- Study on the effect of *Rhamphicarpa fistulosa* on rice published
- Two new PLAR modules on tree crop management developed and validated
- Study on causes of inland valley abandonment published.

##### **2010**

- Validation report for community-based fish culture published
- Effective no-herbicide weed control strategies developed
- NIVISA for six IVC member countries released

##### **2011**

- Final report on the community-based fish culture study published
- Fifteen years of IVC research compiled and published

#### ***Beneficiaries***

Inland valley stakeholders, NARS, NGOs, local government workers and policymakers.

#### ***Partners and their roles***

Five CGIAR centers are members of IVC: Africa Rice Center (AfricaRice) as convening center, IITA, ILRI, IWMI and WorldFish. All centers participate in the annual workshop at which activities are planned, and are linked to IVC by collaborative existing or future projects.

Special projects – such as the Community-based Fish Culture Project (see below) in Mali; National Inland Valley Information Systems of Africa in Benin, Burkina Faso, Guinea, Mali, and Togo; and Improved Varieties in Burkina Faso, Côte d’Ivoire and Nigeria – are coordinated or executed by the IVC members. The following NARS are members of IVC: INRAB in Benin; INERA in Burkina Faso; IRAD in Cameroon; CNRA in Côte d’Ivoire; SARI and CRI in Ghana; IRAG in Guinea; IER in Mali; NCRI in Nigeria; LWDD in Sierra Leone; ISRA in Senegal; IRAT in Togo; and NARI in The Gambia.

The sub-regional organization CORAF, the UN organization FAO and the ARIs CIRAD, ITC, Wageningen UR and The World Vegetable Center are international members of IVC. They participate in research planning, project formulation and capacity building of the national members.

### ***Linkages to Challenge Programs***

IVC and WorldFish are partners with IFPRI in the CP Water and Food project “Community-based fish culture in irrigation systems and seasonal floodplains”.

### ***New initiatives***

A new proposal for a collaborative project called “Valorization of underutilized traditional vegetables grown in West African lowland rice systems” has been resubmitted in 2008. The overall goal of the project is to contribute to poverty alleviation and eradication of malnutrition through generating knowledge on the characteristics, distribution and potential for development and utilization of underutilized plant genetic resources in West Africa. It is a new collaboration between IVC, AfricaRice and IITA, and INRAB (Benin), CRI (Ghana), IER (Mali) and ISRA (Senegal).

### ***Synergy between IVC and the Africa Rice Center (AfricaRice)***

There is a strong synergy between IVC and the convening center. The collaboration materializes between IVC and Africa Rice Center (AfricaRice) Program 2. IVC adopted the Participatory Learning and Action Research (PLAR) developed by AfricaRice as the methodology to transfer inland valley technologies. PLAR was developed in close collaboration with another project at the Africa Rice Center (AfricaRice) called the Participatory Adaptation and Diffusion of technologies for rice-based Systems (PADS).

### ***Linkages to Africa Rice Center (AfricaRice) programs***

- Program 2: Use of improved technologies for testing/dissemination in lowlands
- Program 3: ROCARIZ Taskforce on NRM and Innovation Systems
- Program 4: Promoting favorable policies, effective institutions and programs

## ***CGIAR System Research Priorities***

### **Priority area 2 – Producing more and better food at lower cost through genetic improvements**

- 2a – Maintaining and enhancing yields and yield potential of food staples – MEDIUM
- 2b – Improving tolerance to selected abiotic stresses – MEDIUM

### **Priority area 3 – Reducing rural poverty through agricultural diversification and emerging opportunities for high-value commodities and products**

- 3a – Increasing income from fruit and vegetables – HIGH
- 3b – Increasing income from livestock – HIGH
- 3c – Enhancing income through increased productivity of fisheries and aquaculture – HIGH
- 3d – Sustainable income generation from forests and trees – HIGH

### **Priority area 4 – Promoting poverty alleviation and sustainable management of water, land and forest resources**

- 4a – Promoting integrated land, water and forest management at landscape level – HIGH
- 4b – Sustaining and managing aquatic ecosystems for food and livelihoods – HIGH
- 4c – Improving water productivity – HIGH
- 4d – Promoting sustainable agro-ecological intensification in low- and high-potential environments – HIGH

### **Priority area 5 – Improving policies and facilitating institutional innovation to support sustainable reduction of poverty and hunger**

- 5d – Improving research and development options to reduce rural poverty and vulnerability – HIGH

## ***Millennium Development Goals***

IVC contributes to the Millennium Development Goals (MDG) by addressing MDG 1, 3, 7 and 8. As a result of working on development pathways in the poorest countries of the world, the IVC contribution to MDG 1 speaks for itself. The vast majority of farmers in inland valleys are women. By training these women farmers, IVC contributes to their empowerment and, therefore, to MDG 3. Theme 3 of the new Strategic Plan addresses the effects of inland valley development on biodiversity and the environment (MDG 7), while developing partnerships (MDG 8) is the backbone of IVC. The intervention area of IVC contributes to the CGIAR System Research Priorities and Millennium Development Goals.

Millennium Development Goals		CGIAR System Priorities				
		1	2	3	4	5
1	Eradicate extreme poverty and hunger	+	++	++	++	++
2	Achieve universal primary education					
3	Promote gender equality and empower women		++	++	++	++
4	Reduce child mortality	+	+	+	+	+
5	Improve maternal health	+	+	+	+	+
6	Combat HIV/AIDS, malaria and other diseases		++			++
7	Ensure environmental sustainability	++	++	+	+	++
8	Develop a global partnership for development	++	+		++	++

#### System linkages

Germplasm collection 5%

Germplasm improvement 5%

Sustainable production systems 40%

Policy 25%

Enhancing institutions 25%

#### ***Links to the Regional Plans for Collective Action in West and Central Africa Programs and in Eastern and Southern Africa (Flagships)***

Program 2: Using genetics and technology for food security

Project 2.3: Integrated management of crop, insect pests, diseases and weeds

Program 3: Reducing rural poverty through diversification

Project 3.1: Intensification of vegetables in WCA

Project 3.2: Development of a fruit tree industry for WCA

Program 4: Alleviating poverty through intensification and better productivity

Project 4.1: Integrated land, water and forest management at landscape level

Project 4.2: Sustainable agro-ecological intensification in low and high potential areas

Project 4.3: Water productivity improvement for poverty alleviation

Flagship 1: Integrated natural resources management

Flagship 2: Genetic resources: exploiting genetic diversity for improved crops, trees and livestock

#### ***Budget (US\$ million)***

2008	\$1.8	2009	\$1.8	2010	\$1.8
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# ANNEX VI

## Report of the African Rice Initiative (ARI)

**Dr Inoussa Akintayo**

*Coordinator*

### Introduction

Today rice features prominently in the diet of most of the people in sub-Saharan Africa (SSA). The world rice market is currently facing a serious supply problem that could have adverse effects on our countries, which are using imports to meet a large portion of our rice requirements. Self-sufficiency in rice in SSA calls for production increases. The actions taken by the African Rice Initiative (ARI) aim to meet this objective.

Just like in the year 2006, the 2007 season was successful both at the regional coordination unit and pilot country level. In fact, more than 100 tonnes of foundation seed were produced and distributed or kept for the 2008 season, more than 6500 tonnes produced by the countries, technicians and farmers trained in seed production and PVS approach. Complementary technologies that were earlier developed (timing of the weeding operations, date for fertilizer application, sowing density) were also transferred to end-users. The power of partnership and public awareness resulted in widespread knowledge of NERICAs with a resultant massive adoption in many new countries including Liberia. NGOs and the private sector companies were also involved in NERICA seed production. The examples of Tunde S.A. and Songhai Center in Benin and Mr. Togola in Mali are particularly impressive. Regarding the coordination unit, statutory meetings were held, activities were monitored in pilot countries, contacts with donors were maintained and resources were mobilized to extend NERICA diffusion to other countries. The details of this will be presented in the following report as well as in our 2007 annual report.

### 1 About ARI

Scaling up the success in Guinea, AfricaRice and partners pooled their efforts to set up a permanent mechanism to disseminate NERICA and other improved rice varieties in SSA. The efforts culminated in the launching of the African Rice Initiative (ARI) in March 2002. ARI provides an ideal setting for meeting the Objectives set in the Millennium Development Goals. ARI's main objective is to promote and disseminate NERICAs, other new rice varieties and complementary technologies in SSA, where they can significantly contribute to poverty alleviation and food security. Its immediate objective is to help farmers to adopt NERICAs and complementary technologies by improving farm markets and policies and by a pragmatically oriented approach.

ARI is run by a steering committee which includes a representative of each pilot country, a representative of non-pilot countries, two AfricaRice representatives, one from Sasakawa Global 2000 (SG2000), one from the United Nations Development Program (UNDP) representing the donor community, one representative of the Forum for Agricultural Research in Africa (FARA), one representative of farmer organizations selected in a member country and the Coordinator of ARI.

The AfDB supports the pilot phase of NERICA diffusion activities, which is implemented through the Multinational NERICA Rice Dissemination Project in seven West African countries (Benin, The Gambia, Ghana, Guinea, Mali, Nigeria and Sierra Leone). Other donors, specifically the UNDP, Japan, CFC are also supporting the activities of the Initiative.

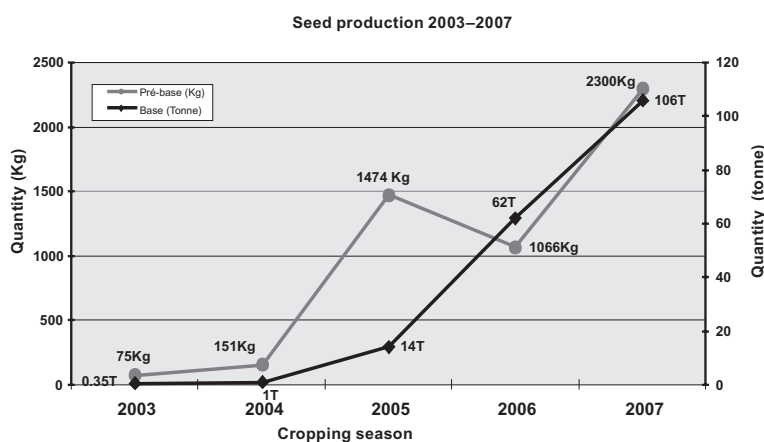
## 2 Technology transfer and production support

### 2.1 Technology transfer

#### 2.1.1 Seed production and distribution

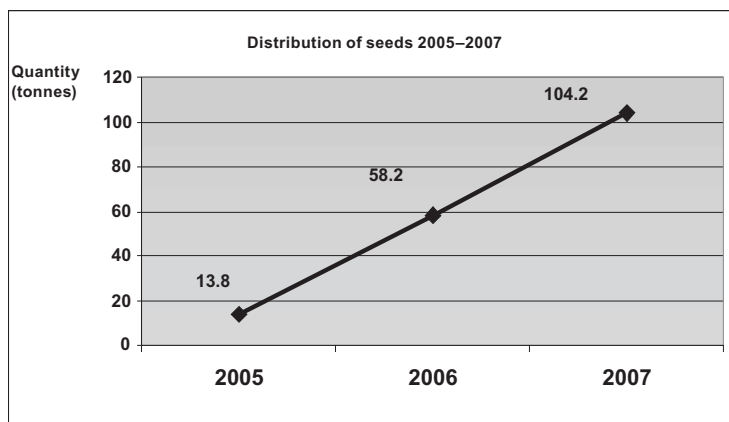
##### At regional coordination unit level

More than 108 tonnes of breeder and foundation seed were produced in 2007 by the regional coordination unit for distribution not only in pilot countries but also in many others countries which requested for seed. A portion has been stored for the 2008 season. Seed production and distribution trends are shown in Figures 1 and 2 and in Table 1.



**Figure 1:** Seed production trends from 2003 to 2007





**Figure 2:** Seed distribution trend from 2005 to 2007

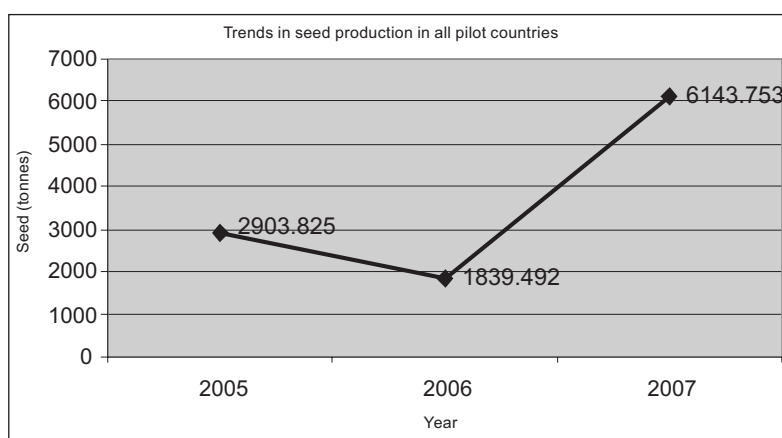
**Table 1:** Seed distribution to various countries in 2007

Countries	Quantity (Kg)
BENIN	2 113
ETHIOPIA	55
GUINEA	238
INDIA	17
LIBERIA	57
MALI	70
NIGERIA	100 029
UGANDA	402
SENEGAL	4
SIERRA-LEONE	500
TOGO	325
AfricaRice	357
<b>Total</b>	<b>104 168</b>

### At pilot country level

In 2007, seed production increased markedly in all pilot countries at a growth rate of more than 387.60%. In fact, foundation and certified seed production increased from 1677.53 tonnes in 2006 to 6502.116 tonnes in 2007. Overall out of a total of 10887.12 tonnes of foundation and breeder seed produced by all the countries between 2005 and 2007, Benin produced 190

tonnes out of which 63 tonnes were produced in 2007; The Gambia produced 3588.5 tonnes out of which 2389.5 tonnes were produced in 2007; Ghana produced 981.622 tonnes out of which 445.68 tonnes were produced in 2007; Guinea produced 1712.76 tonnes out of which 756.5 tonnes were produced in 2007; Mali produced 547.301 tonnes out of which 310.436 tonnes were produced in 2007; Nigeria accounted for 1649.137 tonnes out which 878.637 tonnes were produced in 2007; and Sierra Leone accounted for 2217.753 tonnes out of which 1300 tonnes were the production figures for 2007. A significant progress is visible in the countries in their efforts to make enough quantity and quality seed available to producers. The graph below shows production trends from 2005 to 2007.



**Figure 3:** Trends in seed production in all pilot countries between 2005 and 2007

### 2.1.2 Varietal maintenance and testing

Varietal maintenance of 18 upland NERICAs was conducted to conserve their genetic purity. To identify new promising varieties, 67 elite lines were evaluated and compared to NERICA 11 (the check). From the results obtained, a hierarchical classification was used to group elite lines into three classes compared to the variables studied (Table 2). Group 1 includes the lines with higher performance than the check NERICA 11, group 2 includes lines with identical performance with the check and group 3 includes lines with lower performance than the check. These lines will be evaluated again in the coming seasons to confirm the performance of the elite lines. It should be noted that the lines were tested in less than favorable conditions for rice cultivation (sandy soils, unpredictable rainfall, nematode presence, etc.).

**Table 2:** Elite lines evaluated in the 2007 wet season in Cotonou, Benin

<b>Pedigree</b>	<b>Height at maturity</b>	<b>Number of Tillers/ Plant</b>	<b>Number of Panicles/ Plant</b>	<b>Number of Grains/ Panicle</b>	<b>Number of primary ramifications</b>	<b>Botanical type</b>	<b>Cluster</b>
WAB 775-52-2-2-HB	107	5	5	151	12	Sativa	1
WAB 450-11-1-1-P50-HB	106	6	4	171	14	Interspecific	1
WAB 450-24-2-2-P33-HB	102	3	2	117	10	Interspecific	2
WAB 880 SG14	103	7	6	120	12	Interspecific	3
WAB 880 SG37	110	6	4	119	12	Interspecific	3
WAB 880 SG38	117	6	4	124	11	Interspecific	3
WAB 880 SG38-1	116	6	5	128	12	Interspecific	3
WAB 880 SG70	114	5	4	145	13	Interspecific	3
WAB 880-1-38-13-1-P1-HB	101	6	5	97	10	Interspecific	2
WAB 880-1-38-20-14-P3-HB	101	6	4	102	11	Interspecific	2
WAB 880-1-38-20-26-P2-HB	102	6	5	113	12	Interspecific	2
WAB 891 SG36	113	6	5	102	11	Interspecific	3
WAB 952-B-47AB.1	107	5	4	144	15	Sativa	3
WAB 537-14-4-1-1-1-HB	107	7	7	113	11	Sativa	3
WAB 375-B-12-H3-1	123	4	4	141	12	Sativa	3
WAB 919-72-4-1-HB	103	5	5	139	12	Sativa	3
WAB 775-21-5-2-HB	118	5	5	123	11	Sativa	3
WAB 778-19-1-1-2-HB	104	8	8	107	12	Sativa	2
WAB 569-27-3-1-1-HB	110	6	6	125	11	Sativa	3
WAB 569-35-1-1-1-HB	118	8	5	118	9	Sativa	3
WAB 759-54-2-2-HB	106	6	6	105	12	Sativa	2
WAB 880-SG47	100	5	3	162	15	Interspecific	1
WAB 450-I-B-P-135-HB	98	5	5	104	13	Interspecific	2
WAB 891SG33	102	5	4	87	12	Interspecific	2
WAB 905-B-4A1.1	116	5	4	162	14	Sativa	1
WAB 951-B-181AB.1	119	7	6	100	12	Sativa	3
WAB 718-27-2-1-HB	133	8	5	112	11	Sativa	3
WAB 450-12-2-BL1-DV1	127	6	5	105	11	Interspecific	3
WAB 788-18-2-1-HB	109	7	5	105	12	Sativa	3
WAB 706-68-3	123	7	7	94	10	Sativa	3

<b>Pedigree</b>	<b>Height at maturity</b>	<b>Number of Tillers/ Plant</b>	<b>Number of Panicles/ Plant</b>	<b>Number of Grains/ Panicle</b>	<b>Number of primary ramifications</b>	<b>Botanical type</b>	<b>Cluster</b>
WAB 711-137-3	117	5	5	105	11	Sativa	3
WAB 748-11-2-HB	108	6	6	107	12	Sativa	3
WAB 767-2-4-1-HB	113	9	8	113	12	Sativa	3
WAB 450-11-1-1-P28-4-HB	100	7	6	116	11	Interspecific	2
WAB 901-7A2.1	104	5	4	152	14	Sativa	3
WAB 923-B-6A1.1	108	7	6	114	11	Sativa	3
WAB 960-B-11A1.1	88	7	7	103	10	Sativa	2
WAB 915-B-3A1.1	108	6	6	96	11	Sativa	2
WAB 963-B-12A1.2	91	5	5	111	11	Sativa	2
WAB 910-B-4AB.1	90	5	4	107	9	Sativa	2
WAB 897-B-B-B-B-24	85	4	3	122	12	Sativa	2
WAB 707-32-3-1-HB	84	6	4	100	10	Sativa	2
WAB 712-56-4-1-HB	120	6	6	91	9	Sativa	3
WAB 36-54	77	8	7	103	8	Sativa	2
WAB 715-51-4-1-HB	131	4	4	117	11	Sativa	3
WAB 709-18-1-1-HB	96	5	4	75	9	Sativa	2
WAB 969-40-1-HB	96	5	5	115	12	Sativa	2
WAB 759-33-1-2-HB	95	6	5	85	8	Sativa	2
WAB 326-B-B-19-H1-H1-HB	75	4	3	137	12	Sativa	2
CT 7242-16-9-4-2-1P	87	8	7	114	13	Sativa	2
WAB 721-13-4-1-HB	89	4	4	274	12	Sativa	1
WAB 880-1-38-20-15-P2-HB	101	5	4	114	12	Interspecific	2
WAB 880 SG50	91	4	3	94	8	Interspecific	2
WAB 881-10-37-18-13-P1-HB	111	3	3	126	12	Interspecific	3
WAB 881-SG1	109	4	4	295	11	Interspecific	1
WAB 616-53-4-3-1-1-HB	80	4	4	111	11	Interspecific	2
WAB 450-I-B-P-422-HB	99	3	2	180	11	Interspecific	1
WAB 902-B-14A1.1	85	4	4	108	11	Sativa	2
WAB 340-B-B-2-H2	101	5	4	100	8	Sativa	2
WAB 721-10-2-1-HB	106	8	6	69	9	Sativa	2
ARCCU12Fa1-L2P2-38-1	95	7	5	156	15	Interspecific	1
ARCCU12Fa1-L2P2-6-1	84	9	6	129	12	Interspecific	2

Pedigree	Height at maturity	Number of Tillers/ Plant	Number of Panicles/ Plant	Number of Grains/ Panicle	Number of primary ramifications	Botanical type	Cluster
ARCCU12Fa1-L2P2-14-1	101	5	7	113	11	Interspecific	2
ARCCU12Fa1-L2P2-83-1	105	3	5	117	11	Interspecific	3
ARCCU12Fa1-L6P6-30-1	90	4	3	190	13	Interspecific	1
ARCCU12Fa1-L6P6-36-1	81	5	4	114	12	Interspecific	2
ARCCU12Fa1-L2P2-41-1	84	7	5	126	10	Interspecific	2
WAB 450-16-2-BL2-DV1	94	6	6	127	9	NERICA 11	2

### 2.1.3 Complementary technologies

#### At the level of the regional coordination unit

Complementary technology development continued at the level of the regional coordination unit. A few of the preliminary results are under confirmation including specific fertilizer application rates and timing as well as weeding regimes. Experiments conducted with NERICA 4 have shown that NPK application two weeks after sowing results in increased tillering. The first urea application from 35 to 40 days after sowing (more precisely when the tiller of the third leaf before the flag leaf is taller than the tiller of the fourth leaf) helps to increase the number of grains per panicle. Finally, the second urea application 56 days after sowing (more precisely when the sheaths of the second and third leaf before the flag leaf are at the same level) markedly increases grain filling and thereby helps to produce high yields.

The coordination unit has also developed NERICA-based recipes. A document on these recipes has been produced and distributed. Fact sheets on the 18 already named NERICAs are in their completion phase. A fact sheet on NERICA cultivation has been developed and is being printed.

#### At pilot country level

Complementary technology development is also ongoing in all pilot countries, where a number of results are already available.

In Mali, for example, a two-row seeder was developed. It provides the opportunity to reduce labor use and to plant 1 ha in 8 hour at an average rate of 50 kg/ha of seed and 150 kg/ha of NPK. This technology reduces the cost of planting from CFA 60,000 to CFA 15,000 per hectare (i.e. by 75%).

In Benin, the use of rollers for planting was tested and farmers appreciated the machine and have adopted the 0.30 m x 0.10 m planting density, which makes maintenance of plots easier. In The Gambia, a manual thresher was developed for smallholder producers.

Optimal fertilizer uptake, weeding periods as well as sowing dates are under experimentation in the countries.

## **2.1.4 Participatory Varietal Selection**

### **New NERICA varieties being adopted**

In 2005, the seven pilot countries of the Multinational NERICA Diffusion Project received from the regional coordination unit, a batch of new promising varieties [58 intraspecifics (Sativa) and 33 interspecifics (NERICA)] for Participatory Varietal Selection (PVS). The results of these tests have once again shown that the NERICAs have met the aspirations of farmers.

For example, after the PVS conducted in Benin in 2005, 10 out of 91 varieties introduced were selected by farmers and were multiplied in the off-season for tests in farmers' fields. In 2006, the varieties selected were planted in farmers' fields and managed by farmers. In effect, 100 trials were established in 10 villages in the project zones, one trial per producer. A tasting test was then conducted on the basis of common dishes and food habits in project zones to evaluate the organoleptic quality of these previously selected 10 best varieties. At the end of all the various tests, three varieties were finally selected:

- V62 = WAB 660-1-26-20-16-P2-HB (NERICA)
- V68 = WAB 660 SG 26 (NERICA)
- V81 = WAB 691 SG 26 (NERICA)

Thirteen lines were selected by farmers in Mali from the same batch of materials. Productivity, tillering, health status and early maturity were among the main selection criteria. The most frequently selected varieties were:

- WAB 929-B-1A1-1 (Sativa)
- WAB 905-B-2A1-1 (Sativa)
- WAB 880-SG-42 (NERICA)
- WAB 880-1-32-1-2-P1-HB (NERICA14)
- WAB 880-SG-37 (NERICA)

It must be pointed out that high yield was not the main criterion for selecting one material or the other. WAB 880-SG-14 (NERICA), which produced the highest yield (4750 kg/ha) was less frequently selected.

The list of countries, which have adopted or released NERICAs is increasing remarkably as well as the number of varieties per country (Table 3). This is also the case for the area under rice cultivation. The most spectacular case occurred in Ethiopia, where the rice area under NERICA cultivation increased from 2000 ha in 2006 to 12000 ha in 2007.

**Table 3:** Upland NERICA varieties adopted/released in a number of sub-Saharan African countries

COUNTRIES	NERICA																		Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Benin	A	A		A				A*											3
Burkina Faso												H	H		A		H	A	5
Congo Rep.										A									1
Congo DR				A		A	A												3
Cote d'Ivoire	H	H	A	A	A														5
Ethiopia	H*	H*	H	H															4
The Gambia	A	A	A	A	A	A	A												7
Ghana	H	A																	2
Guinea	H	H	H	H	H	H	H												7
Kenya	A*			A*						A*	A								4
Madagascar			A	A															2
Mali				H				A	A					A				A	5
Nigeria	H	H	A					A											4
Uganda	H*		A	H						H*									4
Sierra Leone	A	A	A	A	A	A													6
Sudan				A			A												2
Liberia	A*			A*			A*	A*											4
Togo	A		A	A															3
Total	12	8	9	14	4	4	5	3	1	3	1	1	1	1	1	0	1	2	

NB: A = adopted; H = released; A\*= adopted in 2007; H\*= released in 2007

## 2.2 Production support

To support more NERICA production, the regional coordination unit initiated a strong awareness and mobilization campaign targeted at the private sector, NGOs and decision makers. The coordination unit is pleased with the decision by many governments specifically that of Benin to promote NERICA rice as one of the priorities of their agriculture diversification policy. In fact, under instruction from government, the National Company for Promoting Agriculture (SONAPRA), was able to establish about 80 hectares of certified seed plots through the

community based seed production (CBSS) approach. It hopes to make available to farmers more than 200 tonnes of certified seed for the 2008 season, more than an additional 4000 ha to be covered. Concurrently, the commitment of entrepreneur Mr Babatundé R Ollofindji to promote NERICA rice has also not waned. In 2007, out of the 77 Districts in the country, he covered 55 Districts, where he funded the establishment of NERICA demonstration plots in farmer's fields. It must be noted that today, NERICA is earning the trust of more and more farmers. The Consultative Council of Rice Farmers in Benin (CCR-B) has benefited on its part from a funding from the Oxfam-Quebec, an NGO, for the implementation of a seed production project, which is under its pilot implementation phase. Through this project, a process has been initiated to lead the CCR-B to self-sufficiency in rice seed.

The Government of Liberia has requested the support of the coordination unit in the implementation of a seed production project and invited the unit to a national fair to exhibit NERICA varieties and NERICA rice based products.

In almost all pilot countries, open days and radio broadcasts in local languages were also made on the importance and production of rice to generate more eagerness from farmers in rice production.

The process of building community based infrastructure and road is underway. The implementation sites have already been identified, invitations for tenders have been made and the effective implementation of the infrastructures will very soon be initiated in all pilot countries.

### **3 Capacity building**

Many types of training courses were held by the coordination unit in 2007 to build the technical capacity of NARS, NGOs and the private sector.

- Twenty technicians from pilot countries were therefore trained in impact assessment.
- A course co-funded by the AfDB, JICA and the UNDP was held on seed multiplication techniques and was attended by 19 technicians from pilot countries.
- Eleven technicians from six West African countries were trained for one month in research capacity development for NERICA evaluation in West Africa. In addition to training courses directly organized by the regional coordination unit, the unit has also facilitated courses at national level. Upon the request of the national coordination unit in Mali, 20 women processors were therefore trained in NERICA based product preparation. In Benin, the regional coordination unit was involved in collaboration with SONAPRA to train 80 leading farmers in certified seed production techniques.



**Table 4:** Summary of persons trained by ARI regional coordination unit and national coordination units from 2004 to 2007

Type of participants	2004		2005		2006		2007		Total
	AfricaRice	COUNTRY	AfricaRice	CTRY	AfricaRice	CTRY	AfricaRice	CTRY	
Students	-	-	-	27	-	204	-	435	666
Technicians	25	-	40	181	30	391	60	653	1380
Farmers	-	-	-	675	-	1587	80	4134	6476
Women	-	-	-	260	-	823	30	1970	3083
Processors	-	-	-	0	-	-	20	-	20

## 4 Resource mobilization

To increase and extend NERICA diffusion to other countries, the coordination unit has developed new projects including:

- *Improving the competitiveness of rice in Central Africa* (US\$2.5 million): The project was submitted to CFC, which has already approved it. Preparations for its implementation are already underway. The project involves three countries – Cameroon, Chad and the Central African Republic – and will last 4 years.
- *Poverty alleviation in rural areas by increasing access of smallholder farmers to improved rice seed in post-conflict countries: the case of Liberia* (US\$300 000): The project has been submitted to UNDP and is being studied.

## 5 Coordination and staffing

The annual steering committee and experts meetings were held and attended by all stakeholders. Country activity reports were presented and discussed. A summary document of achievements to date and of the meeting was produced.

Many field visits have been conducted for monitoring the project in the pilot countries. The coordination unit was able to visit all seven countries at least once in the year 2007 (The Gambia, Mali, Sierra-Leone, Nigeria, Benin, Ghana and Guinea). The unit was also involved in steering committee meetings of a number of countries. The visits helped to assess the extent of the progress made, specifically in technology transfer and private sector mobilization. They also helped in discussions with the authorities to draw attention on delays in the implementation of a number of activities scheduled under the AfDB project, specifically the construction of roads and stores.

Fund transfers for activities covered by the grant in the countries were made according to pilot country requests and after auditing previous expenses. Disbursements to date are presented in Table 4.

**Table 4:** Grant disbursements to member countries for the 2007 financial year as on 15 March 2008 (US\$)

Country	Annual Budget	Disbursement	Balance	Percent Disbursement (%)
Benin	33,568.57	29,931.97	3,636.60	83
The Gambia	38,289.15	38,289.15	0.00	100
Ghana	38,289.15	38,289.15	0.00	78
Guinea	35,841.45	30,000.00	5,841.45	84
Mali	38,289.15	38,289.15	0.00	100
Nigeria	63,815.26	30,000.00	33,815.26	47
Sierra Leone	38,289.15	37,000.00	1,289.15	97
<b>TOTAL</b>	<b>286,381.88</b>	<b>241,799.42</b>	<b>44,582.46</b>	<b>84</b>

The coordination unit received a visit from the AfDB. During discussions the Bank envoy commended the efforts made by the coordination unit and the results achieved to date. He regretted however a communication deficit between national coordination units and the regional coordination unit (reports and other documents are sent to the AfDB by national coordinators without any prior involvement of the regional coordination unit).

It must be pointed out that the regional coordination unit is led by a coordinator supported by a program assistant and technician. At the country level, staff include a coordinator, a monitoring and evaluation officer and an accountant.

## 6 Partnership and open days

Existing partnerships were developed specifically in Benin with the Songhai Center, Tunde SA, Sonapra and the Oxfam-Quebec. New partnerships were initiated with the FAO in Uganda and with the Avepalm company in Togo.

The coordination unit has attended open door days in pilot countries specifically in Nigeria, Mali, Benin and Gambia.

## 7 Current challenges

To face the rapid spread of NERICAs and the visible effects of their impacts in substantially improving the living standards of farmers in rural areas, many governments are showing more eagerness in the promotion of its cultivation. The major bottleneck however, remains the availability of enough quantities of quality seed. The regional coordination unit has received lately very many requests for huge quantities of seed from governments, development agencies, NGOs, individual farmers, farmers' groups and the private sector.

To meet these pressing seed requests from various places, a number of unqualified private individuals and groups have become seed producers, thereby resulting in a proliferation of substandard seed. The coordination unit took note of this and found out that the challenge ahead was enormous, involving specifically government accountability in the establishment of a streamlined, low cost, open and sustainable quality seed production system. This is why training sessions in seed multiplication techniques are held to build the capacity of the various operators to address the seed problem.

## 8 Success stories in 2007

Just like in previous years, many NERICA success stories were reported in 2007.

- **In Mali**, Mr. Bakary Togola was able to make a profit of US\$100,000 from the sale of NERICA seed. He was also able to raise the area under NERICA cultivation from 4 ha in 2004 to 60 ha in 2006 and 80 ha in 2007.
- **In The Gambia**, retired civil servants and farmers attested to the profitability of NERICA cultivation. "Now we can send our children to school", said Mr. Oumar Bojang, Secretary of the Yirima Kafo farmer association in Jambur. Through NERICA cultivation, the Yirima Kafo membership of 180 women and 20 men with the support of the AfDB project made a profit of about US\$4,000 in 2006 and were able to open a bank account.
- **In Benin**, an impact study covering 24 villages conducted by AfricaRice and its partners, has shown the positive impacts of NERICA adoption on the livelihood of a number of farmers. Better harvests with higher yields have helped NERICA producing farmers make more money to support schooling, medical care and a better diet. Schooling rate has increased by 6% in the study area and farm families were able to spend an additional US\$20 in school expenses per child and US\$12 in health care per sick child.
- According to the FAO, rice production has markedly increased in 2007 in West Africa with the diffusion of NERICA varieties. The most striking case occurred in Guinea where production increased by 5% compared to 2006, the highest increase in history with the adoption of NERICA varieties.

## 9. Conclusion and outlook

The year 2007 was therefore, full of many pleasant developments that highlighted the eagerness of farmers to adopt NERICA varieties. According to FAO, rice production has markedly increased in 2007 in West Africa with the diffusion of NERICA varieties. This has delighted the regional coordination unit, which has invited the operators to mobilize more for the common fight, which is the fight for food security. National coordinators have been urged to double their efforts in the year 2008 for more success and to address the issue of construction works of roads and stores. The sustainable availability of quality seed being the challenge to face, the coordination unit would like every country to take measures to establish a reliable and sustainable seed system.

The current food crisis and its related seed requests are all beckoning to us. ARI will do all it can to increase its seed production in 2008 and beyond.

### 2008 Budget

#### **The Multinational (AfDB) NERICA Diffusion Project**

- Technology transfer	US\$ 98,395.45
- NARS Grant	US\$368,717.00
- Coordination unit	US\$100, 518.32
Total (1)	US\$567,630.46

#### **Capacity building for NERICA Diffusion (UNDP)**

Seed Production	US\$5000.00
Annual/Workshop Review	US\$27,000.00
Total (2)	US\$32,000.00

#### **Improving the competitiveness of rice in Central Africa (CFC)**

AfricaRice	US\$346,128.00
NARS	US\$275,400.00

#### **For the following activities:**

- Seed production
- Capacity building
- Baseline investigation
- Coordination

Total (3)	US\$621,528.00Grand
Total (1+2+3)	US\$1,220,158.46

## **Publications**

Ikeda R, Sokei Y and Akintayo I. 2007. Reliable multiplication of seed for NERICA varieties of rice, *Oryza sativa* L. Genet Resour Crop Evol, 54:1637-1644

Oikeh SO, Abaidoo RC, Houngandan P, Rahimou I, Niang A and Akintayo I. Integrated soil fertility management involving promiscuous dual-purpose soybean and upland NERICA enhanced rice productivity in the savannas. AfricaRice MS: 070707. Nutrients Cycling in Agroecosystems.

Akintayo I. 2007. The African Rice Initiative: History and achievements. International Rice Commission Newsletter, vol. 56

Rice-based recipes for rural and urban households in Africa

## **Presentations at conferences and meetings**

Akintayo I. *The African rice initiative and NERICA dissemination* presented in Tokyo, Japan, September 2007

Akintayo I. *The African rice initiative for improved rice dissemination* presented at the FAO seminar, Accra, Ghana, 28-30 May 2007.

Akintayo I. *The African rice initiative for improved rice dissemination* presented at a seed production training course, Porto-Novo, Benin, August 2007.

Akintayo I. *Status of NERICA dissemination: 2007 outlook*, Uganda, November 2007

Akintayo I. *Report by African Rice Initiative Coordinator* presented at the 27th Session of the Ordinary Council of Ministers, Abuja, Nigeria, 27-28 September 2007.

Akintayo I. *The African Rice Initiative for improved rice dissemination* presented at the IRRI-AfricaRice-CIAT Alignment Meeting, Cotonou, Benin, June 2007.

Akintayo I. *NERICA Dissemination in SSA: Status and way forward* presented at the fifth ARI steering committee and experts' meeting, Cotonou, Benin, 23-25 April 2007.

Akintayo I. *The African Rice Initiative for the development of the rice sector: Development in SSA* presented at a meeting on African Research Policy, Cotonou, Benin, June 2007.

Akintayo I. *Status of implementation of NERICA dissemination project in pilots countries*, Kaduna 2007.

## **ANNEX VII**

### **Report of the Inland Valley Consortium (June 2006 – May 2008)**

**Dr Paul Kiepe**  
*Scientific Coordinator*

#### **1 About the Consortium**

During its 15 years of existence, the Inland Valley Consortium (IVC) has focused on the lowlands and generated a platform for scientific and technical interactions between partners at the national, regional and international level. IVC stimulated national capacity building on inland valley characterization, development approach issues and the development of sustainable inland valley ecosystems. Through the development of this expertise, IVC has contributed to the national dynamic on the sustainable development of inland valleys.

The two principal donors, France and The Netherlands, stopped funding IVC from December 2006. The only consortium donor left in 2007 was the World Bank. Other funds came from restricted projects such as Sustainable Productivity Increase of Rice in the Inland Valleys of West Africa (SPIRIVWA), Community-based Fish Culture (CBFC) and Ants-based Pest Control (ABPC).

The activities continue in most member countries and the national coordination units (NCUs) have submitted a number of research proposals. However, the majority of these proposals were not in line with the recommendations of the Center-Commissioned External Evaluation of IVC. Phase III focuses exclusively on trans-boundary, multi-annual projects, while the number of trans-boundary project proposals originating from IVC members is still below expectation.

#### **2 Progress made so far**

Besides the three restricted projects mentioned above, there is one successful trans-boundary, multi-annual project called the National Inland Valley Information System of Africa (NIVISA).

##### **2.1 Knowledge management and sharing**

The NIVISA project gathers all geo-referenced data on inland valleys in each country in a relational database. The project is presently operational in five countries; Benin, Burkina

Faso, Mali, Guinea and Togo. Mali is the last country to join while the database for Burkina Faso has already been finished.

## 2.2 Technologies developed, validated and disseminated

- Book: Manuel Technique d'Aménagements de Bas-fonds Rizicoles au Burkina Faso (2006)
- Video: Aménagements des Bas-fonds Rizicoles du Burkina Faso (2007)
- Database: National Inland Valley Information System of Burkina Faso (2007)

## 2.3 Capacity building and resource mobilization

- Formation sur l'utilisation de la base de données sur les résultats de l'inventaire des bas-fonds (NIVISA-TG), Lomé, June 2006
- Formation sur l'utilisation de la base de données sur les résultats de l'inventaire des bas-fonds (NIVISA-BF), Ouagadougou, August 2007
- Training of trainers in participatory learning and action research for integrated rice management (PLAR-IRM), Umuahia, Nigeria, May 2007
- Training of trainers in PLAR-IRM, Bobo-Dioulasso, Burkina Faso, May 2007
- Formation sur la construction de la base de données sur les résultats de l'inventaire des bas-fonds (NIVISA-ML) Sikasso, Mali, July 2007

## 3 Staffing

### *Regional Coordination Unit*

Name	Affiliation	Function
Paul Kiepe	AfricaRice	Coordinator
Carine Kan	AfricaRice	Secretary
Jonne Rodenburg	AfricaRice	Weed Scientist
Marcel Meijs	Left	GIS Specialist
Moussa Mahaman	Deceased	GIS Specialist
Philip Idinoba	Left	Agronomist

### ***National Coordination Units***

<b>Name</b>	<b>Affiliation</b>	<b>Country</b>
Gustave Dagbenonbakin	INRAB	Benin
Youssouf Dembele	INERA	Burkina Faso
Julius Takow	IRAD	Cameroon
Camille Koffi	CNRA	Cote d'Ivoire
Ebenezer Annan-Aful	CRI	Ghana
Baourou Mansare	IRAG	Guinea
Abdoulaye Hamadoun	IER	Mali
Samuel Bakare	NCRI	Nigeria
Modou Sene	ISRA	Senegal
Mohamed Kandeh	LWDD	Sierra Leone
Ansumana Gibba	NARI	The Gambia
Alami Adou Rahim	ITRA	Togo

### ***Consortium Steering Committee***

<b>Name</b>	<b>Affiliation</b>	<b>Function</b>
Ansumana Gibba	NARI	President
Paul Kiepe	AfricaRice	Secretary (non voting)
Ebenezer Annan-Aful	CRI	Member
Abdoulaye Hamadoun	IER	Member
Gustave Dagbenonbakin	INRAB	Member
Moise Sonou	FAO	Member
Bruno Lidon	CIRAD	Member
Pieter Windmeijer	WUR	Member
Vincent Mama	CORAF	Member
Marco Wopereis	AfricaRice	Member ex-officio

The Consortium Steering Committee (CSC) met in September 2006 in Cotonou to discuss and approve the budget. Since there was no consortium-wide funding, the CSC did not meet in 2007. The next IVC Workshop is planned for September 2008, which will be combined with a CSC Meeting.



## 4 Outlook

Several new initiatives have been undertaken so far. Two consortium-wide concept notes have been sent to the Government of Japan and the European Union, respectively. Both initiatives will be discussed during the next annual workshop, which is scheduled to take place from 22-25 September 2008 in Cotonou.

## 5 Budget and Projects funded in 2006-2008

### 5.1 Overall Budget 2006-2008 (in US\$)

Donor	2006	2007	2008
Netherlands	360,000	180,000	-
France	75,000	-	-
World Bank	40,000	75,000	27,200
Community-based Fish Culture	26,241	26,241	26,241
SPIRIVWA	-	402,748	161,729
Ant-based Pest Control	10,000	10,000	20,000
<b>Total</b>	<b>511,241</b>	<b>693,989</b>	<b>235,170</b>

### 5.2 Value addition projects funded in 2007 (in US\$)

Country	Project	Amount
Burkina Faso	Finalisation et valorisation de la base de données sur les bas-fonds au Burkina Faso à travers l'organisation d'un atelier national	5,615
Mali	Démarrage de l'inventaire et des enquêtes et la collecte des données pour la construction de la base de données sur les bas-fonds au Mali	15,625
Togo	Finalisation et valorisation de la base de données sur les bas-fonds au Togo à travers l'organisation d'un atelier national	9,921

Country	Title	Degree
Benin	Etude des expériences d'aménagement hydroagricole des vallées de l'Ouémé et du Zou à Zagnanado et Covè (Justin Djagba)	Ingenieur Agronome
Benin	Innovations paysannes pour la gestion intégrée des adventices dans les rizicultures des communes de Dassa-Zoumé et de Glazoué au Bénin (Benjamin Kouazoundé)	Ingenieur Agronome
Benin	Riziculture au bas-fonds au Bénin: évaluation des problèmes phytosanitaires causes par <i>Rhamphicarpa fistulosa</i> dans les communes de Dassa-Zoumé et de Glazoué (Norliette Zossou)	Ingenieur Agronome

#### 5.4 Student being trained in 2007-2008

Presently four students are being trained at the MS level; three from the University of Abomey-Calavi (Benin) and one from the University of Bamako (Mali).

## **ANNEX VIII**

### **Report of the West and Central Africa Rice Research and Development Network (ROCARIZ)**

**Dr Lawrence T Narteh**

*ROCARIZ Coordinator*

#### **Summary**

The West and Central Africa Rice Research and Development Network (ROCARIZ) has been able to keep faith with its members over the years despite an acute downturn in funding which has adversely affected its smooth operations. This report, covering the period from July 2006 to May 2008, highlights the modest achievements of the network in technology testing, dissemination and validation in some of the member countries. Since September 2006, attempts have been made at the systematic inclusion of hitherto 'non active' countries such as Mauritania, Cameroon and Cote d'Ivoire in ROCARIZ operations. Attempts to bring Liberia and Guinea Bissau are still fraught with some challenges.

The impressive participation of 55 scientists from ROCARIZ at the Africa Rice Congress in Tanzania in August 2006, the spirited participation of scientists in the monitoring tour to Senegal and Mauritania in October 2007, the targeted training of NARS scientists on impact assessment methodology and the training of local seed operators in Togo in September 2006, attest to the determination to ensure that ROCARIZ remains a viable machinery for AfricaRice to partner with its member country scientists to achieve impact in rice science.

High quality scientific papers were received at both the 2004 Regional Rice Research Review (4Rs) and the 2006 Africa Rice Congress. The high interest shown by national scientists and their AfricaRice counterparts in the conduct of the visiting fellows program suggest that there is synergy between AfricaRice and the network which must be encouraged.

AfricaRice is currently seeking donors to support the position of the ROCARIZ Coordinator and related network activities because funds from the hitherto main donor, USAID, have dried up. When funds are obtained, it should be possible for the network to regain its former luster, albeit under a different arrangement and configuration.

## **1 About the network**

ROCARIZ is an AfricaRice-CORAF/WECARD-NARS rice research network that generates and disseminates relevant rice technologies to end users through breeding, natural resource management, integrated pest management, economics and participatory innovation technology transfer task forces. A Steering Committee comprising NARS scientists and AfricaRice representatives approves the Coordinator's work plan and budget which includes the disbursement of small research grants and training activities targeted at NARS partners. In collaboration with the International Network for Genetic Evaluation of Rice in Africa (INGER-Africa) and using participatory learning and action research (PLAR), ROCARIZ conducts multidisciplinary monitoring tours to member countries with NARS scientists and rice farmers to evaluate the network's research and development activities.

ROCARIZ's strategic plan normally provides for a two-year funding cycle, which has changed drastically because of low availability of funds disbursed on an annual basis. The funds enable NARS scientists and development agents to carry out studies on rice-based systems to meet the following objectives:

- Increase rice genetic diversity in the region;
- Increase rice productivity and production in the region, while conserving natural resources;
- Make the tools, techniques and mechanisms available to NARS to strengthen research and development (R&D) capacity and transfer technologies; and
- Enhance partnerships among all stakeholders for effective participatory technology transfer and market development.

So much has been achieved since ROCARIZ came into being in 1999 thanks to the financial support of USAID and the European Union (EU). Since January 2005 however, the network has been experiencing a downturn in funding because the major donor, USAID, and the major stakeholder, CORAF/WECARD, have proposed a major shift in its operations. This has drastically affected the operational budget and the network's activities. In 2006 and 2008, the network did not receive any funding.

## **2 Progress made so far**

The network made some strides during the 2006-2008 review period when selected projects were implemented in some countries through a competitive grant scheme. The lull in funding meant a drastic reduction in operations although efforts were made to bring into the network Guinea Bissau, Liberia, Chad and Cote d'Ivoire to enable the network to reach its full potential in discharging its functions to fulfill its mandate.

The following major achievements could be noted:

- The network sponsored 55 scientists from member countries to take part in the 2006 Africa Rice congress in Dar es Salaam, Tanzania.
- The Economics Task Force organized two training workshops in Tanzania and Ghana in 2006 and 2007 respectively where 23 scientists from NARS were trained.
- The Economics Task Force supported three visiting fellows to work with the AfricaRice Impact Economist to write full scientific papers based on earlier work done in their respective countries.
- A monitoring tour was organized to Senegal and Mauritania in October 2007 to exchange scientific and technical views with the many operators in the field (e.g., CORAF/WECARD, ISRA, SONADER, FEPRODES) and many lessons were learnt.
- Modest achievements have been made in technology testing and impact assessment in most of the countries by all five operating task forces.

## **2.1 Knowledge management and sharing**

Apart from localized training and the visiting fellows program which were implemented, the network could not organize regular task force meetings and many of the discipline-related training programs.

Four prerequisites for rice-based green revolution in Africa came out of the 2006 Africa Rice Congress. They were policy, capacity building, technologies and infrastructure. Over 100 abstracts were received. Subsequently, 66 full scientific papers were received from scientists and policy makers who attended the Congress. Eight papers have been selected by the African Crops Science Journal published by Makerere University, Kampala, Uganda. The remaining 52 papers are being published as part of the proceedings of the Congress.

## **2.2 Major publications**

- English and French versions of the proceedings of the workshop on *Iron toxicity in rice-based systems in West Africa* held in March 2003 in Cotonou, Benin, have been published. It contains 14 papers.
- Proceedings of the Third Regional Rice Research Review (4Rs) held in Accra, Ghana, in 2004 have also been published. It contains 28 peer-reviewed papers on aspects such as rice breeding and improvement, integrated pest management, natural resources management, socio-economics and technology transfer.

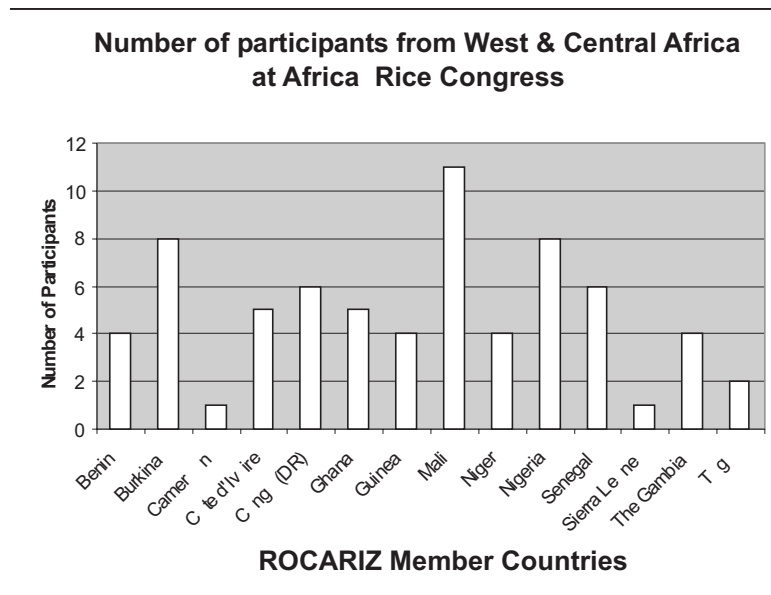
### Other publications

Narteh LT, Winslow M, Youm O and Keya SO. 2006. Partner-driven agricultural research for development networks in West Africa: the case of ROCARIZ. *KM4D Journal*. 2(2): 84-90. [www.km4dev.org/journal](http://www.km4dev.org/journal).

Narteh LT, Millar D and Beks B (editors). 2006. Abstracts for the Africa Rice Congress. Theme: Beyond the First Generation NERICAs in Africa: Paradigms and partnerships for the next decade. AfricaRice, Cotonou, Benin. [www.africaRice.org](http://www.africaRice.org).

Narteh LT, Millar D and Beks B (editors) 2006. Proceedings of the 3<sup>rd</sup> regional rice research review. AfricaRice, Cotonou, Benin. [www.africaRice.org](http://www.africaRice.org).

Audeber, A, Narteh LT, Kiepe P, Millar D and Beks B (editors). 2006. Iron toxicity in rice based system in West Africa. In Press. Africa Rice Center (AfricaRice). [www.africaRice.org](http://www.africaRice.org).



## 2.3 Technologies developed, validated and disseminated

### Results from the Task Forces:

#### 2.3.1 Breeding

- Studies from Burkina Faso show that in the valley bottoms or flood plains, yield levels ranged between 4.73 and 4.28 t ha<sup>-1</sup>, whereas in the hydromorphic zones, yield levels ranged between 4.58 and 4.0 t ha<sup>-1</sup>. In the irrigated paddies, yield levels ranged between 2.13 and 2.0 t ha<sup>-1</sup>. The best performing varieties were L-2-4, WAS 161 B 9 3 and WAS 161 B -5-3 with a mean yield of 3.6 t ha<sup>-1</sup> and mean growth duration of 88-100 days.
- Forty-two lowland fixed lines were tested at M'pourie near Rosso on the Mauritanian side of the Senegal River Valley using a participatory varietal selection approach. Overall, the yield levels recorded were as high as 9.2 tons ha<sup>-1</sup> (WAS 63-22-5-9-10-1) while the lowest yield recorded was 2.7 tons ha<sup>-1</sup> (WAS 173-B-B-10-6-5). WAS 197-B-6-3-11 produced the highest number of tillers per m<sup>2</sup> (568) while WAS 173-B-B-10-6-5 recorded the lowest number per m<sup>2</sup> (232). It took 120-124 days for nine of the tested lines to reach maturity and this appears to be the modal class, although two of the varieties matured in 98 days.
- In observational nurseries in Nobewam, Ghana, 80 rice varieties were evaluated in 2004 and 2005. Lowland rice progenies (entries) WAS 186-B-8-B-2 and WAS 161-B-9-1-FKR 1 showed severe symptoms of iron toxicity that was not the characteristic bronzing. Symptoms were reversed when severely affected plants were uprooted and potted, and after dry spells. Iron content in roots and lower leaves of WAS 161-B-9-1-FKR 1 and tolerant Bouake 189 were 0.5 mg kg<sup>-1</sup> for both varieties. Upper leaves of the former variety had 450 compared to 506 mg kg<sup>-1</sup> for Bouake 189. Manganese levels for Bouake 189 were 112 (roots), 162 (lower leaves) and 134 mg kg<sup>-1</sup> (upper leaves). Susceptible WAS 161-B-9-1-FKR 1 had corresponding values of 9.6, 6.2 and 0.4 mg kg<sup>-1</sup>. This variety could therefore be compared with other susceptible checks for Fe toxicity. Studies in 2005 also showed that severe rice yellow mottle virus (RYMV) infestation occurred resulting in yellowing, stunted growth and complete yield loss for some affected plants. The site is therefore identified as a suitable 'hot spot' for testing for resistance to RYMV.

#### 2.3.2 Integrated pest management

At Sébéri, 35 km south east of the capital of Niamey, Niger, 12 lowland, inter- and intraspecific rice varieties were evaluated for weed competitiveness in the wet season of 2005. Parameters evaluated were weed (air-dried) biomass and rice grain yield. The results showed that grain yield for the varieties in the weeded plots were superior (4.22 t ha<sup>-1</sup> as against 3.76 t ha<sup>-1</sup>).

Recorded mean weed biomass was 4.54 t ha<sup>-1</sup> for no weed control and 3.72 t ha<sup>-1</sup> for the weeded treatments.

Two experiments were conducted during the cropping season of 2005 to evaluate the responses of two NERICA rice varieties to weed interference in the uplands at Nyankpala near Tamale in the Northern Guinea Savannah ecological zone, Ghana. Weed infestation 6 weeks or more after planting (WAP) significantly depressed plant height (at 12 and 15 WAP), leaf area index (LAI), tiller count m<sup>-2</sup>, straw weight at harvest and grain yield. Keeping the two NERICA varieties weed-free for up to 6 WAP resulted in plant height, LAI, tiller count m<sup>-2</sup>, straw weight and grain yield similar to those kept weed-free throughout crop growth (at 12 and 15 WAP). The critical period of weed interference with the two NERICA varieties in the upland ecology were generally similar and was between 3 and 6 WAP. This is an important guide for the NERICA dissemination program in Ghana and the target for farmers with respect to the optimum timing of weed control to maximize grain yields. Season-long weed infestation resulted in 66% and 72% reduction in grain yield of NERICA 1 and NERICA 2, respectively suggesting the apparent vulnerability of the crop to weed infestation. The occurrence and composition of weeds at the two locations were similar, broadleaves (66%), grasses (23%) and sedges (11%). The most dominant weeds were *Brachiaria lata*, *Celosia laxa*, *Cleome rutidosperma*, *Commelina africana*, *C. benghalensis*, *Cyperus spp.*, *Digitaria horizontalis*, *Mitracarpus villosus*, *Mollugo nudicaulis*, *Paspalum scrobiculatum* and *Scoparia dulcis*.

In 2007, 16 genotypes were evaluated at the perimeter rizicole de la coopérative départementale des riziculteurs (CODERIZ) de Tiassale (Cote d'Ivoire) to evaluate which are equally resistant to rice blast as well as RYMV. Results showed no statistically significant difference in the severity of blast in the tested lines. On a scale of 1-7 (1=lowest and 7=highest infection), the mean infection was noted to range between 1 and 3. The control, Bouake 189, recorded an infection level of 2.75, which confers resistance to blast.

### 2.3.3 Natural resource management

The use of improved varieties requires closely monitored fertilizer application regimes for the sustainability of the system. Agronomic trials in Mali showed that the fertilizer rate recommended by research combined with organic matter (manure 5t ha<sup>-1</sup>) produced the highest paddy yield (6 t ha<sup>-1</sup>), followed by the standard extension dosage (5.5t ha<sup>-1</sup>) and farmer dosage (5t ha<sup>-1</sup>). Partial economic evaluation showed that standard treatment dosage is more economical with a profit margin of 346,717 CFA/ha and a profit/cost ratio of 0.40. The recommended dosage produced a profit margin of 277,085 CFA/ha with a ratio of 0.36 compared to 179,245 CFA/ha and a ratio of 0.28 for farmer dosage. The study concluded that the optimal soil fertilization level for profitability calls for a restitution of mineral elements used by the rice crop as well as consistent mineral fertilizer application and organic manure supply.



### 2.3.4 Economics

Impact assessment studies in Mali identified sustainable farmer access to financial services as a major problem in the irrigated zone of “Office du Niger”, the main rice production zone and an agricultural credit hub of the country. Studies were carried out to identify the level of indebtedness of farmers and involved 177 operators distributed within 14 villages of “Office du Niger” operation zone. Analysis of the results showed rates of indebtedness averaged around 30,000 and 60,000 CFA/ha and affected all operator categories. It was higher among operators of un-rehabilitated plots. The causes were both endo- and exogenous. Endogenous causes were linked to poor loan allocation, non compliance with sequence in the cropping patterns and lack of agricultural equipment. Exogenous factors were linked to socioeconomic changes, rainfall hazards and lack of consultation among local financial institutions.

### 2.3.5 African Rice Initiative (ARI) baseline studies

As part of AfricaRice efforts at disseminating NERICAS to small scale farmers in Africa, the Center through the Africa Rice Initiative (ARI) received funding for dissemination of improved rice seeds to seven pilot countries - The Gambia, Guinea, Sierra Leone, Ghana, Benin, Mali and Nigeria. ROCARIZ provided a useful avenue as the network to conduct research on baseline studies because it had trained national scientists on impact assessment methodology. Thus the project titled *Ex-post and ex-ante impact of NERICAs and complementary technologies* was launched and ROCARIZ was responsible for carrying out the research. The Economics Task Force received and distributed US\$42,000 to the seven pilot ARI countries. The national agricultural research institutes of The Gambia, Guinea, Sierra Leone, Ghana, Benin, Mali and Nigeria each received US\$6,000. Subsequently Ghana, Nigeria, Mali and Benin received additional funds from UNDP to further support data collection given the scope of work to be executed.

## 3 Capacity Building

A) Impact Assessment Methodology Training, 7-9 August 2006, Dar es Salaam, Tanzania. The training was to equip social scientists from mostly ARI pilot countries to scientifically measure the impact of the dissemination of new rice varieties in the different rice growing ecologies in their respective countries. Thirteen scientists from Benin, Gambia, Ghana, Mali, Nigeria, Senegal, Sierra Leone, Tanzania, Togo and Uganda were trained in the methodology of impact assessment. The 3-day workshop introduced participants to concepts, economic models, econometrics, state of the art methods and tools as well as practical issues related to survey design, and the organization and management of survey data.

B) Training of Trainers on Rice Seed Production, 4-8 September 2006, Kpalime, Togo. The course on seed production was organized in collaboration with Institut Togolais de recherche agronomique (ITRA) and the Institut de conseil et d'appui techniques (ICAT). Its objective

was to keep Togolese national scientists abreast of current trends in rice seed production, legislation and storage/sales practices; and at the same time train seed operators in the field who would subsequently go out and train other lower level seed growers. Among the outputs of the training was a proposal to be developed for a community based seed system (CBSS) to support rice seed production in Togo.

C) Impact Assessment Methodology Training, 23-25 August 2007, Accra, Ghana. Thirteen NARS scientists from Benin, Burkina Faso, Ghana, Gambia, Guinea and Nigeria were trained in advanced impact assessment methodologies. Resource persons came from AfricaRice and the University of Ibadan, Nigeria. The major topics addressed were conceptual framework for impact assessment, ex-ante and ex-post ante and its implications for methodology application; econometrics; use of ACCESS, SPSS and STATA software and introduction to ATE. Participants have subsequently been fully engaged in data collection in the field.

D) Visiting fellows:

- Abdoulaye Fall from ISRA, Senegal, visited AfricaRice for from April to May 2006) and worked on a paper titled *The impact of credit on rice productivity in Senegal*.
- Yenizie Kone from IER, Mali, visited AfricaRice from October to December 2006 and worked on *L'évaluation de l'impact de l'utilisation du credit sur les exploitations familiales de l'office du Niger, Mali: Analyse a partir d'un modele de menage agricole*.
- Lamin Dibba from NARI, Gambia, visited AfricaRice from November 2007 to February 2008 and worked on *NERICAs in The Gambia: Evidence from two case studies on adoption and impact*.

#### **4 ROCARIZ monitoring tour**

A monitoring tour was organized to Senegal and Mauritania, from 22 to 28 October 2007. The participating scientists understood the constraints faced by rice farmers in the Senegal River Valley and helped to prioritize areas of research and development intervention. The tour enabled the network's managers to discuss with Directors of Research of Senegal and Mauritania on the way forward to address the constraints faced by farmers in the rice sub-sector. The main actors such as ISRA, CORAF/WECARD, AfricaRice (St Louis), GTZ, TripleAID, CNARDA, and SONADER (Mauritania) clearly showed their commitment and interest in working and forging closer links with ROCARIZ.

The salinity problems in the Fatick Region of Senegal, the seed problem and the need for official action to make sure new varieties are released early after several years of testing came to the fore as major areas for the attention of the network. Women farmers in the Senegal River Valley were not well integrated in rice cultivation, although FEPRODES (St. Louis)

serves as a unique model. Farmer training and the need to evaluate farmers' roles in producing and selling seed to other farmers were considered important and called for a deeper study so as to document our understanding and up-scaling of the 'farmer to farmer' seed production mechanism.

Bacterial blight is still a major problem in the valley and the rice variety Sahel 202 seems to be worst affected. The many lessons learnt in the monitoring tour should help the network glean out the major research and development issues for farmers in the Senegal River Valley.

## 5 Staffing (Coordination Unit and Steering Committee)

The leadership of the ROCARIZ Steering Committee has changed since August 2006 with Dr Mamadou Coulibaly (IER, Mali) as the Chair and representing the Breeding Task Force. Dr Yacouba Doumbia (IER, Mali) has replaced Godwin Olaniyan (WIN, Nigeria) as Chair of the Technology Transfer Task Force. Similarly Ms Vivian Ojemohon (NCRI, Nigeria) has replaced Mr. Sekou Diawara (IRAG, Guinea) as Chair of the Economics Task Force. Drs Blaise Kabore and Zacharie Segda (INERA, Burkina Faso) represent the Integrated Pest Management and the Natural Resources Management Task Forces, respectively. The AfricaRice membership has not changed although AfricaRice management has been notified of the need to review the mandate of serving officers. CORAF/WECARD has announced the appointment of Dr Ernest Asiedu as Coordinator of its newly formed Cereals network. He is based in Dakar, Senegal. The ROCARIZ require that steering committee members be replaced through an election process at the biannual General Assembly meeting. A meeting should have been held in 2008 but with the precarious financial position of the network, this does not look possible. Changing the membership of the ROCARIZ Steering Committee can be considered at the July 2009 Africa Rice Congress tentatively scheduled for Dakar, Senegal.

**Table 1.** ROCARIZ Task Force leaders, their countries, institutions and dates elected into office

Mamadou Coulibaly	IER, Mali	Breeding	2004
Yacouba Doumbia	IER, Mali	Technology Transfer	2006
Vivian Ojemohon	NCRI, Nigeria	Economics	2006
Blaise Kabore	INERA Burkina	IPM	2004
Zacharie Segda	INERA, Burkina	NRM	2004

***Summary of Steering Committee activities:***

- Meetings (April 2005, March 2007)
- Monitoring tours (Niger, Burkina Faso & Mali; 2005; Senegal and Mauritania, 2007)
- Africa Rice Congress (July-August 2006)
- Selection of projects (42 in 2005; 8 in 2007)

## **6 Future prospects**

With the completion of the CORAF/WECARD Strategic Plan based on the CAADP process, it is expected that new sources of funding will be obtained for the network to be re-invigorated. With the current low funding, there is a lull in operations. For ROCARIZ to be as active as it was remains a challenge. The coordinator's tenure ends in December 2008 and a decision will have to be made on the form the network would take by January 2009. The possible options are as follows:

- Maintaining the network as it is with support from AfricaRice until a donor can be found.
- Reducing the coordination office to keep costs to bearable levels with oversight from the DDG's office.
- Evaluating how the network could operate under the suggested Sub-Saharan Africa Rice Consortium (SARC) proposed under the IRRI/AfricaRice/CIAT programmatic alignment.
- A combination of any of the above.

**Table 2.** Summary of ROCARIZ financial report for period Jan-Dec 2007\*

Travel and subsistence (local and international)	\$12,985
Transfers to NARS	\$30,253
Monitoring tour	\$41,125
Visiting scientists	\$44,035
Stationery and operations	\$8,760
Overhead charges (25%)	\$34,288
<b>Total</b>	<b>\$171,443</b>

*\* Funds were not received in 2006*

## ANNEX IX

### Report of the International Network for Genetic Evaluation of Rice in Africa (INGER-Africa)

**Eklou A. Somado (PhD)**  
*INGER-Africa Coordinator*

#### **1 About the network: Historical background**

In 1975, the International Rice Research Institute (IRRI) launched the International Rice Testing Program (IRTP) as a systematic global program between CG centers and the national rice research programs for the collection, distribution and wide testing of rice genetic materials. This program was later re-designated the International Network for Genetic Evaluation of Rice (INGER).

In 1985, INGER was reorganized to provide regional focus - INGER–Asia/Global which also looked after global needs was placed under the responsibility of IRRI; INGER-Latin America and the Caribbean was placed under the responsibility of CIAT, and the oversight for INGER-Africa was provided by AfricaRice, though it was hosted at the time by IITA in Nigeria.

In 1990, a decision was made to relocate INGER-Africa to AfricaRice’s headquarters. While awaiting this decision to become effective AfricaRice and its national partners decided in 1991 to launch varietal improvement task forces to support rice breeding activities in the major rice growing ecologies, including the rainfed upland and lowland, irrigated schemes and the mangrove swamps. The transfer of INGER-Africa operations to AfricaRice became effective in 1997.

INGER was initially funded by the United Nations Development Program (UNDP) and other donors. At present each Center supports its INGER activities.

The overall objective of INGER-Africa has been to link national rice improvement programs in Africa and international agricultural research centers and to promote genetic diversity for different ecosystems through global exchange, evaluation and utilization of improved breeding materials originating from sources worldwide.

This innovative germplasm exchange approach has hastened the dissemination and the adoption of new and better varieties in Africa in the recent years and has contributed to

increased biodiversity at the farm community level. Data have shown that one decade (1994-2004) of germplasm exchange and testing by INGER-Africa has led to nearly 200 improved varieties being selected, released and grown by farmers in sub-Saharan Africa (SSA).

## **2 Progress made so far**

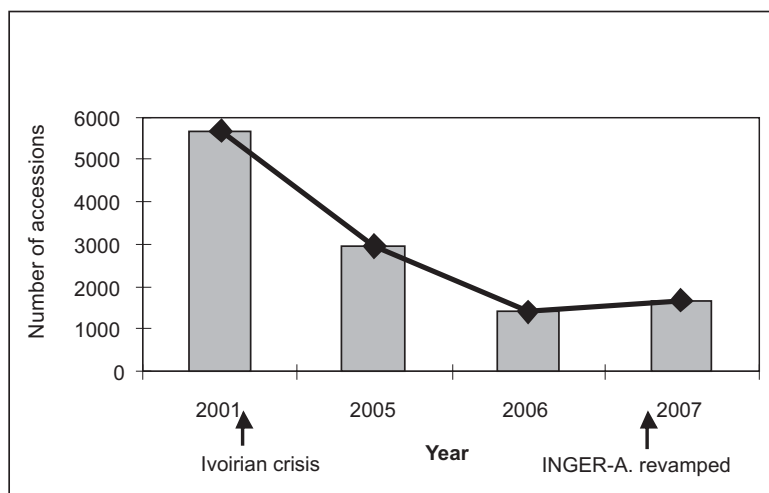
The following activities have been routinely undertaken by INGER-Africa: (i) seed handling, storage, trial composition and dispatch; (ii) training of farmers for community seed production; (iii) impact assessment and biodiversity studies/analysis of results; (iv) INGER review and planning workshop; and (v) training NARS scientists in data analysis and interpretation.

### **2.1 Knowledge management and sharing**

Superior varieties of rice with resistance to stress, shared and widely tested in Africa. INGER-Africa responds to the rice germplasm needs of more than 30 SSA countries and does so by multiplying, purifying and dispatching seeds of improved varieties initially received from sources across the world. These seeds are tested by breeders in the national programs and the best lines are released for cultivation by farmers. Prior to the Ivorian crisis in 2002, an average of 3,000 seed samples was dispatched yearly to various stakeholders in SSA.

From April 2007, when AfricaRice resolved to revamp INGER-Africa, to March 2008 the network has responded to the rice germplasm needs of 12 countries in SSA and three in Asia and Europe by multiplying and purifying a total of 1,747 accessions of rain-fed upland, rain-fed lowland and irrigated lowland germplasm initially developed by AfricaRice's breeders or received from various sources across the world (i.e. IRRI and CIAT). This number is higher by 20% than that distributed over the same period in 2006-2007, prior to the appointment of the INGER-Africa Coordinator in 2007 (Figure 1). The upward trend has been attributed to the financial support from the Canadian International Development Agency (CIDA) which provided seed money of US\$20,000 in the framework of the IRRI-CIAT-AfricaRice alignment process. This little push has helped revamp the exchange of rice germplasm through INGER-Africa.

In 2007, a total of 956 seed samples were dispatched to West African countries such as Benin, Burkina Faso, Sierra Leone, Nigeria and Liberia while 791 samples were sent to the Eastern, Central and Southern African (ECSA) countries of Ethiopia, Tanzania, Kenya, Congo, Uganda, Rwanda and the Democratic Republic of Congo. Much of this material was dispatched for testing in participatory varietal selection trials in various ecologies and the best-adapted lines will be released for cultivation by local farmers. Upon request, 69 seed samples were also sent to Japan, South Korea and the United Kingdom during the same period.



**Figure 1:** Evolution of germplasm distribution by INGER-Africa as affected by limited financial support in the aftermath of the Ivorian crisis

## 2.2 Technologies developed, validated and disseminated

Dissemination of successfully tested germplasm improved through farmer community-based seed management, multiplication and conservation

Farmers and farmer groups were trained to produce, manage and conserve their own seeds of improved/released varieties in order to hasten their diffusion and adoption. In 2002, prior to the Ivorian crisis, INGER–Africa had continued to train farmers in collaboration with two local NGOs (OVDL and ACOPCI) operating in the community-based seed production project in Côte d’Ivoire. INGER-Africa provided 2 tonnes of seed and 1 tonne of breeder seed of two improved upland varieties to each of the two NGOs. INGER-Africa and its collaborating NGOs trained farmers in the western region of the country on seed production and management techniques. Seed produced by these farmers served to extend the training activities to more farmers. A total of 40 tonnes of seeds of NERICA 1 and NERICA 2 were distributed to farmers for production in seven regions of Côte D’Ivoire. More than 6,000 farm families in 200 villages across the country were involved in the activity. These farmers were representatives of farmers’ groups whose members were mostly women. They were carefully selected to serve as community seed producers. This alliance with local NGOs and the active involvement of farmers enhanced the rapid dissemination of these modern varieties in the country. Unfortunately, the war heavily affected some of these farmers’ groups in the northern and western parts of the country. There are reports that the local seed bank and seed stores were completely destroyed during the war in Cote d’Ivoire. AfricaRice is helping with post-conflict rebuilding of rice production in the country through the restoration of farmers’ germplasm previously collected and conserved in AfricaRice’s genebanks.



### **2.3 Capacity building and resource mobilization**

Capacity of NARS improved in multi-location on-farm testing of improved germplasm. Data analysis was identified as one of the bottlenecks to a quick and efficient varietal selection by NARS breeders. Eighteen NARS participated in the training program. During this course, NARS capacity was enhanced to enable them to use statistical tools and to be better equipped to interpret research results. The training program was aimed at improving the quality of on-farm trial methodologies and multilocal trials involving elite lines and improved varieties both on station and in farmers' fields.

## **3. Staffing and networking**

The networking consists of member NARS programs as well as international centers (CIAT and IRRI) that contribute elite breeding lines and genetic donors to a common pool coordinated by INGER-Africa. Seeds are multiplied and purified at AfricaRice, assembled into different nurseries and sent to NARS partners upon their request. NARS partners evaluate these nurseries for adaptation to different rice ecosystems or tolerance to biotic and abiotic stresses. The best genetic materials are selected by NARS for direct release as commercial varieties to farmers or used as parents in hybridization programs.

Since INGER-Africa has got back on track, the network's activities have been coordinated by a scientist appointed by AfricaRice in April 2007. However, in order to get the network back to its full operational level comparable to that of the years before the Ivorian crisis in 2002, more staff members are needed including research assistants and field and laboratory technicians.

## **4. Outlook**

Now that AfricaRice has expanded to cover all of SSA, there is an urgent need to expand INGER-Africa's activities to the East and Southern regions of the continent, while consolidating its achievements in West and Central Africa. Consequently regional varietal testing will continue and even be strengthened to cover more countries in East, Central and Southern Africa. Countries such as Uganda, Ethiopia, RD Congo and Central African Republic have recently joined AfricaRice and their active participation will bring the consolidation of INGER-Africa's activities in that sub-region. More proactive actions will be taken to strengthen INGER-Africa, including sourcing for funds, improving data quality, documentation and training of farmers and NARS.



## 5. Summary of proposed budget (USD x 1,000)

Items	Year 1	Year 2	Year 3	Total
Personnel costs (INGER-Africa Coordinator + 2 support staff)	120	122	124	366
Seed production, handling and dispatch by AfricaRice to 34 countries in SSA	30	30	20	80
Supplies (including seed health testing)	10	10	10	30
Equipment <sup>1</sup>	30	2	2	34
Travel and monitoring visits <sup>2</sup>	5	10	40	55
Workshops and training <sup>3</sup>	60	40	60	160
Publications and communication	5	10	10	25
Competitive Grants to NARS for varietal testing and breeder seed production <sup>4</sup>	60	80	60	200
Sub-total	312	304	316	932
Indirect costs (25%)	78	76	79	233
<b>TOTAL</b>	<b>390</b>	<b>380</b>	<b>395</b>	<b>1,165</b>

## ANNEX X

### Report of the Eastern and Central Africa Rice Research Network (ECARRN)

**Dr Ashura Luzi-Kihupi**  
*Regional Coordinator*

#### 1 About the network

The Eastern and Central Africa Rice Research Network (ECARRN) has been operating as one of 17 networks, programs and projects (NPPs) of the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA). The membership of ECARRN is similar to that of ASARECA, comprising 10 countries: Burundi, Democratic Republic of Congo, Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, Sudan, Tanzania and Uganda. ECARRN has been receiving financial and technical backstopping from ASARECA and the Africa Rice Center (AfricaRice) since its establishment in January 2005. However, from October 2007, ASARECA changed its mode of operation from networks to programs. In ASARECA's new operational plan, the 17 NPPs were merged into seven programs namely staple crops, non-staple crops, livestock and fisheries, agro-biodiversity, natural resource management and forestry, policy and advocacy, capacity development, uptake, information and Integrated Agricultural Research for Development (IAR4D). Rice activities are now nested in the staple crops program (Program 1). Consequently, the network is now fully supported by AfricaRice.

The ECARRN coordination office is located at the Mikocheni Agricultural Research Institute, Dar-es-Salaam, Tanzania. Through research for development (R4D), ECARRN aims to increase the efficiency of rice research in the Eastern and Central Africa (ECA) sub-region so as to facilitate economic growth, food security and export competitiveness through productive and sustainable rice production systems. Its mission is to contribute to enhanced productivity, value addition and competitiveness of the rice sector in East and Central African (ECA) through the development and dissemination of demand-driven knowledge and technologies. The network has a Regional Steering Committee (RSC) with 14 members of which 10 are from member countries. Ex-officio members include a representative of the ASARECA Secretariat; AfricaRice as a host institution, IRRI, donor representatives and representatives from advanced research institutes that could be co-opted. The structure of this committee is decided and regularly reviewed by a Regional Stakeholders' Workshop to ensure adequate representation of the member countries as well as categories of stakeholders that are members of the network. It was envisaged that the RSC would meet once a year while the stakeholders'

workshop would be meeting once in two years. The SC was able to meet each year except 2008, while the stakeholders' workshop met only once in December 2005.

The Chair of the RSC is selected from among the member countries on an annual basis in conformity with the practice within ASARECA. Each year the Steering Committee elects a Vice-Chair who assumes the position of the Chair in the following year. The Chair, Vice-Chair, one member and the Regional Coordinator constitutes an Executive Committee that can be called to make decisions on behalf of the RSC in case of urgent matters in between meetings of the RSC. The RSC is tasked with the approval of ECARRN's work plan, research proposals and budgets and provide general guidelines and supervision for the network's activities.

ECARRN is nested within Project 6: Partnership, learning and innovation system in AfricaRice's 2008-2010 MTP and is responsible for the following outputs:

1. Improved partnerships and networks to promote rice sector development
2. Improved and functional pro-poor seed systems
3. Enhanced rural learning systems
4. Strengthened post-harvest sector

## **2 Progress made so far**

Since the last AfricaRice National Experts Committee meeting held in Cotonou in June 2006 the following AfricaRice 2007-2009 MTP outputs have been achieved.

### **2.1 Knowledge Management and Sharing**

#### ***Regional Steering Committee meetings***

ECARRN held two Steering Committee meetings on 5 August 2006 and 29 June 2007. The issues that were discussed and recommendations made include the approval of the network work plans and budgets and resource mobilization strategies. All meetings were well attended by members from NARS, AfricaRice, IRRI and ASARECA.

#### ***Africa Rice Congress***

AfricaRice through its West & Central Africa Rice Research and Development Network (ROCARIZ) organized the first ever Africa Rice Congress from 31 July to 4 August 2006, in Dar-es-Salaam, Tanzania, in collaboration with ECARRN and the Ministry of Agriculture, Food Security and Cooperatives (MAFC) of the Government of Tanzania. The aim of the Congress was to chart the course for rice research & development in sub-Saharan Africa. The congress was well attended with over 200 participants including eminent rice scientists from around the globe. A total of 66 participants came from East, Central and Southern Africa (ECSA) countries. The Congress received excellent media coverage both within and outside Africa.

### ***Establishment of the database on rice scientists***

The network has established a database on rice scientists in ECA. This has enhanced the collaboration between scientists in the region. There are currently 113 scientists (with MSc and PhD degrees) who are working on rice in the region.

### ***ECARRN, JICA/AICAD and IRRI collaboration***

ECARRN, the Japanese International Cooperation Agency/African Institute for Capacity Building (JICA/AICAD), the Ministry of Agriculture, Food Security and Cooperatives of the Government of Tanzania (MAFC) and the Ministry of Agriculture and Natural Resource (MANR) of Zanzibar formed a Technical Committee for dissemination of NERICA varieties. A similar committee was also formed in Kenya where ECARRN is also a member. These committees are financed by JICA/AICAD. A National Rice Steering Committee was also formed in Ethiopia in August 2007 with financial and technical backstopping from Sasakawa Africa Association.

During the reporting period, there has been increased IRRI and AfricaRice collaboration using ECARRN as the platform for implementing rice research & development activities in ECA by development partners and donors. A number of collaborative research proposals have been jointly prepared by the two centers and submitted to various donors.

### ***Publications***

ECARRN printed and distributed about 200 booklets and CDs summarizing the proceedings of a priority setting workshop held in December 2005 and other information about the network activities to different stakeholders. CDs on the Rice Knowledge Bank were received from IRRI and distributed to scientists. The CDs contained information on the major research outcomes and technologies from IRRI. CDs from AfricaRice on seed health and rice parboiling were also distributed.

With assistance from the Rockefeller Foundation, the network established a web page at [www.africancrops.net/ricenetwork](http://www.africancrops.net/ricenetwork). AfricaRice has also established an ECARRN web page at [www.africarice.org/partnership/ecarrn](http://www.africarice.org/partnership/ecarrn).

## **2.2 Technologies developed, validated and disseminated**

### ***Germplasm multiplication and distribution***

Seeds of 90 upland sativa varieties were multiplied at the Agricultural Research Institute (KATRIN, Ifakara, Tanzania) and at Ruvu Rice Farm near Dar-es-Salaam. At Ruvu, 18 upland NERICAs, 60 lowland NERICAs, upland *Oryza sativa* varieties and other improved local rice varieties were planted for demonstration purposes during the Africa Rice Congress.

Seventy eight NERICA lines (60 lowland & 18 upland varieties) and seeds of 22 other upland *O. sativa* varieties obtained from these multiplication trials were distributed for evaluation by collaborators in Ethiopia, Sudan, Tanzania, Kenya, Uganda, Congo, DRC, Madagascar and Burundi. In Tanzania, rice seeds were tested at Mbeya, Ifakara, Dakawa, Morogoro and Zanzibar.

With the participation of farmers, several NERICA varieties were identified and adopted by farmers in some countries. Table 1 shows the status of NERICA dissemination in ECARN countries.

In Uganda, NERICA 4 has been released and planted to more than 13,000 ha. NERICA 1 and NERICA 10 were released in 2007.

NERICAs 1, 4, 10, and 11 have been recommended as suitable varieties for Kenyan conditions and are under national performance trials. NERICAs 1, 2, 3 and 4 were released in 2007 for the Somalia region in Ethiopia. In the Democratic Republic of Congo, NERICAs 4, 5 and 7 are being tested in farmers' fields and will soon be released. In Tanzania, NERICAs 1, 2, 3, 4, 7 and WAB 450-12-2-BL1-DV4 have been selected for testing in farmers' fields.

**Table 1:** Status of dissemination of NERICAs and other improved varieties in ECA

Country	Varieties and Status
Uganda	NERICA 4 released and planted in >13,000 ha NERICA 1 & 10 released in 2007 Various NERICAs in continuing lowland and upland PVS
Kenya	NERICA 1, 4, 10 & 11 under national performance trials
Ethiopia	NERICA 1, 2, 3 & 4 released in Somalia region in 2007 NERICA 8-18 under evaluation
Congo D.R	NERICA 4, 5 & 7 under evaluation in farmers' fields Various NERICA lines under continuing PVS
Tanzania	NERICA 1, 2, 3, 4, 7 & WAB 450-12-2-BL1-DV-4 recommended for on-farm evaluation Various upland & lowland NERICAs recommended for multiplication trials Mwangaza and Kalalu (RYMV resistant varieties) released in Tanzania in 2005
Rwanda, Congo Brazzaville	Various NERICA lines under evaluation
Sudan & Burundi	Various NERICA lines under on-station evaluation

Participatory varietal selection (PVS) trials are being conducted in Uganda, Rwanda, Tanzania, Congo DR and Congo Brazzaville with backstopping from ECARRN using 67 upland inter-specific lines and 72 lowland NERICAs.

Development of IPM Strategy for controlling parasitic weed, *Ramphicarpa fistulosa* (Hoschst), in lowland rice

A survey of the parasitic weed, *Ramphicarpa fistulosa*, was conducted in October 2007 in Mbinga and Kyela districts along Lake Malawi by the ECARRN Visiting Scientist in order to determine the magnitude of the weed problem, develop the best weed control strategy, identify local control methods, study the farmers' level of knowledge on the biology of the weed and control measures and identify social related factors in rice production.

A total of 64 farmers were interviewed and *R. fistulosa* was ranked as the major weed problem in farmers' fields followed by wild rice, *Oryza longistaminata*. Farmers interviewed were aware of the weed and have observed it in flooded rice fields. However, the majority of farmers were unaware of the biology of weed and the best control measures. Farmer weed control methods included fallowing, hand weeding, shifting cultivation and application of 2-4D herbicide.

## **2.3 Capacity building and resource mobilization**

### ***Training courses/workshops***

**Training course on concept note and proposal writing, Dar-es-Salaam, 8-12 May 2006.** The aim of the course was to develop and strengthen the capacity of collaborating NARS scientists and partners to develop and write demand-led competitive and convincing grant winning research project proposals. Eighteen NARS scientists who showed interest in submitting concept notes in response to both CGS Funding Stream A (funding which is open to all ASARECA NPPs) and CGS Funding Stream B (funding which is specific to NPPs in this case ECARRN) attended the course. Four concept notes for CGS Funding stream A and one for stream B were prepared and submitted to ASARECA. AfricaRice also submitted a concept note for stream C. Of the five proposals submitted, two were successful (i.e. one for stream A and one for stream B).

**Training course on Impact Assessment, Dar-es-Salaam, 7–9 August 2006.** The mini-workshop on methodologies of impact assessment was organized jointly by the AfricaRice Impact Assessment Unit, ROCARIZ and ECARRN after the Africa Rice Congress. It attracted 16 participants from the ECA region.

**Regional training course on rice production, Kilimanjaro Agricultural Training Centre (KATC), 18–28 June 2007.** The main purpose of the training course was to improve the understanding, knowledge and skills of rice researchers, technicians, extension and development professionals including NGO and private sector staff on the importance and evolution of the rice sector in Africa, the best production and post-production/grain quality management technologies and methods for enhancing production, productivity and market value of rice in Africa. The latest production and post-production/grain quality management technologies and methods for enhancing production, productivity and market value of NERICAs in Eastern and Central Africa were emphasized. The course was attended by 20 rice scientists, technicians and extensionists from NARS, private sector and NGOs from 10 countries (Kenya, Uganda, Ethiopia, Sudan, Madagascar, Congo DR, mainland Tanzania, Zanzibar, Rwanda, Burundi and Mozambique). The resource persons were from University of Dar-es-Salaam, AfricaRice, ECARRN, JICA and KATC.

#### **Meetings/workshops attended by the Regional Coordinator and ECARRN staff**

A number of regional meetings, workshops and conferences were attended since 2006 where the Coordinator represented the interest of ECARRN, ASARECA and AfricaRice. Some of the meetings attended by the Coordinator were as follows:

1. 32<sup>nd</sup> ASARECA Committee of Directors meeting and Annual General Assembly, Entebbe, Uganda (30 February 2006)
2. Symposium on Seed Health in Agricultural Development, SUA, Morogoro, Tanzania (4–6 April 2006)
3. ASARECA NPPs Consultative Meeting, Nairobi, Kenya (30<sup>th</sup> May–2<sup>nd</sup> June 2006)
4. 5<sup>th</sup> Biennial meeting of AfricaRice National Experts Committee, Cotonou, Benin (19–20 June 2006)
5. Consultative Meeting to develop ASARECA operational plan, Entebbe, Uganda (20–23 June 2006)
6. 34<sup>th</sup> ASARECA Committee of Directors meeting, Entebbe, Uganda (12–15 September 2006)
7. Second Workshop on Agricultural Water Management in Eastern and Southern Africa (IMAWESA), Maputo, Mozambique (18–22 September 2006)
8. ASARECA M&E workshop, Mombassa, Kenya (24–26 September 2006)
9. AfricaRice PVS Workshop, Cotonou, Benin (30 October–2 November 2006)
10. AfricaRice Research Days, Cotonou, Benin (13–17 November 2006)
11. ASARECA M & E workshop, Dar-es-Salaam, Tanzania (November, 2006)
12. ASARECA TUUSI Workshop, Entebbe, Uganda (7–9 February 2007)
13. Proposal writing workshop, Cotonou, Benin (28 May–2 June 2007)
14. EPMP field visit, Uganda (12–15 June 2007)
15. 5<sup>th</sup> Workshop on promotion of NERICA in Kenya, AICAD, Nairobi, Kenya (26–27 July 2007)



16. ASARECA 3<sup>rd</sup> Board of Directors meeting (23- 25 July 2007)
17. PVS Monitoring, Uganda (7- 9 August 2007)
18. National Workshop for rice researchers & Tutors, ARI, KATRIN, Ifakara, (13-15 August 2007)
19. National Rice workshop, Addis Ababa, Ethiopia (21-22 August 2007)
20. 2<sup>nd</sup> TUUSI workshop, principles and engagement, Entebbe, Uganda (24 August, 2007)
21. ASARECA Agrobiodiversity & Biotechnology Programme Strategic Planning Workshop, Entebbe, Uganda (8-10 October 2007)
22. Strategic Plan and Priority Setting Workshop for the ASARECA's Staple Crops Program, , Entebbe, Uganda (30 October – 3 November 2007)
23. 26<sup>th</sup> Ordinary session of AfricaRice Council of Ministers, Abuja, Nigeria (27-28 November 2007)
24. Inception and Planning meetings of the Africa component of the IRRI-AfricaRice BMGF joint project, Cotonou, Benin (5-8 March 2008)

#### **Training courses/workshops attended by scientists from the ASARECA region**

- The ECARRN Coordinator and a participant from Tanzania attended the NERICA Technical Committee at AICAD, Nairobi. ECARRN is a member of this committee, which aims at enhancing the distribution of NERICA in East Africa.
- Two rice scientists from Tanzania attended the training course on Rice Breeding: Laying foundation for the second Green Revolution, at IRRI in August 2007.
- Two participants from Uganda attended a consultative workshop on fostering exchange of statistical data and information on the rice economies of AfricaRice member states held 12-14 December 2007 in Cotonou, Benin
- Two rice scientists from Ethiopia and Burundi attended a training course on the basics of rice science in Cotonou, 26 November-14 December 2007. The course was conducted by AfricaRice in collaboration with the University of Nagoya, Japan.
- A participant from Tanzania attended the Rice Policy Forum held at IRRI, Philippines, 18-19 February 2008
- Eight participants from Uganda, Tanzania, Kenya, Ethiopia and Zambia attended a research-based seed production for rice productivity course, 10-21 March 2008 in the Songhai Center, Port Novo, Benin. The course was designed to strengthen the alignment of CIAT, IRRI and AfricaRice research programs in Africa.
- Rice breeders from the ECSA region attended the first rice breeders' network meeting organized by the Alliance for a Green Revolution in Africa (AGRA), 21-23 April 2008, in Entebbe, Uganda.
- Rice breeders from the East Africa region attended a rice breeders' workshop in Chokwe, Mozambique, on 12-16 May 2008 as part of the implementation of the IRRI-AfricaRice IFAD project.



- ECARRN granted Mr Elijah Sawe, MSc student at Moi University, the amount of US\$4000 for his research titled *Effects of maturity stages, grain position and packaging on quality of NERICA rice seed*.

### **Proposals approved**

Two ASARECA CGS projects with ECARRN backstopping (*Integrated management options for sustainable lowland rice-legumes cropping system* under CGS stream A and *Livelihood improvement through integrated management practices for rainfed lowland rice* under CGS Stream B) have been approved and were expected to be implemented in 2007. The Stream A project will be implemented in Tanzania and DR Congo while the Stream B project will be implemented in Tanzania. However, funding for these projects has been put on hold because of restructuring of ASARECA and its new programmatic operational plan. Feedback on these projects is expected later this year.

A new IRRI-AfricaRice project titled *Alleviating rural poverty through the improvement of rice production in East and Southern Africa* has been approved for funding by IFAD. The project will cover six countries (Kenya, Mozambique, Tanzania, Rwanda, Uganda and Burundi). The inception workshop for this project will be held on 3 and 4 July 2008, in Nairobi, Kenya. Another IRRI-AfricaRice project titled *Stress-tolerant rice for poor farmers in Africa and South Asia* was approved for funding by the Bill and Melinda Gates Foundation. The countries in ECSA involved in this project are Ethiopia, Kenya, Madagascar, Mozambique, Rwanda, Tanzania and Uganda. The planning meeting for this project was held 25-28 March 2008 in Cotonou, Benin, and implementation has commenced.

### **Unsuccessful proposals**

- A proposal titled *Physiological response of upland NERICA to the nitrogen application and plant spacing* to the IFS by the ECARRN Technical Assistant.
- *Improving rice productivity and livelihoods of smallholder farmers in post-conflict Burundi, Rwanda and DR Congo: Consolidating peace through rice* proposal submitted by AfricaRice to the Belgian Government for consideration.

### **The Coordinating unit also facilitated:**

- IRRI/AfricaRice germplasm exchange
- Visits of various Scientists from AfricaRice, IRRI and other organizations from within and outside the country
- Rice scientists in the region to attend training and meetings at AfricaRice and IRRI

### 3 Staffing

The ECARRN Coordination unit has four members of staff, a coordinator, technical assistant; administrative assistant and a driver. AfricaRice employed a Visiting Scientist (Agronomist/ Weed scientist), Dr Juma K Mohamed from Uyole Agricultural Research Institute, Tanzania, in March 2007 for one year.

ECARRN's coordination is assisted by a 14-member Regional Steering Committee whose membership was reconstituted in June 2007 at the 4th Steering Committee meeting in Arusha, Tanzania. Mrs Winfred Kore from Kenya was elected as a member, Dr Getachew Alemayehu from Ethiopia took over the Chairmanship and Dr Rabeson Raymond (Madagascar) was elected Vice Chair. Dr Geoffrey Asea from Uganda replaced Dr George Bigirwa who joined the Alliance for Green Revolution in Africa (AGRA).

#### Members of Regional Steering Committee

Country	Name	Role
Ethiopia	Dr Getachew Alemayehu	Chair & Executive Committee Member
Madagascar	Dr Rabeson Raymond	Vice & Executive Committee member
Kenya	Mrs Winfred A. Okore	Executive Committee Member
Burundi	Mr Fulgence Niyongabo	Member
D.R Congo	Mr Joseph Baibinge Mateso	Member
Rwanda	Mr Elie Rene Gasore	Member
Sudan	Dr Ahmed Mohamed Mustafa	Member
Tanzania	Mr Nkori J.M. Kibanda	Member
Uganda	Dr Geoffrey Asea	Member
Eritrea	Mr Tesfamichael Abraha	Member
Tanzania	Dr Ashura Luzi-Kihupi	Coordinator, Secretary
AfricaRice Rep.	Dr Sylvester Oikeh	Ex-officio member
IRRI Rep.	Mr Joseph Rickman	Ex-officio member
ASARECA Rep.	Dr E. Tukahirwa	Ex-officio member

### 4 Outlook

The ECARRN office needs additional scientists to carry out research activities and to increase visibility in the region as at present only the coordinator and the technical assistant carry out research activities in addition to their administrative functions. The office operates with a very small budget which limits its activities. The fate of the Steering Committee has yet to

be decided with the cessation of funding from ASARECA. However, the services of Steering Committee members continue to be required for providing information and collaboration with their countries. It may be worthwhile for AfricaRice to provide funds for annual Steering Committee meetings.

The critical challenge for ECARRN is mobilization of resources with the objective of enhancing its image as an efficient and relevant regional mechanism for producing results and adding value to rice research in the region. Attempts have been made to build the capacity of regional rice research scientists and institutions to fundraise through writing competitive research proposals.

There has been a substantial increase in NERICA seed requests and ECARRN should be financially supported to respond to these requests by multiplying foundation seeds at Kilangali Foundation Seed Farm in Tanzania.

# Appendix

## 1 Visitors

The coordinator has facilitated visits of scientists from the region and linked them with national scientists. Notable is the visit in February 2007 by Honorable Peter Liley, Member of Parliament, conservative member of the UK House of Commons and Chairman of Globalization and Global Group to discuss the work of AfricaRice. Other visitors to ECARRN were as follows:

- Mr Aggrey Altman from USA Hope in Tanzania Foundation
- Dr Habib Ly from Senegal, AfricaRice consultant on a mission to evaluate AfricaRice outstation (12-17 February)
- Dr Lydia Kimenye ASARECA Expert on Technology Uptake and Up scaling
- Dr Jiro Nozaka and Mr Patrick Wakhu, AICAD, Nairobi, Kenya
- Dr Joe Rickman, IRRI Africa Program Coordinator
- Mr Alexander Bozmoski, student & analyst, USA Hope in Tanzania Foundation Environmental Programme (21 July 2007)
- Dr John Mwangi, CGIAR Internal Auditor (9–13 July 2007)
- Mr Willem Heemskerk, Royal Tropical Institute, visited Tanzania to assess capacity needs for mainstreaming AIR4D into ASARECA's activities (30 May 2007)
- Dr and Mrs Gurdev S. Khush, California, USA,(13-15 July 2007)
- Dr Paul van Mele, AfricaRice, Cotonou
- Dr Surapong Sarkarung, IRRI, Mozambique (August 2007)
- Dr David Shire, IRRI, Los Banos
- Ms Stella Kihara, AGRA, Nairobi
- Dr Nick Minot & Ms Ruth Hill, IFPRI, Washington
- Ms Lucy Kiboi, CGIAR, Nairobi, Kenya
- Prof. Joseph Yayock, IFAD Consultant, Abuja Nigeria

## 2 Budget for 2006-2008

Item	Cost	Source
Coordination (including GSS salaries and travel)	US\$ 45,000 (2007) US\$26,500 (SS for 2008)	AfricaRice
Steering Committee meetings (3)	63,000 Euros	EU
Capacity Building (including Training)	123,722 Euros	EU
Stakeholders meetings (1)	25,000 Euros	EU
Technical Backstopping	29,960 Euros	EU
CGS (A)	450,000 Euros	EU
CGS (B)	105,000 Euros	EU

# ANNEX XI

## Update on AfricaRice Headquarters in Côte d'Ivoire

**Dr Sitapha Diatta**

*Resident Representative*

### 1 Contact with host country authorities

Permanent contact is maintained with the Ministry of Higher Education and Scientific Research, Government of Cote d'Ivoire through the National Center for Agronomic Research (CNRA), the technical arm of the Ministry. The AfricaRice representative represented the AfricaRice Director General in 2007 at the first Côte d'Ivoire Research Promotion Week (SEPRI). AfricaRice had a stand, where publications, posters and samples of paddy rice, NERICAs and *O. sativas* were exhibited. The stand attracted many people, who wanted to know more about NERICA. An attendance certificate was presented to participants by the Ministry of Higher Education and Scientific Research. We have also been receiving requests for rice seed from farmers in zones close the station.

Côte d'Ivoire will implement a rice production recovery program to attain self-sufficiency in food by 2011 and to help in the fight against the rising cost of living. The Technical Advisor to the President has therefore, called for a meeting with the AfricaRice Representative in Côte d'Ivoire for more information on AfricaRice varieties currently disseminated and adopted by farmers. Five NERICAs (1 to 5) are currently cultivated in Côte d'Ivoire as well as the upland WAB56 series (WAB56-50, WAB56-104, WAB56-125). Meanwhile WITA4, WITA9 and WITA12 are extensively cultivated in operational and undeveloped lowlands. This information was shared with the Technical Advisor after an hour-long meeting in his office. The Advisor promised to get back to us for seed multiplication.

### 2 Office blocks in Abidjan, Bouake and M'bé

- The Abidjan Office has been transferred from "Deux Plateaux" to "Plateau" not far from "Clinique de l'Indenie". The rent for the new office block is far less than the old office block.
- In Bouake, the Guest House hosts the liaison office. The infrastructure (offices, rooms, kitchens) as well as the garden and lawn are very well kept. The Guest House is patronized very much by experts from government ministries, international organizations (United Nations Agencies) and NGOs for meetings, seminars and workshops or on their way to the North.

- At M'bé, all offices and laboratories are in good condition because they are regularly cleaned. They can be immediately used by staff at any time upon return.

### **3 Land area and irrigation facilities at M'bé**

AfricaRice has 38 hectares of operational lowlands for breeder and foundation seed experimentation and production. Water control is perfect and irrigation is conducted using buried PVC pipes through which water is drawn from a dam directly into the plots. Buried irrigation channels prevent significant water losses. The infrastructure also helps to achieve two cropping seasons, one in the wet and the other in the dry season.

### **4 Headquarters activities**

With the exception of the following activities, no research activity is ongoing at the headquarters because of the relocation of scientists to Benin:

- In 2006 and 2007, NERICA 1 and NERICA 2 foundation seed multiplication was conducted upon the request and funding of Nigeria. Fifty-seven tonnes of foundation seed comprised of 41 tonnes of NERICA 1 and 16 tonnes of NERICA2 were produced and delivered to Nigeria. The seed certification was done by the Plant Quarantine Unit of Nigeria. The Genetic Resources Unit (GRU) and INGER-Africa have also used the land in M'be to regenerate and multiply varieties in cold storage that had lost their viability.
- In 2008, under the alignment of research programs between AfricaRice, CIAT and IRRI, 1,200 ecotypes were named by the three institutes and given to INGER-Africa for multiplication, screening and selection against abiotic and biotic constraints. These 1,200 ecotypes are currently being planted and are at heading and maturity stages for the early maturing ones.
- For the same year 2008, the Government of Liberia with the support of FAO requested and funded the production of 200 tonnes of foundation seed for Liberia. The funds will very soon be made available to AfricaRice to initiate activities.

### **5 Visits to headquarters**

Mr Aguibou Tall and Dr Marco Wopereis, DAF and DDG-R4D respectively, visited Abidjan, Bouake and M'bé. It was an introductory visit since they had just joined AfricaRice.

## 6 Conclusion

AfricaRice headquarters at M'be is well maintained by the thirty-odd General Support Staff employed for that. The land and irrigation facilities, specifically in the lowland, can be used to produce foundation seed if funding for it is secured just as it was done for Nigeria.

Initial rainfall patterns for this year are very good since we have a total of 499.3 mm including 5mm for February, 54.3 mm for March, 222.5 mm for April and 217.5 mm as on 23 May compared to 2007, when for the whole month of May the total was 105.5mm. The water level in the dam also seems very good. It stands at 5.55 m as on 23 May, while during the same period in 2007 it stood at 2.40 m around the end of May.

# ANNEX XII

## Contribution from Member States

Financial status from 1990 to 2008								
Update on member state contributions (in US \$)								
	Situation up to December 2007				Update May 2008		Balance due as on May 2008	
	Total	Total	Unpaid Balance	% Unpaid	2008 Annual	Received	Unpaid Balance	% UNPAID
COUNTRY	Due	Received	31/12/2007		Dues	Year to Date	31-May-08	
TOTAL								
Benin	463,473	(481,756)	(18,283)	-4%	18,283	0	0	0%
Burkina Faso	426,689	(159,953)	266,736	63%	18,283	0	285,019	64%
Cameroon	481,895	(129,668)	352,227	73%	27,742	0	379,969	75%
Cote d'Ivoire	739,725	(739,725)	0	0%	37,202	0	37,202	5%
Ghana	734,603	(129,958)	604,645	82%	37,202	0	641,847	83%
Guinea	426,689	-	426,689	100%	18,283	0	444,972	100%
Guinea Bissau	426,688	(50,000)	376,688	88%	18,283	0	394,971	89%
Liberia	426,688	(48,131)	378,557	89%	18,283	0	396,840	89%
Mali	466,711	(413,840)	52,872	11%	18,283	0	71,155	15%
Mauritania	426,689	-	426,689	100%	18,283	0	444,972	100%
Niger	426,689	(207,900)	218,789	51%	18,283	0	237,072	53%
Nigeria	3,186,034	(3,186,034)	0	0%	160,175	0	160,175	5%
Senegal	427,942	(409,659)	18,283	4%	18,283	(18,283)	18,283	4%
Sierra Leone	426,689	(44,615)	382,074	90%	18,283	0	400,357	90%
Chad	426,688	-	426,688	100%	18,283	0	444,971	100%
The Gambia	426,689	(34,758)	391,931	92%	18,283	0	410,214	92%
Togo	426,691	(82,278)	344,413	81%	18,283	0	362,696	82%
Uganda		-	0	0%	18,283	0	18,283	0%
Democratic Republic of Congo	18,283	-	18,283	100%	18,283	0	36,566	100%
Congo (Brazzaville)	18,283	-	18,283	100%	18,283	0	36,566	100%
Central African Republic	18,283	-	18,283	100%	18,283	0	36,566	100%
GRAND TOTAL	10,822,122	(6,118,273)	4,703,848	43%	573,132	(18,283)	5,258,697	46%



	<b>Total</b>	<b>Total</b>	<b>Unpaid Balance</b>	<b>% Unpaid</b>	<b>2008 Annual</b>	<b>Received</b>	<b>Unpaid Balance</b>	<b>% UNPAID</b>
<b>COUNTRY</b>	<b>Due</b>	<b>Received</b>	<b>31/12/2007</b>		<b>Dues</b>	<b>Year to Date</b>	<b>31-May-08</b>	
OPERATING								
Benin	341,689	(359,972)	(18,283)	-5%	18283		0	0%
Burkina Faso	341,689	(157,558)	184,131	54%	18283		202,414	56%
Cameroon	396,895	(55,484)	341,411	86%	27742		369,153	87%
Cote d'Ivoire	649,603	(649,603)	(0)	-0%	37,202		37,202	5%
Ghana	649,603	(129,958)	519,645	80%	37202		556,847	81%
Guinea	341,689	-	341,689	100%	18283		359,972	100%
Guinea Bissau	341,688	(50,000)	291,688	85%	18283		309,971	86%
Liberia	341,688	(18,131)	323,557	95%	18283		341,840	95%
Mali	341,691	(288,819)	52,872	15%	18283		71,155	20%
Mauritania	341,689	-	341,689	100%	18283		359,972	100%
Niger	341,689	(207,900)	133,789	39%	18283		152,072	42%
Nigeria	2,833,775	(2,833,775)	0	0%	160175		160,175	5%
Senegal	341,689	(323,406)	18,283	5%	18283	(18,283)	18,283	5%
Sierra Leone	341,689	(44,615)	297,074	87%	18283		315,357	88%
Chad	341,688	-	341,688	100%	18283		359,971	100%
The Gambia	341,689	(34,758)	306,931	90%	18283		325,214	90%
Togo	341,691	(82,278)	259,413	76%	18283		277,696	77%
Uganda		-	0	0%	18283		18,283	100%
Democratic Republic of Congo	18,283	-	18,283	100%	18283		36,566	100%
Congo (Brazzaville)	18,283	-	18,283	100%	18283		36,566	100%
Central African Republic	18,283	-	18,283	100%	18283		36,566	100%
<b>SUB-TOTAL</b>	<b>9,026,683</b>	<b>(5,236,257)</b>	<b>3,790,426</b>	<b>42%</b>	<b>573,132</b>	<b>(18,283)</b>	<b>4,345,275</b>	<b>45%</b>
CAPITAL								
Benin	121,784	(121,784)	0	0%			0	0%
Burkina Faso	85,000	(2,395)	82,605	97%			82,605	97%
Cameroon	85,000	(74,184)	10,816	13%			10,816	13%
Cote d'Ivoire	90,122	(90,122)	0	0%			0	0%
Ghana	85,000	-	85,000	100%			85,000	100%
Guinea	85,000	-	85,000	100%			85,000	100%
Guinea Bissau	85,000	-	85,000	100%			85,000	100%
Liberia	85,000	(30,000)	55,000	65%			55,000	65%
Mali	125,020	(125,020)	0	0%			0	0%
Mauritania	85,000	-	85,000	100%			85,000	100%
Niger	85,000	-	85,000	100%			85,000	100%

	<b>Total</b>	<b>Total</b>	<b>Unpaid Balance</b>	<b>% Unpaid</b>	<b>2008 Annual</b>	<b>Received</b>	<b>Unpaid Balance</b>	<b>% UNPAID</b>
<b>COUNTRY</b>	<b>Due</b>	<b>Received</b>	<b>31/12/2007</b>		<b>Dues</b>	<b>Year to Date</b>	<b>31-May-08</b>	
Nigeria	352,259	(352,259)	0	0%			(0)	-0%
Senegal	86,253	(86,253)	0	0%			0	0%
Sierra Leone	85,000	-	85,000	100%			85,000	100%
Chad	85,000	-	85,000	100%			85,000	100%
The Gambia	85,000	-	85,000	100%			85,000	100%
Togo	85,000	-	85,000	100%			85,000	100%
Uganda	0	-	0	0%			0	0%
Democratie Republic of Congo	0	-	0	0%			0	0%
Congo (Brazzaville)	0	-	0	0%			0	0%
Central African Republic	0	-	0	0%			0	0%
<b>SUB-TOTAL</b>	<b>1,795,439</b>	<b>(863,858)</b>	<b>913,422</b>	<b>51%</b>	<b>0</b>	<b>0</b>	<b>913,422</b>	<b>51%</b>

## **ANNEX XIII**

### **Post-Masters Internship Program**

#### **Background of the Post-Masters Internship Program**

As part of the Africa Rice Center's (AfricaRice's) new vision to develop capacity in house and at the same time build the capacity of NARS to improve the delivery of quality rice science, an innovative "Post-Masters" Internship Program was launched in March 2007. The realities on the ground in sub-Saharan Africa are that many brilliant young Africans with Master of Science degrees find it difficult to obtain their first jobs because of lack of professional experience. To add to that, staff turnover in many national systems is such that the NARS are inadequately staffed when at the same time older scientists are being lost to retirement. AfricaRice also is experiencing a shortage of competent staff in the Research Assistant cadre. It is against this background that the Post-Masters Internship program was launched.

The principles behind the Post-Masters Internship Program are as follows:

- Recruitment of young scientists with a Masters or DEA degree at AfricaRice on two-year non-renewable contracts.
- During the two years the young scientists will be attached to a research program and mentored by a AfricaRice scientist.
- Successful interns will receive a consolidated monthly stipend not less than national civil service pay.
- At the end of their apprenticeship at an international center, successful interns are positioned to pursue job opportunities at AfricaRice depending on vacancies, pursue a PhD degree or offer their skills and experience elsewhere (NARS, universities or the private sector).

AfricaRice plans to recruit 20 young scientists per year depending on requirements of the Center and availability of funding. They will be based at the Center's five stations. The AfricaRice Board and the AfricaRice Council of Ministers and the CGIAR have welcomed this innovative program and are looking forward to its implementation as this will offer a great opportunity to create the next generation of rice researchers in sub-Saharan Africa.

#### **Update on the Post-Masters Internship Program**

The program has received the full backing of the AfricaRice Council of Ministers, the AfricaRice Board and the CGIAR as a means to fight unemployment of African youth and to

build African capacity in rice research and development. The sourcing of funds is being given the highest priority so that implementation of the program will commence as soon as possible. In this vein, a concept note which covers the capacity building thrust of the program has been submitted to the Canadian International Development Agency for consideration. In addition, AfricaRice is setting aside some funds to ensure a modest start of the Program in 2008.

Linkages are also being explored with the African Women in Agricultural Research and Development (AWARD) Fellowship Program of the Gender and Diversity Program of the Consultative Group on International Agricultural Research (CGIAR). The latter program offers qualified African agricultural women scientists specially tailored two year career development fellowships, available at post-Bachelors, post- Masters and post-PhD levels.

A recruitment committee comprising AfricaRice staff and NARS partners has been established for the program and will have the responsibility of reviewing the applications. The first call for proposals which will constitute the pioneer period for the program will target five nationals from Benin and Nigeria. A second call for proposals building on the experience from the first call will be regional and international across all sub-Saharan Africa member states. Additional information on the Post-Masters Internship Program can be found at [www.africarice.org](http://www.africarice.org)

## ANNEX XIV

### Africa Rice Trends Joint Publication AfricaRice and NARS Proposal

#### 1 Background

The Africa Rice Center organized a workshop titled *Consultative workshop fostering the exchange of statistical data and information on the rice economies of AfricaRice member states* from 12 to 14 December 2007 in Cotonou, Benin.

The participants were experts in agricultural economics from national agricultural research systems (NARS), and experts in agricultural statistics from national services in charge of crop surveys and agricultural statistics of 11 AfricaRice member States (Benin, Burkina Faso, Côte d'Ivoire, Democratic Republic of Congo, Ghana, Guinea, Mali, Niger, Nigeria, Uganda and Senegal). Experts from regional and sub-regional integration institutions (WAEMU, RESIMOA, INSAH and AGRHYMET) also participated in the workshop.

The objective of the consultation was to explore ways and means for strengthening cooperation in the exchange of information, and in the collection, processing and dissemination of relevant and reliable data on rice technologies and rice economies of AfricaRice member states.

The major recommendations of the workshop included:

- Setting up a consultative framework for the collection, processing and dissemination of rice statistics and information in each member country
- Establishment of a regional consultative framework on the analysis and dissemination of rice statistics and information
- Publication of bulletins on the regional and national economies

#### 2 Proposal for a new Joint AfricaRice and NARS Africa Rice Trends publication:

The first two recommendations are being implemented. This proposal is geared towards the implementation of the third recommendation:

It is proposed that the Africa Rice Trends, a regular AfricaRice publication, be now a joint annual publication of AfricaRice and NARS starting in 2008:

- Each NARS will be responsible for a 3-5 page overview of the rice sector in their respective countries (statistics and information on production, consumption, imports, prices, policy developments, investments, etc)
- AfricaRice will be responsible for preparing a regional synthesis of major rice developments with an international perspective including a synthesis of national developments.

All contributing institutions (including national statistical services and other primary data originating institutions) and authors will be acknowledged explicitly and appropriately.

## ANNEX XV

### **Consultative Workshop Fostering the Exchange of Statistical Data and Information on the Rice Economies Cotonou, 12-14 December 2007**

#### **Summary**

Faced with threats of rice supply shortage, the strategic choice of significantly increasing domestic rice production is understandably generating obvious interest among decision-makers and rice stakeholders especially since the price hikes are improving the competitiveness for local production. To help African rice economies to fully achieve their potential and contribute significantly to poverty reduction and development efforts, it is critical to have detailed and reliable information on the rice economy of AfricaRice member states.

Therefore, following the recommendations of its External Program and Management Review (EPMR, August 2007), the Africa Rice Center organized a workshop titled *Consultative workshop fostering the exchange of statistical data and information on the rice economies of AfricaRice member states* held from 12 to 14 December 2007 in Cotonou, Benin.

The workshop participants were experts in agricultural economics from national agricultural research systems (NARS), and experts in agricultural statistics from national services in charge of crop surveys and agricultural statistics of eleven (11) AfricaRice member States namely: Benin, Burkina-Faso, Cote d'Ivoire, Democratic Republic of Congo, Ghana, Guinea, Mali, Niger, Nigeria, Uganda and Senegal. Experts from regional and sub-regional integration institutions such as WAEMU, RESIMOA, INSAH and AGRHYMET also took part in this important meeting.

The objective of this technical consultation was to explore ways and means of strengthening cooperation in the exchange of information, and in the collection, processing and dissemination of reliable and detailed data on rice technologies and the rice economies of AfricaRice member states. The workshop was structured along the following timeline:

- Day 1: Presentations of member states and discussions
- Day 2: Presentations of sub-regional institutions and beginning of working group sessions
- Day 3: Continuation of working groups and recommendations

After reviewing the type of rice data that are collected by the national agricultural statistics offices, the working group sessions (three groups) revealed the existence of several

methodologies for the collection of primary data as well as the irregularities in the collection and publication of key information due to budgetary constraints. The deliberations also showed that data on production cost, rice varieties and technologies per main rice agro-ecologies are not systematically collected and analyzed. In addition, weaknesses were noted in the dissemination of updated information on the cost of developing new irrigated areas, the cost of rehabilitating existing irrigation areas, as well as information on public investment and rice policies (especially policy measures and instruments influencing rice sector)

To remedy this situation, the experts proposed to insert in the existing agricultural data collection systems specific line items that could bring out refined information on core variables such as the production of rice varieties (traditional and improved) per ecology as well as information on the production costs for the main rice farming systems. Moreover, to facilitate the exchange of information and data on rice economies of AfricaRice member States, the experts called for the establishment of a consultative framework in each country and at the regional level.

Despite the diversity of rice economies prevailing in countries, the recommendations of the experts converged on the following six themes:

1. Establishment of a common system of collection, treatment, analysis and diffusion of rice data in collaboration with CILSS, AfricaRice, AFRISTAT and FAO through the design of common methodologies for data collection, processing, analysis and diffusion by the end of 2008;
2. Setting up at a country level of a consultative framework on rice data and information exchange involving national rice stakeholders including NGOs by the end of 2008;
3. Establishment of a regional consultative framework on rice data and information exchange with regional integration institutions (AfricaRice, UEMOA, CILSS, RESIMAO, AFRISTAT, etc.) by the end of 2008;
4. Creation of regional journals and bulletins on rice in collaboration with regional integration institutions by the end of 2009;
5. Organization of periodical meetings on exchanging information and rice data collection and dissemination systems by the end of 2009;
6. (a) Establishment of a sustainable system of collection, treatment, analysis and dissemination of rice information at the level of each member state; (b) establishment of a sustainable funding system of the regional consultative framework by the regional and sub-regional integration organizations such as UEMOA, ECOWAS and AfDB, WADB;
7. Establishment of an interdisciplinary working group to follow-up the recommendations in collaboration with AfricaRice, UEMOA, RESIMOA, AGRHYMET, INSAH, and the concerned ministries as from 2008/2009.

This workshop was participative and was highly appreciated by all participants for the content of its program, organization and facilitation. With these recommendations, it was decided that representatives of NARS and sub-regional organizations that attended the workshop would serve as focal persons to initiate the implementation of the recommendations. Once back to their respective environments, they will then contact the appropriate institutions to follow up the recommendations of the workshop.

## **Appendix 1**

### **Terms of Reference for the Working Group**

1. Identify the constraints and gaps in
  - Collected rice data
  - Methodology and data quality
  - Regularity of data collection
  - Access to data and their dissemination to rice stakeholders
2. Identify the core rice data to be collected and identify how this can be done within the existing data collection systems
3. Identify key national institutions to be involved and identify what their roles should be
4. Identify ways and means for ensuring sustainable funding for rice data collection, processing and dissemination at the national level
5. Identify how to establish a regional system for regular exchange of rice data and relevant mechanism for its implementation
  - Institutions and their roles
  - Setting of a flexible and sustainable system warranting rights and obligations of all partners
  - Collaboration in rice data processing and analysis
  - Access to rice data / information
  - Joint publications



## **Appendix 2**

### **Consultative workshop on fostering the exchange of statistical data and information on the rice economies of AfricaRice member states 12–14 December 2007 in Cotonou, Benin Workshop Terms of references**

#### **1 Introduction**

Recent developments in the world rice market have sent rice sector trends in sub-Saharan Africa (SSA) into a sharp curve. The world rice market is marked by price hikes, dwindling rice stocks in the major rice exporting countries and global consumption exceeding production since 2001. The high price of crude oil and associated instability as well as the allocation of arable land to biofuel production are further sources of concern for African rice sector development. The option of increased dependence on imports looks more and more expensive and unsustainable. Keeping the status quo also by resorting to imports to meet domestic rice demand is likewise being questioned more and more by African States.

With threats like these to the African rice economies, the strategic choice of significantly increasing domestic rice production is understandably generating obvious interest among decision-makers and operators in the rice economy because the price hikes are improving the competitiveness of local production. Intensifying rice production and reducing dependence on imports is well up in the priorities of agricultural policy reference documents such as African Union's NEPAD/CAADP and ECOWAS' ECOWAP as well as national poverty reduction strategy papers. A recent study by IFPRI, in collaboration with the IITA, CORAF/WECARD and ECOWAS shows that rice, among all agricultural commodities, holds the highest potential contribution to economic growth in the ECOWAS region.

To help African rice economies to fully achieve their potential and contribute significantly to development efforts of the member states of the Africa Rice Center (AfricaRice), many political and institutional constraints must be overcome. It is now critical to have detailed and reliable information on the rice economy of AfricaRice member states. This is one of the recommendations made by the External Program and Management Review (EPMR) of AfricaRice, which took place in August 2007.

In response to this recommendation AfricaRice is hosting a technical consultation from 12–14 December 2007 on exploring ways and means of laying down a sustainable exchange system for data and information on rice policies and technologies in Africa.

Even though there are many statistical data and information sources on various parts of the rice economy in AfricaRice member states, significant gaps still remain in the collection and diffusion of detailed information. In fact the FAO, AGRHYMET and national bodies for agricultural statistics and food security monitoring are compiling and disseminating extensive statistical data and information, particularly on production, yields, areas cropped, opportunities and consumption etc. RESIMAO member organizations are also collecting and disseminating statistical data on prices and price trends in rice markets. However, a deal of key information is not always collected or systematically disseminated to all stakeholders and interested parties. This includes statistical data and detailed information on:

- Sources, types (agricultural census, crop assessment survey etc.) methodologies and frequency of data collection (area under cultivation, yields, production, rice supply networks...)
- Rice production systems (production, yield and costs per ecology)
- Rice potential (arable areas, irrigable areas, lowland, rainfed, water resources etc.)
- Rice technology dissemination (adoption of modern varieties, post-harvest etc)
- Application of improved agronomic practices
- Public investments in rice sector
- Information on rice policies (subsidies, tariff and border measures, policy affecting producer and consumer prices, seed legislation, output and input price trends etc.)
- Types and grades of rice marketed
- Frequencies and intensities of abiotic (drought, flood, salinity, etc.) and biotic (diseases and pests) stresses
- Prospect for applying remote sensing and GIS technologies to rice production systems to enhance data collection and analysis

## 2 Objectives of the workshop

The main objective of this technical consultation is to think on ways and means to lay the foundations for a sustainable system of cooperation among actors involved in monitoring and analyzing the rice economies in AfricaRice member countries. This workshop will focus on fostering data and information exchange on production systems, rice markets, technologies and policies. The specific objectives are as follows:

- Suggest a program of collaboration between AfricaRice and national, regional and international rice sector operators for collecting, analyzing and disseminating information on rice sector status and trends.
- Identify areas for which statistical data are not regularly collected by the service in charge of official agricultural statistics
- Develop a practical framework to institutionalize collection and exchange of comparable data on rice economics in AfricaRice member states.
- Define practical implementation modalities for an integrated information collection and exchange program on rice economics in AfricaRice member countries.

- Develop a monitoring plan for the collaborative program of statistical data and information exchange between AfricaRice and its national, regional and international rice sector partners for collecting, analyzing and disseminating information on the rice economies in AfricaRice member states.

### **3 Participants**

The participants will be experts from institutes dealing with agricultural statistics and economists from national agricultural research systems in AfricaRice member states. International and regional institutions involved in monitoring and analyzing the African rice sector will also be invited to this consultation.

An economist from NARS and an expert in agricultural statistics from:

- Ghana
- Burkina-Faso
- Nigeria
- Benin
- Mali
- Senegal
- Guinea
- Niger
- Côte d'Ivoire
- Uganda
- Democratic Republic of Congo

#### **International and Regional Organizations**

- FAO
- UEMOA
- ECOWAS
- AGRHYMET
- INSAH
- RESIMAO
- AFRISTAT

### **4 Program of events**

- Presentation on the rice economies of the countries invited (rice policy, rice sector investments, inventory of existing data per ecology, data collection and analysis methodology source of rice policy analysis and monitoring).
- Group discussion on the creation of a framework of collaboration for institutionalizing the collection and exchange of comparable data on current rice economy status and trends in AfricaRice member states.

- Modalities of the practical implementation of this framework for data collection and information exchange on rice economics in AfricaRice member states.
- Collaboration among participants for building and publishing an annual database on the rice economy in AfricaRice member countries.
- Monitoring plan for the collaboration framework.
- Ways of mobilizing resources

## **5 Workshop Agenda (tentative)**

### ***Wednesday, December 12, 2007***

- Opening Ceremony
- Presentation of the objectives of the workshop
- Presentations by member states

### ***Thursday, December 13, 2007***

- Presentations by member states
- Presentation by invited regional integration institutions
- Discussions in working groups

### ***Friday, December 14, 2007***

- Continuation of discussions in working groups
- Restitution of working groups discussions
- Recommendations
- Closing remarks

## 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 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

AfricaRice	Africa Rice Center (Cotonou, Benin)
CIAT	<i>Centro Internacional de Agricultura Tropical</i> (Cali, Colombia)
CIFOR	Center for International Forestry Research (Bogor, Indonesia)
CIMMYT	<i>Centro Internacional de Mejoramiento de Maiz y Trigo</i> (Mexico, DF, Mexico)
CIP	<i>Centro Internacional de la Papa</i> (Lima, Peru)
ICARDA	International Center for Agricultural Research in the Dry Areas (Aleppo, Syria)
ICLARM	WorldFish Center (Penang, Malaysia)
ICRAF	World Agroforestry Centre (Nairobi, Kenya)
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics (Patancheru, India)
IFPRI	International Food Policy Research Institute (Washington, D.C., USA)
IITA	International Institute of Tropical Agriculture (Ibadan, Nigeria)
ILRI	International Livestock Research Institute (Nairobi, Kenya)
IPGRI	Bioversity International (Rome, Italy)
IRRI	International Rice Research Institute (Los Baños, Philippines)
IWMI	International Water Management Institute (Colombo, Sri Lanka)



**AfricaRice**

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