



Food and Agriculture
Organization of the
United Nations



WORLD BANK GROUP
Agriculture

CEMA

European
Agricultural
Mechanization



AGRA

Growing African Agriculture



Sustainable mechanization development strategy options and, the role of public-private and private-private partnerships.



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30th November – 3rd December 2016 Venue (Safari Park Hotel) Nairobi, Kenya

Outline of the presentation

1. AfricaRice Profile.
2. AfricaRice and its 2011-2020 Strategic Plan, priority areas and mechanisms.
3. Activities of the Africa-wide Rice Mechanization Task Force.
4. What Africa Rice is doing in promoting SAM in Africa . Public-private partnerships & other models used by AfricaRice
5. What is being recommended now for the Nairobi meeting to consider?
6. Role of women explained- what about the role of youths?

1. AfricaRice Profile

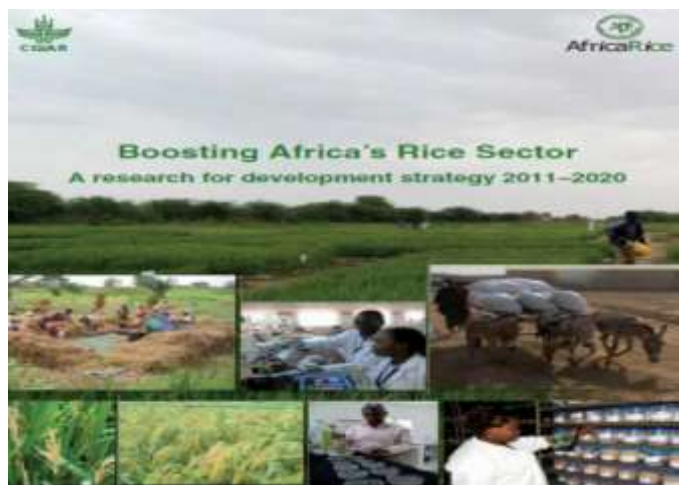
The Africa Rice Center (AfricaRice) is a leading pan-African research organization created in 1970 by 11 African states as an autonomous intergovernmental research organization. Today its membership comprises 26 countries, covering West, Central, East and North African regions, namely **Benin, Burkina 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, Rwanda, Senegal, Sierra Leone, Togo and Uganda.**

AfricaRice is a member of the **CGIAR Consortium of International Agricultural Research.**

In close association with its **national partners**, AfricaRice operates through a continent-wide taskforce mechanism based on specific broad research themes relating to rice. This mechanism was adopted to strengthen and empower the research and development capacity of national systems and to pool expertise and resources.

The headquarters is in Cote d'Ivoire and sub-stations in Bénin, Ghana, Libéria, Madagascar, Nigeria, Sénégal, Sierra Leone and in Tanzania.

2. AfricaRice and its 2011-2020 Strategic Plan, priority areas and mechanisms



To increase rice productivity and competitiveness in sub-Saharan Africa, AfricaRice and partners have developed **a strategic plan to boost Africa's rice sector (2011-2020)**.

This plan was approved by the AfricaRice Council of Ministers in September 2011.

The Strategic Plan will be implemented in partnership with many partners across the research to development continuum.

Priority areas

1 Genetic diversity and improvement

2 Yield gap closure, intensification and diversification

3 Sustainable expansion of rice areas

4 Rice value chain development

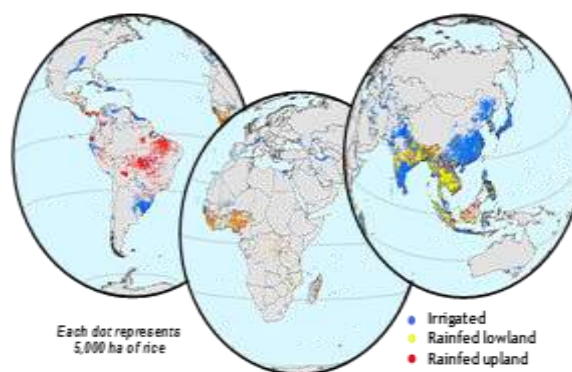
5 Policy and technology targeting

6 Rice sector development support

7 Capacity strengthening

Mechanism 1

A Global Rice Science Partnership (GRiSP)

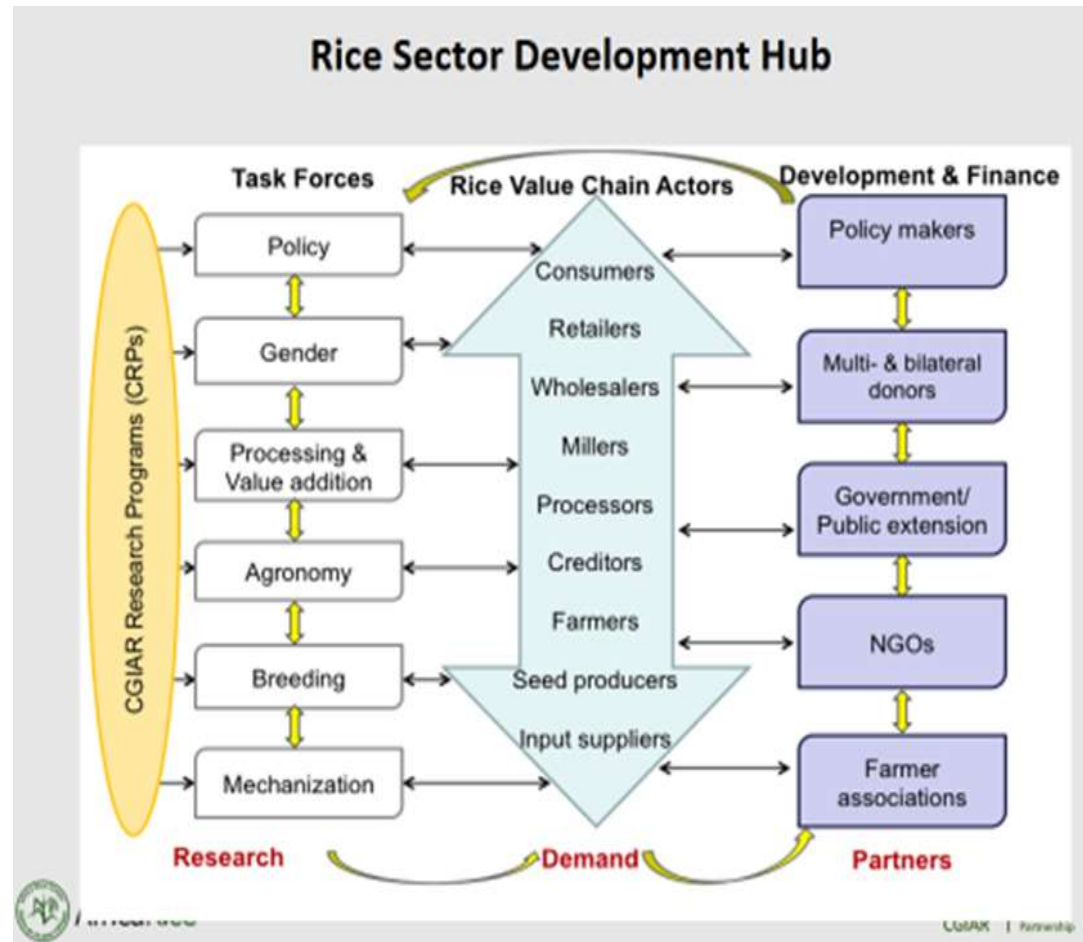


Mechanism 2 Task forces



Breeding
Agronomy
Processing and value-addition
Mechanization
Gender
Policy

3. Activities of the Africa-wide Rice Mechanization Task Force



Activities of the Africa-wide Mechanization Task Force

Activity 1
Needs' assessment & survey
(expert & field level)

Activity 4 & 5
Inventory development &
enhancing global partnership (e.g.
visit to Latin America & Asia)

Matching

Information on hubs from various
task forces

Activity 2
Introduction and testing of new
agricultural equipment (on-
station & on-farm) in
collaboration with
agronomists/post-harvest
specialists

**Local
development
possible**



Activity 3
Construction of local prototype &
testing (on-station & on-farm)

**Local development
not possible**

Introducing to farmers as one of
good agricultural practices by
agronomists/post-harvest
specialists



Countries involved in the Africa-wide Rice Mechanization Task Force and private partners

- **NARS (19 institutions)**

Benin (INRAB/PTAA), Burkina Faso(INERA/IRSAT), Cameroun (IRAD), Côte d'Ivoire (ANADER/CFMAG), DR Congo (INERA), Ethiopia (EIAR/ARARI), The Gambia (NARI), Ghana (CSIR/MOFA-AESD), Guinea Bissau (INPA), Madagascar (FOFIFA), Mali (IER), Niger (INRAN/IPDR), Nigeria (NCRI), Rwanda (RAB), Senegal, (SAED/CRA), Sierra Leone (SLARI), Tanzania (DRD), Uganda (NARO).

- **Private sector (5 fabricators)**

Ghana (GRATIS-FOUNDATION), Senegal (AGRITECH), Côte d'Ivoire (AFCF), Nigeria (HANIGHA), Mauritania (MSA).

The Africa-wide Rice Mechanization Task Force (Born on the 29 July 2013)



Countries of mechanization activities: 27 countries

19 Taskforce countries and 28 focal points are members of the task force

Research activities and training

- Equipments under testing
Transplanter
Seeders
Parboiling briquetting
Combine Harvester

108 fabricators trained in 6 technologies to be disseminated in the 19 countries

Out scaling process of ASI

270 ASI threshers were built
3 parboiling units installed

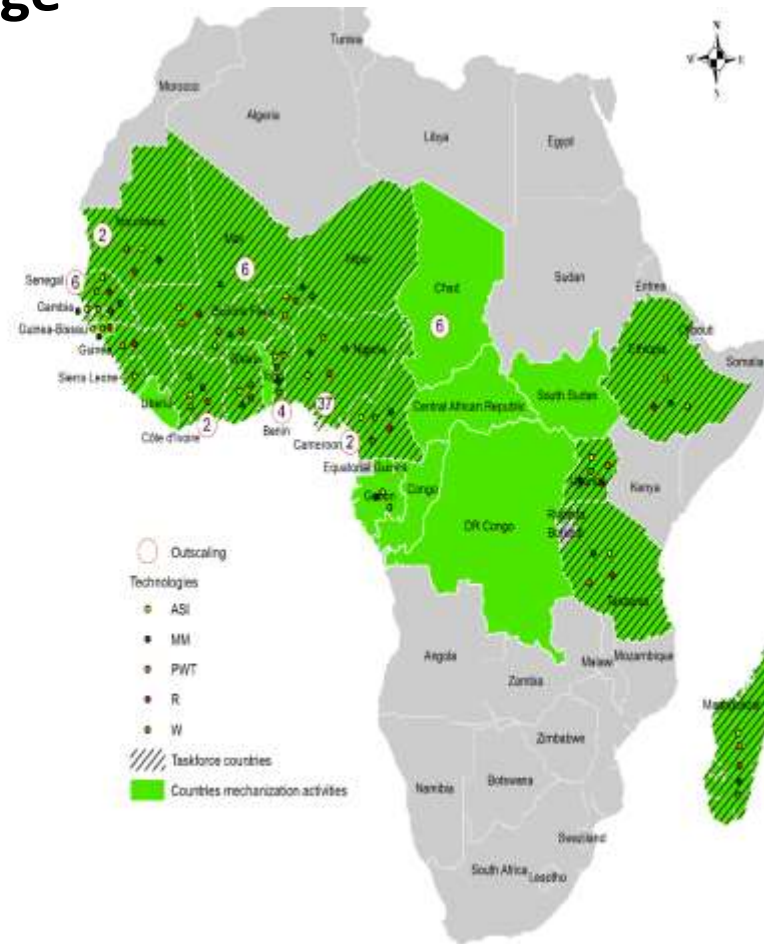
Training :

- regional training
- National training
- **Research**

The construction of the combine harvester

Link with international partners
privates and research institutions

Mechanization Taskforce: Results and Challenge



Scalable innovations along the rice value chain



4. What Africa Rice is doing in promoting SAM in Africa . Public-private partnerships & other models used by AfricaRice

➤ Development and testing of locally-developed prototypes in target countries and connecting with private sectors

- **Transplanter at Africa Rice**
- **Seeder at Africa Rice**
- **Parboiling briquetting**
 - 4 briquetting machines built by Cameroon, Nigeria, McGill University and AfricaRice
- **Paddy cleaner**
 - 2 built in Uganda and in Mauritania
- **Weeders (manual and mechanical)**
 - 10 countries fabricating manual weeders
 - 2 types being tested and fabricated with Africa Rice, the NARS and private firm In Tanzania
- **Parboiling vessel and pilot plant units**
 - 5 plants fabricated in Cameroon, Nigeria in Niger, in Benin and soon in Senegal
 - 1 pilot plant constructed at AfricaRice in collaboration with McGill University, Canada
- **Two light threshers** (manual and motorized) built and 12 fabricators trained in Uganda
- . **Conventional axial flow thresher for rice and cow peas**
- . **Combine Harvester**



THE ASI THRESHER EXPERIENCES

1	HANIGHA Nigeria Ltd..	Nigeria
2	NCAM, Ilorin, Kwara State	Nigeria
3	DESFABENG Company Ltd., Bida, Niger State	Nigeria
4	Edouard KAKPO TOURNEUR/ SOUDEUR Glazoooue	Benin
5	KEBBEH WELDING	The Gambia
6	National Agricultural Research Institute (NARI)	The Gambia
7	Agritech	Senegal
	Socafon Société Coopérative des Artisans et Forgerons de l'Office du Niger	Mali
8	ECAA/TCHAD	Tchad
9	Camara Ibrahima KATIOLA COTE D'IVOIRE 00 225 05 33 28 65	Côte d'Ivoire
10	GIEMSA	Mauritania
11	Centre de Songhaii	Benin
12	INRAB/PTTA	Benin
13	Piam Fokam Godefrey	Cameroon
14	Mr Sambo	Cameroon
15	Mohammed and Co –Jigawa	Nigeria
16	BC Technical	Nigeria

Large collaboration among Rice value chain actors in the Hub with the collaboration of Innovation platforms: local manufactures. Farmers cooperatives, financial institutions, service providers

Farmers (who do not have own thresher) can save time, reduce labor demand, reduce grain loss, and enhance double cropping. ASI owners can expect an internal rate of return of 65% and a high cost/benefit ratio (1.73) over the economic life of ASI. Local blacksmiths' income can be increased. Employment for providing service for threshing can be increased. Indirectly, Governments can get taxes on the importation of the engine, belts and bearing. Banks may be encouraged to provide with loans to farmers and owner of ASI.



16 out of 108 trained manufactures are fabricating of the ASI threshers

270 ASI threshers built in 2 years for a turn over of \$ 1,350 000

The Gem parboiling unit in connection with IPs

The GEM parboiling facility installed in Lafia Nigeria to profit the Bukan-sidi/Lafia rice innovation platform is a 1.2 ton/day capacity parboiling complex .The trainers were then engaged to train 1215 other processors (915 women and 300 men) during a period of three month under the supervision of AfricaRice, ADP and NCRI.

Although up to 1215 processors were trained, the installed system can only host a maximum of 10 employees per day. More of such systems need to be installed to make maximum use of all those who have been trained.



Stakeholder	Change brought by Innovation Platforms (IPs) in rice value chain	
	Before IP	With IP
Farmers/Producers	3.5 t/ha	5.0 t/ha
Women Parboilers (<i>Bante IP</i>)	1.0 t paddy/month (during harvest)	10 t paddy/month (during harvest)
ESOP processor (<i>Bante IP</i>)	1.5 t paddy/day(during harvest)	5 t paddy/day(during harvest)
Processors (SONAPRA Millers)	500 t paddy (during harvest)	1000 t paddy(during harvest)
Traders	sold 15 t/month	sold 20-25 t/month
Mini Rizerie (<i>Glazoue IP</i>)	25% increased income	50% increased income
Extension (CARDER)	reached 100 rice farmers	reached 250 rice farmers
NGO-MRJC	reached 4 villages	reached 9 villages
Micro-Finance (CLCAM)	CFA 10 million	CFA 21 million
Policy (Local Government)	Cotton + Maize as cash crop	Cotton + Maize + Rice as cash crop

Mechanical and motorized weeders (ring hoe)

Hand-operated device that allows quick and efficient weeding of line-sown or line-transplanted rice. A mechanical weeder can cut, uproot and burry weeds by push-pulling it in between the rows of the crop. It should be followed by hand weeding of remaining weeds in the row.

Reduce weeding time by 30 to 50% in rice and any other upland crops



Motorized weeders can reduce labor inputs for weeding, and are engine-operated machines that allow quick and efficient weeding of line-sown or line-transplanted rice in irrigated lowlands. A motorized weeder can cut, uproot and burry weeds by walking it through the crop, in between the rows of the crop. It should be followed by hand weeding of remaining weeds in the row. **The motorized weeders are piloted in four sites in Tanzania: Mbeya (Mbarali District), Kilimanjaro (Moshi Rural District), and Morogoro (Kilombero District and Mvomero District).**

Timesaving obtained with the motorized weeder compared to hand weeding is estimated to be around 90%.

Weeding of rice in Africa is primarily done by women and children. Therefore, any technology making weeding less cumbersome and time-consuming will benefit them.

Light thresher : Easy to push by men, women and youth



One person can push it through 30cm deep water



Children pushing thresher



Weighs only 138 – 150kg compared to those other threshers weighing 350 – 1,000kg

Much of the weight rests on tires making it easily hand pushed by women and youth to rice gardens (Fig 1).

Easily towed to rice gardens through village roads using bicycles

Women and youth comfortably operate the thresher

The threshing efficiency - 99.9%

Uses 5.5hp petrol engine

Threshing output for all gender category - 650 – 800kg/hr. for a liter of fuel

Physical threshing loss reduced from 4.5% to 0.1%

Economic gain during threshing - USD 136.8/ha

Model development of youth and enterprise as Service provider perspective and connecting with Innovation platform



Model development of youth and enterprise as Service provider perspective: ASI owners can expect an internal rate of return of 65% and a high cost/benefit ratio (1.73) over the economic life of ASI Financial benefits with ASI can be greatly higher, as returns of 20-161% to capital investment have been demonstrated.

- **Technologies /innovations in the IPs (including policies, institutions and markets) - Facilitating demand driven technology / innovation generation, catalysing technology /innovation deployment and dissemination, building competence and skills of IP actors, facilitating information and knowledge sharing through the IPs**
- **Facilitation of Entrepreneurship - Developing models of Agribusiness / Entrepreneurship development, agribusiness skills development, youth and women entrepreneurship development through the IPs', facilitating access to finance and handholding**

Organization of hands-on training workshops on building machinery

Power tiller and attachments



Organization of hands-on training workshops on building machinery

Institutional innovations: linking millers and rice growers





Mini-combine harvester MADE IN AFRICA



6. What is being recommended now for the Nairobi meeting to consider?

Recommendations formulated during **the mechanization workshop in 2011** aim to prevent any repetition of past mistakes and to ensure sustainable and focused mechanization of the rice sector in Africa. Mechanizing Africa's rice sector is a prerequisite to reach the ambitious growth objectives set by African governments for their rice sectors.

Government



- Facilitate enhanced public–private sector collaboration in the development of agricultural mechanization in rice-based systems.
- Encourage the establishment of partnerships among local manufacturers to enhance the efficiency and quality of their work.
- Facilitate access to credit for key actors (local manufacturers and end users) in the mechanization value chain to sustain and increase the supply and demand for agricultural technology.
- Build and support local training centers in agricultural mechanization.

International manufacturers



- Establish direct dealerships in Africa.
- Build local capacity in the use and maintenance of equipment.
- Provide stewardship and quality assurance.
- Develop partnerships with local manufacturers to upgrade their construction capacities.
- Support local training centers in agricultural mechanization.

Local manufacturers



- Construct quality equipment or components that are adapted to local rice-growing conditions and for which local manufacturers have a clear competitive advantage.
- Provide aftersales services for products.
- Create partnerships among local manufactures to standardize key equipment and to better respond to demands for local manufacture and maintenance of equipment

National research and extension agencies



- Contribute to the elaboration of policies that strengthen agricultural mechanization of the rice sector.
- Build local capacity through introduction of prototype technology in partnership with local manufacturers.
- Identify and work with key local manufacturers to help adapt prototype machinery that can be fabricated locally.
- Support training of local artisans for constructing and servicing machinery.
- Elaborate technical standards and norms for use, maintenance and manufacturing of equipment based on field testing.
- Provide advice on business planning to mechanize farming in rice-based systems with farmer cooperatives and service providers.
- Provide methods and decision support for extension agents and end users to guide use and maintenance of agricultural equipment.



International research centers such as AfricaRice, IRRI and CIRAD

- Contribute to enhanced public–private sector collaboration in the development of agricultural mechanization in rice-based systems.
- Help improve local manufacturing technologies.
- Establish a network of local manufacturers and researchers from national and international research (Rice Mechanization Working Group within the new African Rice Task Force mechanism) to enhance and sustain agricultural mechanization in rice-based systems, in particular:

International research centers such as AfricaRice, FAO, IRRI and CIRAD

- Support the development of training curricula on agricultural mechanization in partnership with key actors in Asia and Latin America;
- Facilitate South–South cooperation between Africa and Asia and Latin America for local manufacturers and research through exchange visits and training.
- Assess government policies related to agricultural mechanization, in particular with respect to the importation of agricultural machinery and spare parts across Africa.
- Advocate support for mechanization as part of national rice development strategies.

Role women can play in the development, introduction, utilization and out-scaling of agricultural mechanization tools:



- Women should help identify their effective roles and needs of equipment along the agricultural value chain
- Once the tools are developed bearing in mind the need and the ergonomic conditions of women, they should be involved in the on-station and on-farm test and validation of the equipment, even before the introduction, utilization and out-scaling of the equipment in the selected sites
- After validation and introduction on the utilization sites, women must be made responsible of the overall management of the equipment. Here there should be linked to the artisans and anybody that can help them solve any technical problem that might occur during the utilization of the tools
- Women may have other role than users of the equipment
- They can acquire equipment of their choice, even bigger than what they can use and go into entrepreneurship. This will create job for the youth that will work in women enterprises, promote female entrepreneurship, make easier and more accessible the utilization of heavy equipment in women's fields

Private sector partners and entrepreneurs are key catalyst in innovation for the rice value chain development in a sustainable manner



End
Thank
you