



Research
Program on
Rice

**Global Rice
Science
Partnership**

GRiSP – Africa 2012 Accomplishments

Paul Kiepe

CARD 5th General Meeting

Pre-Conference Seminar

4 February 2013, Dakar, Senegal



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**Global Rice
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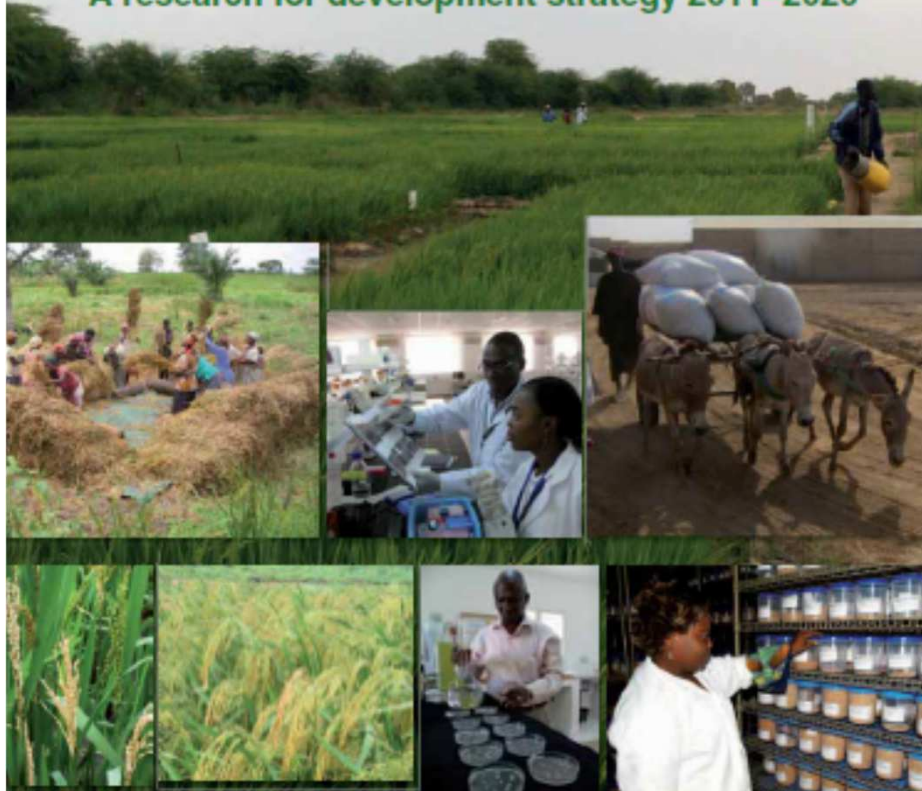
Contents

- Working towards impact
- Highlights
- Looking ahead



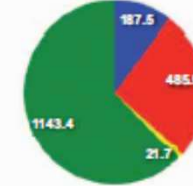
Boosting Africa's Rice Sector

A research for development strategy 2011–2020

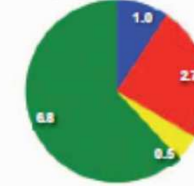


Central Africa Eastern Africa Southern Africa West Africa

A.1. Gross annual benefit of research on value-chain actors' income by region (US\$ million discounted at 5%)

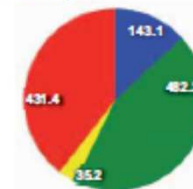


A.2. Number of people lifted above the PPP \$1.25 poverty line among farmers and consumers by region (millions)

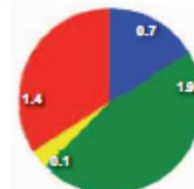


Irrigated Lowland Mangrove Upland

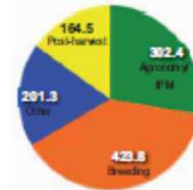
B.1. Gross annual benefit of research on farmer income by ecology in 2020 (US\$ million discounted at 5%)



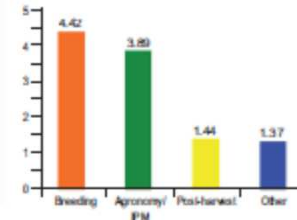
B.2. Number of people in rice-farming households lifted above PPP \$1.25 poverty line by ecology in 2020 (millions)



C.1. Gross annual benefit of research on farmer income by research discipline (US\$ million discounted at 5%)



C.2. Number of people in rice-farming households lifted above the PPP \$1.25 poverty line by research discipline (millions)



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Science for Impact

What is needed?

- Critical mass
- Connect actors (R \leftrightarrow R; R \leftrightarrow D \leftrightarrow P)
- Concentrate efforts (avoid dispersion)
- Communicate results

How?

- Through 3 mechanisms

Mechanism 1: Consortium Research Programs

Priority area (PA)	GRiSP (Theme)	WLE	CCAFS	Non CRP
1 Genetic diversity and improvement	1 + 2			
2 Yield gap closure, intensification and diversification	3		X	
3 Sustainable expansion		X	X	
4 Value chain development	4			
5 Policy and targeting	5			
6 Rice sector development	6			X
7 Capacity building	Cross-cutting		X	X

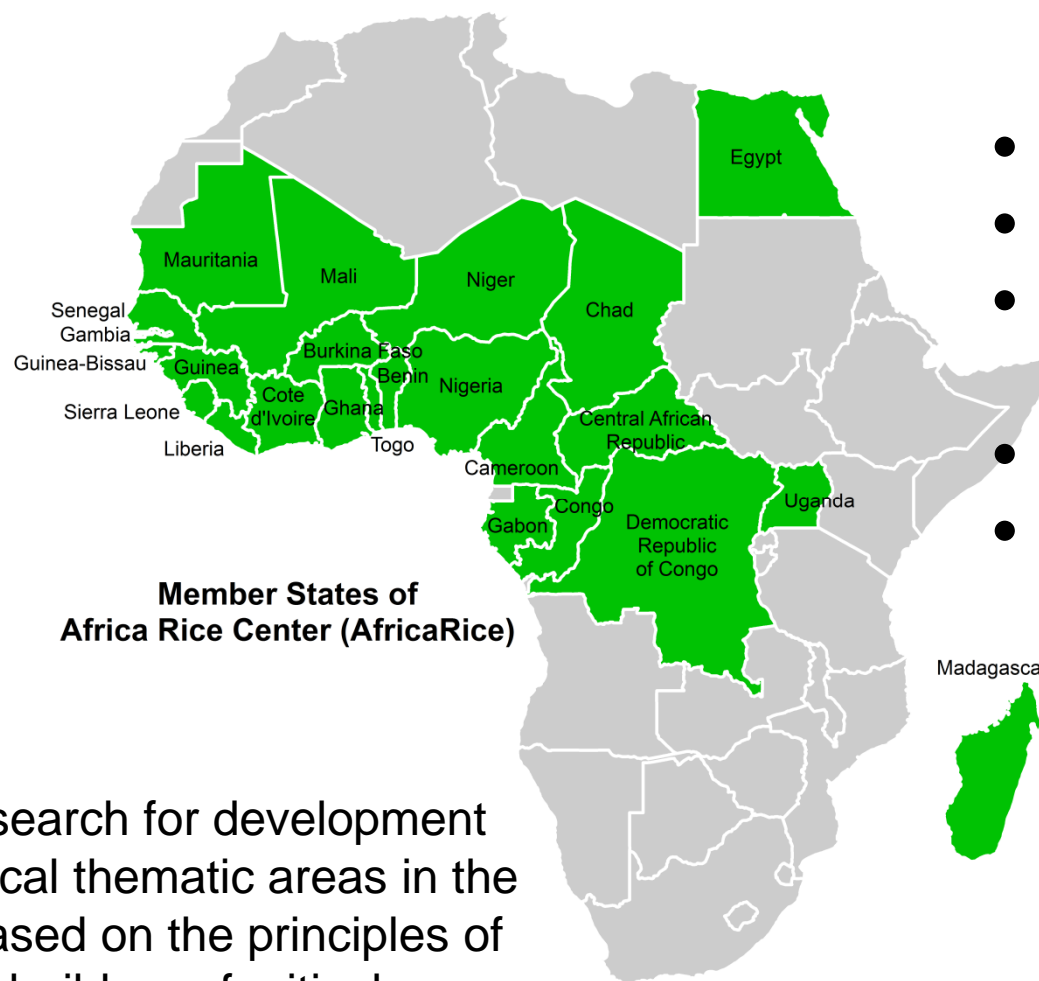


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Mechanism 2: Task Forces



Member States of
Africa Rice Center (AfricaRice)

- Breeding
- Agronomy
- Processing & value-addition
- Gender
- Policy

‘Collective research for development efforts on critical thematic areas in the rice sector, based on the principles of sustainability, build-up of critical mass and ownership by national research systems’

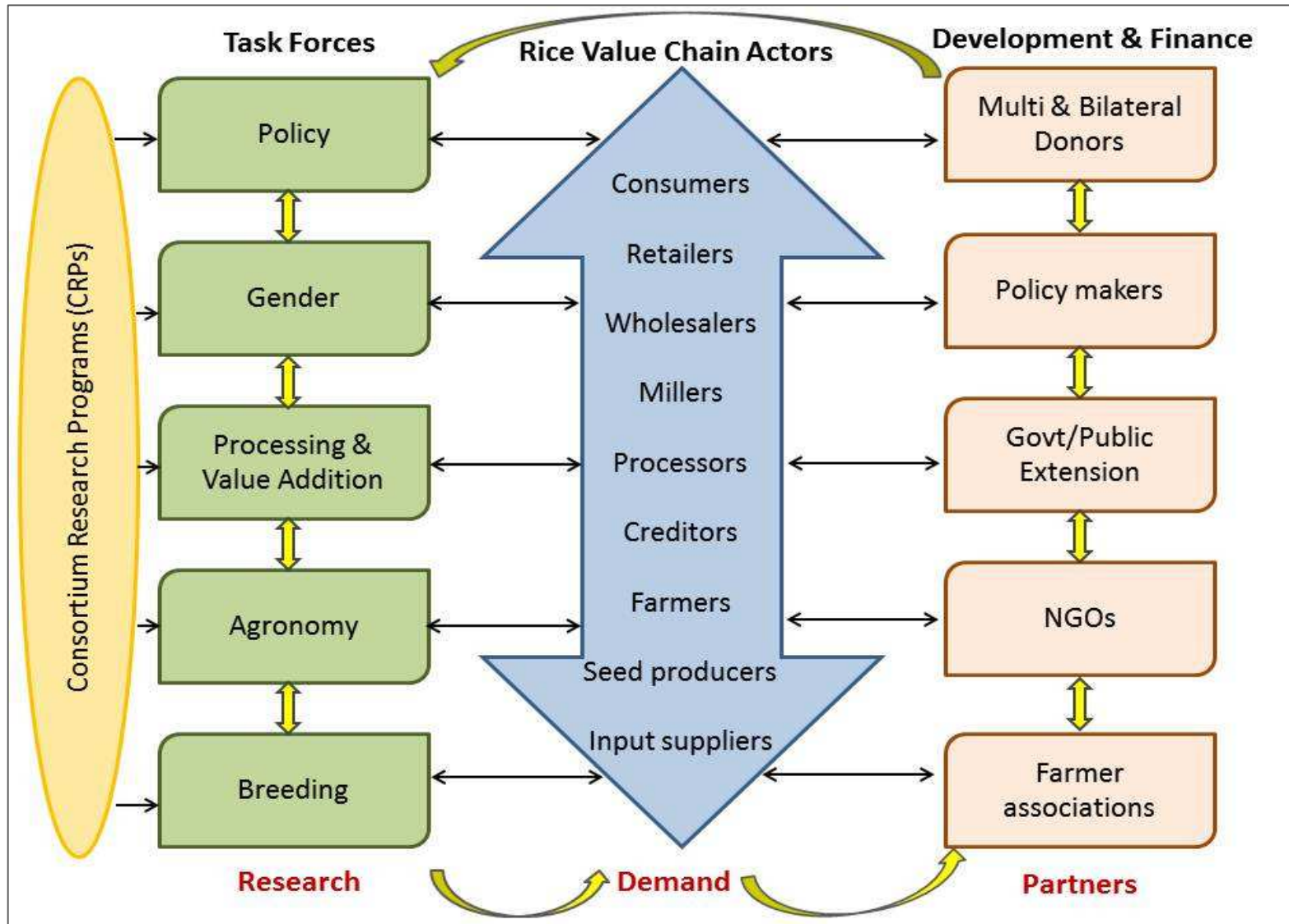


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Implementation of Strategic Plan



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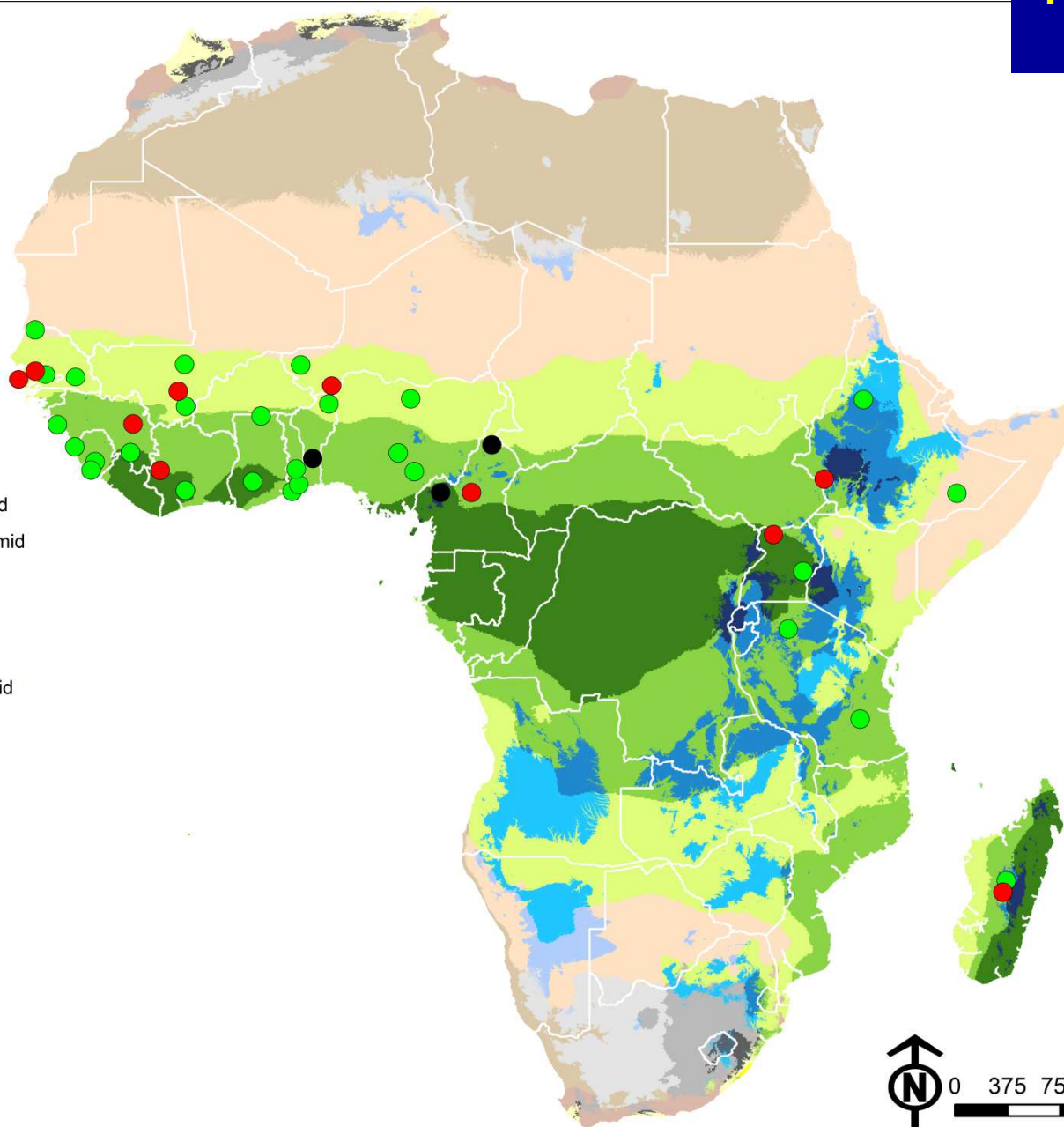
Mechanism 3: Rice Sector Development Hubs

Ecology

- Lowland
- Upland
- Upland and Lowland

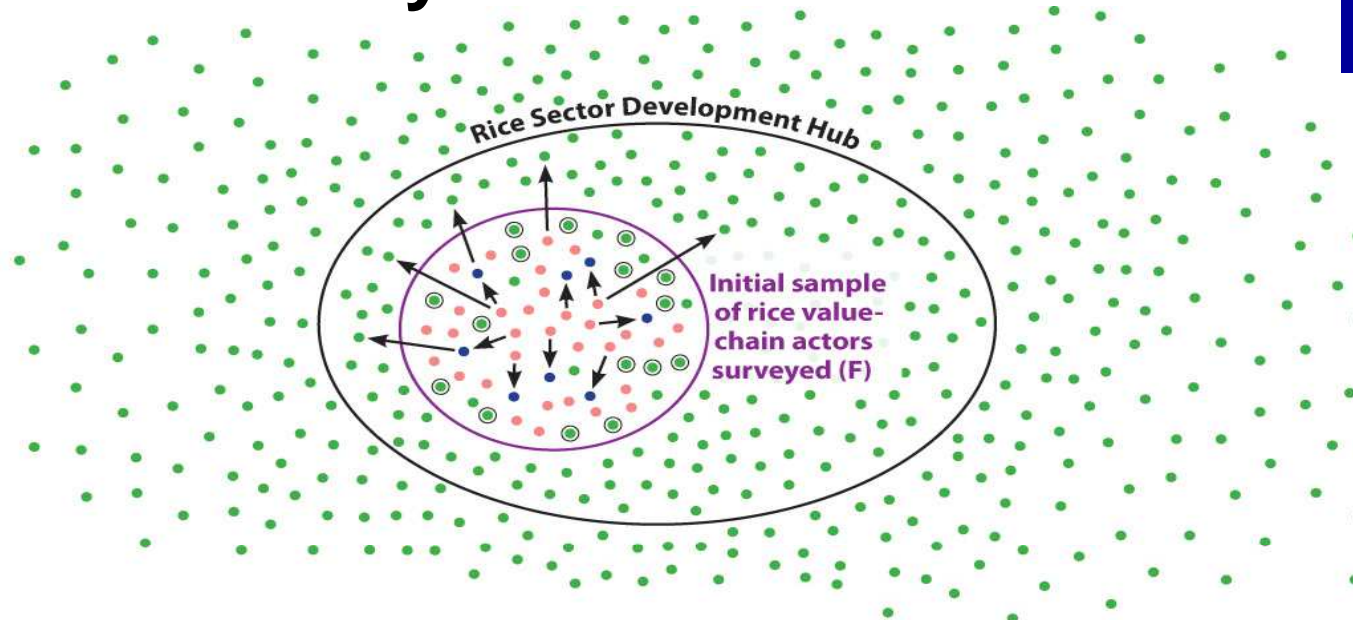
Agroecological Zones

- Sub-tropical - warm / arid
- Sub-tropical - warm / semiarid
- Sub-tropical - warm / sub-humid
- Sub-tropical - warm / humid
- Sub-tropical - cool / arid
- Sub-tropical - cool / semiarid
- Sub-tropical - cool / sub-humid
- Sub-tropical - cool / humid
- Tropical - warm / arid
- Tropical - warm / semiarid
- Tropical - warm / sub-humid
- Tropical - warm / humid
- Tropical - cool / arid
- Tropical - cool / semiarid
- Tropical - cool / sub-humid
- Tropical - cool / humid



Ex-ante and ex-post impact assessment in the hub and beyond

**GRiSP
Product
5.4.1 &
5.4.2**



Key

- F: sample of value-chain actors for initial surveys
- N1: a subset of F
- N2: a subset of F, mutually exclusive of N1
- N3: all other value-chain actors in the Hub (i.e. not N1 and N2) and some from beyond the Hub
- N0: a sample of actors involved in the initial survey, but neither N1 nor N2 — used as control group



Science for Impact

What is needed?

- Critical mass
- Connect actors (R \leftrightarrow R; R \leftrightarrow D \leftrightarrow P)
- Concentrate efforts (avoid dispersion)
- Communicate results

How?

- CRPs; AfricaRice leads GRiSP in Africa
- 'Rice Task Forces'
- Network of 'Rice Sector Development Hubs'
- Awareness raising (AfricaRice's Council of Ministers, NEC meetings, etc.)



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Contents

- Working towards impact
- **Highlights**
- Looking ahead

2012 AfricaRice Science Week and GRiSP-Africa Science Forum



Total of 161 participants from regional and national partners (29), IRRI (6), IRD (10), CIRAD (4), JIRCAS (9), Institute of Development Studies (IDS, UK) (1), other CGIAR centers in Cotonou (3), the media (8), and AfricaRice (90).



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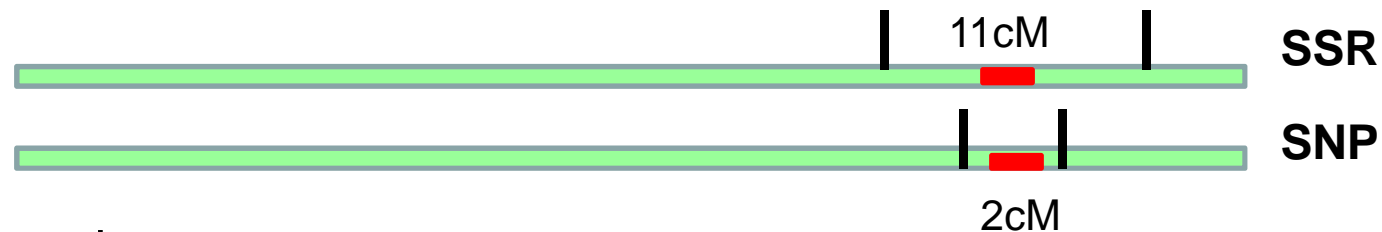
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GRiSP Themes 1 and 2: Genetic diversity and improvement

<p>Germplasm</p> <ul style="list-style-type: none"> ● Conservation <ul style="list-style-type: none"> ● Trait identification ● Data management 	<p>Pre-Breeding</p> <ul style="list-style-type: none"> ● Trait/Gene identification <ul style="list-style-type: none"> ● Marker development 	<p>Breeding</p> <ul style="list-style-type: none"> ● Trait incorporation ● Marker assisted selection ● Conventional selection <ul style="list-style-type: none"> ● Line Development 	<p>Evaluation</p> <ul style="list-style-type: none"> ● Multi-site, multi-year, evaluation ● Key site, NARS <ul style="list-style-type: none"> ● PVS ● INGER 	<p>Variety Release System</p> <p>Seed Production System</p>	<p>New Variety</p> <p>Each Region, Country</p>
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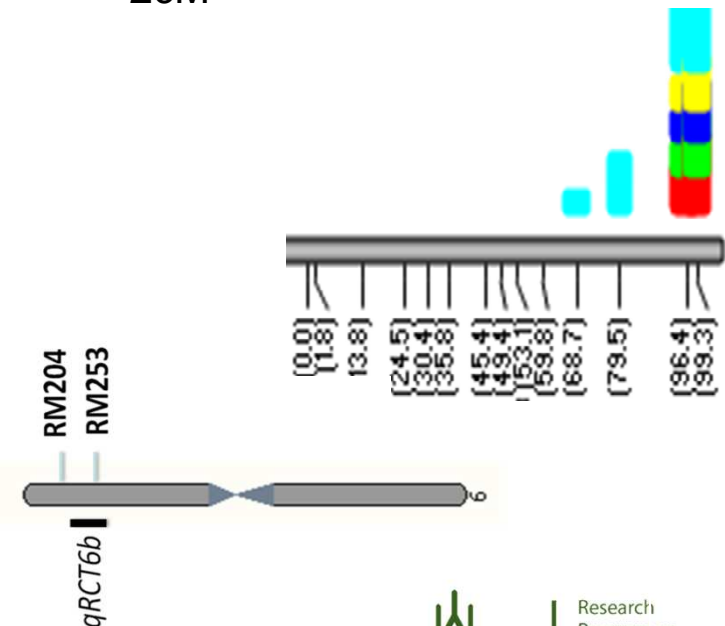
New QTLs Identified

1. AfRGM resistant QTL of both *O. sativa* and *O. glaberrima*
ITA306 x Tos145-19 , ITA306 x Tog7106 genotyped with ca 300 SNP markers and SSR as well. A QTL with strong effect identified in both.



2. BLB resistance
New resistant gene, ***xa/B3***, identified.
The resistance is effective to **5 strains in West Africa tested.**

3. Cold tolerant QTL
qRCTb6, for cold tolerance derived from Kunmingxioabaigu, is under fine mapping.



New Sources of Tolerant Germplasm

GRiSP Products
2.3.2, 2.3.3, 2.2.3

- **AG Tolerant *O. glaberrima***
Out of 2000 *O. glaberrima*, accession tolerant to 15 cm water depth identified (Acc 764, 1941, 1629)
- **Fe toxicity tolerant *O. glaberrima***
Out of 500 *O. glaberrima*, lines tolerant in terms of yield in hotspot identified (TOG6635, IRGC102262 etc)
- **Germplasm resistant to stem borer**
LAC 23, CG 14, NERICA 14, WAB 1159 identified as resistant to rice stem borers



IRGC102514



WAB 1159-2-12-11-6-9-1-2

MAS for Disease Resistance

**GRiSP
Products
2.2.2, 2.3.3**

Trait	Donor	Recipient	Locus	2011	2012
RYMV1 resistance	Gigante	IR64, IR47, Sahelika, FKR28	<i>rymv 1-2</i>	BC3F5	BC3F6
	Gigante, NIL 2, 16, 54, 130	WITA4, Bouake189, ITA306 NERICAL19, Saro5, IR64	<i>rymv 1-2</i>	<i>Parent</i>	BC1F1
	<i>O. glaberrima</i> TOG5681	Saro , Supa	<i>rymv1-3</i> New	<i>Parent</i>	BC1F1
RYMV 1 and 2 resistance	<i>O. glaberrima</i> (Acc104586)	NERICA L19, NIL 130	<i>rymv 1 -2</i> <i>and rymv 2</i>	F1	F2
Blast resistance	Owarihata mochi	IR64, NERICA L19, Sahel 108, Kogoni, Rassi, IR31785	<i>pi21</i>	F1	BC2F1
	Modan		<i>PB1</i>	F1	BC2F1



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MAS for Abiotic Stress Tolerance

GRiSP Products
2.3.2, 2.3.1, 2.3.4,
2.3.3

Trait	Donor	Recipient	Locus	2011	2012
Salt tolerance	FL 478	Rassi	<i>saltol</i>	BC3F2	BC3F3
	Pokkali	Sahel 108	<i>saltol</i>	BC2F1	BC2F3
Submergence tolerance	Swarna sub 1	WITA 4	<i>Sub 1</i>	BC2F1	BC3 F2
	IR64 sub1	NERICA L19	<i>Sub 1</i>	F1	BC1
	Swarna sub 1	TOX4004, Kogoni, FARO44, BW 348-1	<i>Sub 1</i>	F1	F2
Drought tolerance (Lowland)	Apo, IR77298-14-1-2-10	WITA4, NERICA L19, FARO44	<i>DTY3.1</i> <i>DTY8.1</i> <i>DTY2.1</i> <i>DTY2.2</i>	F1	F2
Cold tolerance	Silewah	NERICA L19, Sahel 108	<i>ctb1, ctb 2</i>	BC1F1	BC1F2
P-deficiency tolerance	Kasalath	NERICA 1, 4, 10, WAB96, WAB515, Dourado precoce	<i>Pup 1</i>	Pup1 survey F1	BC1F1



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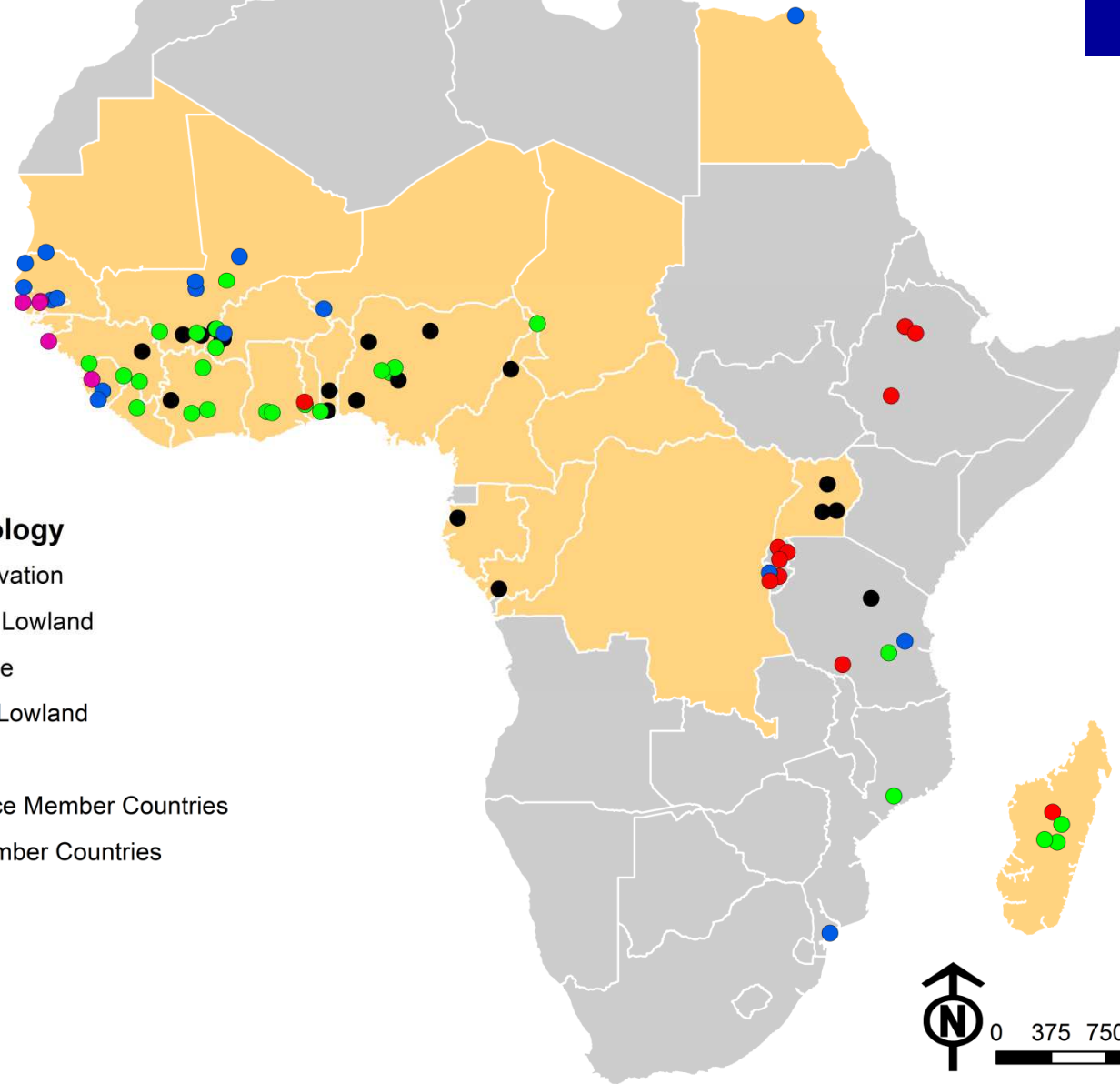
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Africa-wide Rice Breeding Task Force

GRiSP
Product
2.1.4

Types of Ecology

- High Elevation
- Irrigated Lowland
- Mangrove
- Rainfed Lowland
- Upland
- AfricaRice Member Countries
- Non-Member Countries



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Promising breeding lines close to release

GRiSP
Theme 2
All Products

Ecology	Traits	Number	Status	Country
Upland	Drought	11	PVS	Benin, Burkina Faso, Mali, Nigeria
		3	DUS	Uganda
		3		Burkina Faso, Guinea Conakry
Irrigated	Cold	16	PVS	Senegal, Mali
	Fe toxicity	6	PVS	Burkina Faso (WAT1046, WAS20BB, SIK9-164)
	RYMV	4		Mali
	Quality	5		Tanzania, Benin, Gabon, Cote d'Ivoire Uganda
	High yield	16	Submit	Mauritania (Sahel series 2007-2009)
Lowland	Salt	11	PVS	Gambia, Mali, Senegal
	Cold	16	PVS	Mali, Senegal
	Fe toxicity	18	PVS	Burkina Faso, Ghana, Guinea, Nigeria
		4		Guinea Conakry (CK)
	High yield	5	NPT, submit	Mozambique, Tanzania, Kenya
		3	DUS	Uganda
High Elevation	Cold	10	PVS	Madagascar, Ethiopia



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Varieties Released in 2011-2012

GRiSP
Theme 2
All Products

● Upland

- Benin * NERICA 1, 2, 3, 4, 6, 7, 8
- Zimbabwe NERICA 1, 3, 7,
- Nigeria NERICA 7 (FARO 58), NERICA 8 (FARO 59)
- Ethiopia WAB 189 (Cold), FOFIFA3737 (Cold),
WAB 515-B-16A1.1 (Cold)

● Lowland

- Nigeria NERICA L19 (FARO60), NERICA L34 (FARO61)
- Benin * NERICA L20, NERICA L14

● Irrigated

- Burundi IR77713-30-1-1-3, IR79511-47-2-6-5
- Mozambique Makassane, IR80482-64-3-3-3
- Mali Sahel 177 (aroma), Sahel 316, Sahel 306



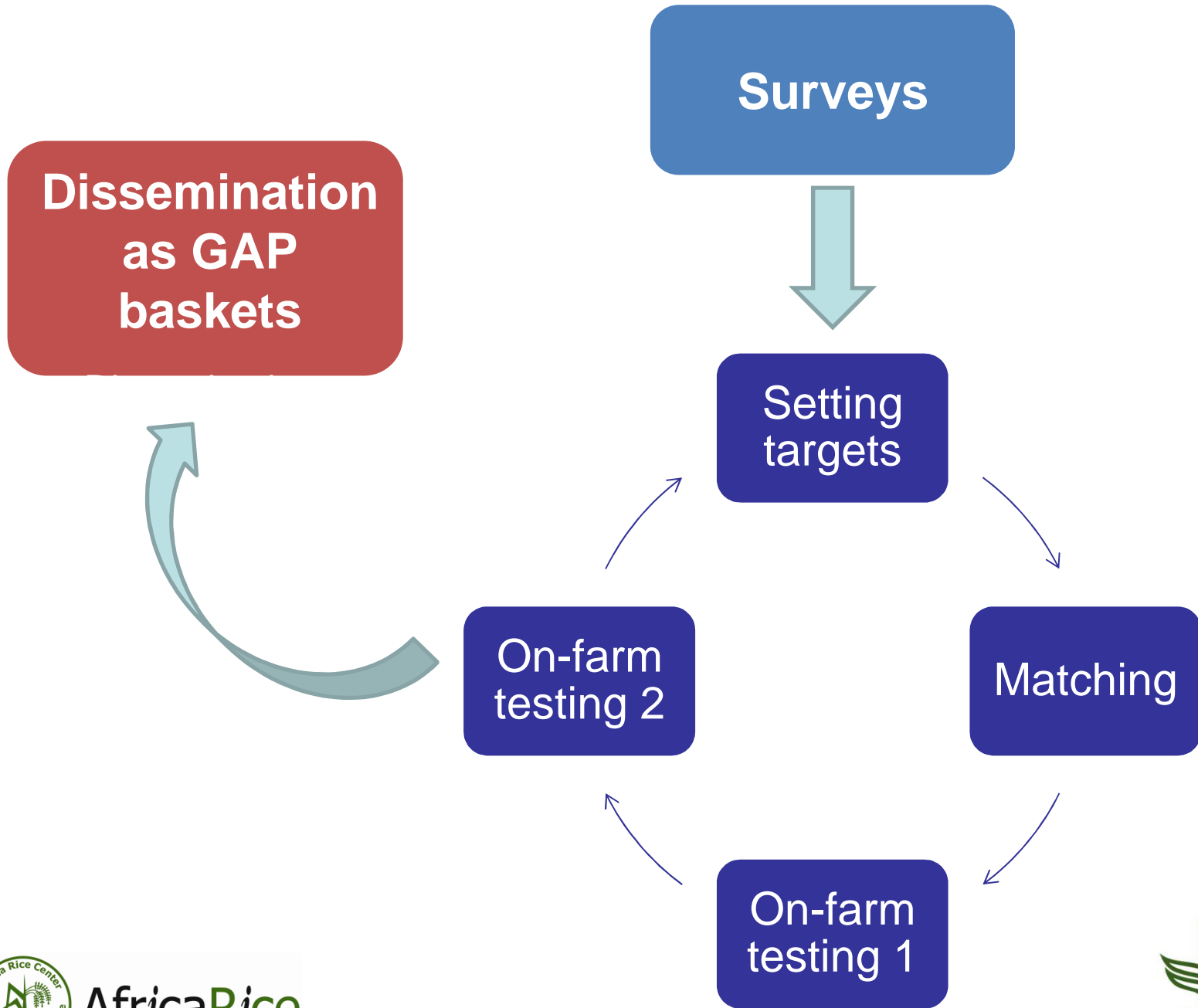
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Theme 3: Sustainable productivity enhancement

<p>Determinants and product development</p> <ul style="list-style-type: none"> ● Land prod. ● Water prod. ● Nutrient prod. ● Labor prod. 	<p>Integration – field level</p> <ul style="list-style-type: none"> ● GAPs from seed to harvest ● Intensification / diversification / yield and productivity gap closure 	<p>Integration at village, watershed level</p> <ul style="list-style-type: none"> ● Environmental services ● CC mitigation 	<ul style="list-style-type: none"> ● Public-private partnerships ● Re-packaging ● Policy 	<p>Wide Scale Diffusion</p> <ul style="list-style-type: none"> ● M&E, stewardship
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Yield and productivity gap surveys

**GRiSP
Products
3.1.4, 3.3.5**

- Target area: 1–3 rice sector development hubs in 15 countries
- Yield gap survey
 - >> Objective: identify determinants of rice productivity in the hubs
 1. Protocol available
 2. Training workshop on Feb.
 3. Data collection tool developed
 4. Video & field guide drafted
 5. Establishment of weather stations
 6. Backstopping visits (Oct. to Dec. 2012)

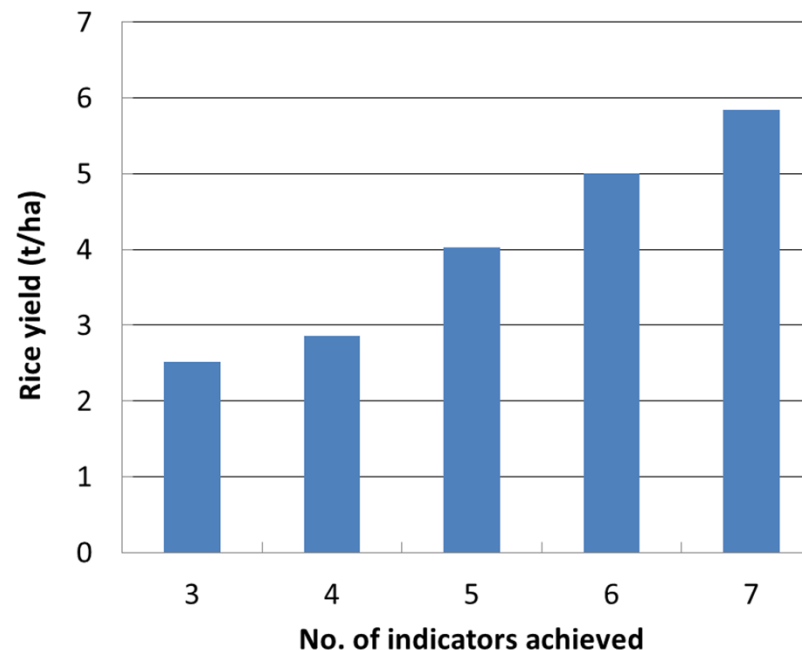


Rice productivity and yield determinants

GRiSP
Products
3.1.4, 3.3.5

Determinants of rice productivity in irrigated lowland in Benin >> use as GAP check-list

1. Residue management
2. Plowing method
3. Drought
4. Rat damage
5. N application rate
6. Land leveling
7. Sand content in the soil



Land preparation and weeding

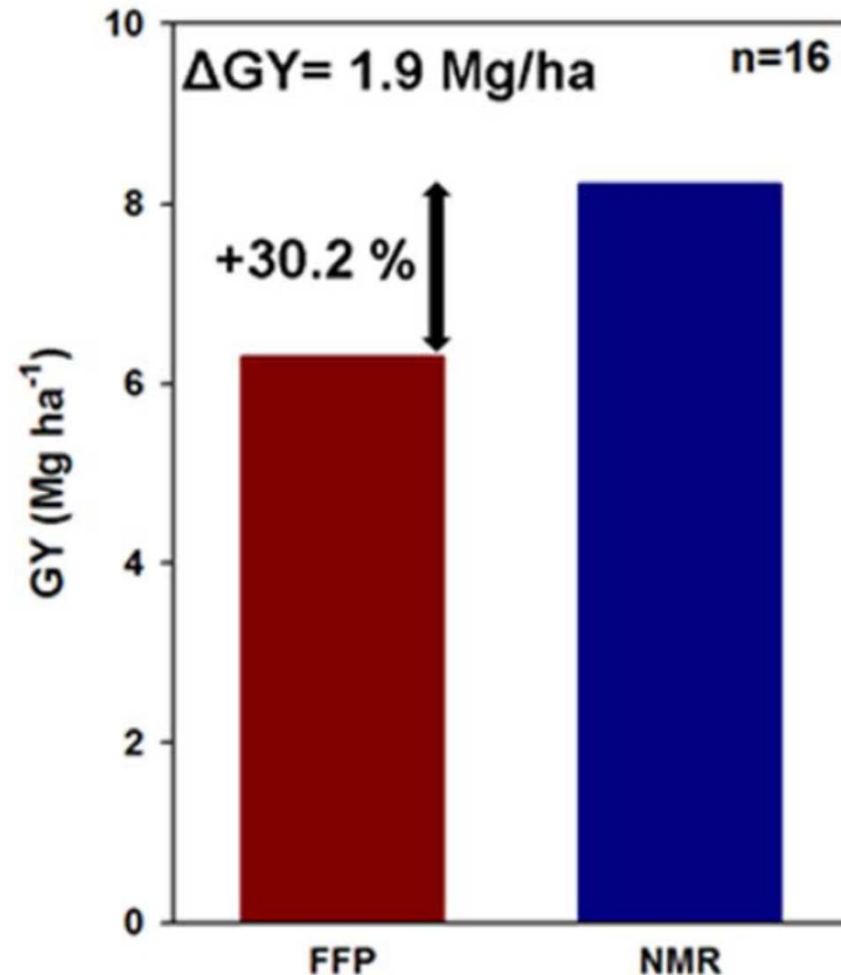
**GRiSP
Products
3.3.3 and
4.1.1**



Nutrient manager (NMR) on-farm testing in the 1st season in Senegal

GRiSP
Product
3.1.2

- With NMR, about 1.9 t/ha or 30% yield increase
1. 3 splits in NMR > 2 splits in farmers' practices (FFP)
 2. Late 2nd split application in FFP (around booting stage)
- Yield data available from nutrient omission trials in Benin, Burkina Faso, Nigeria, Niger, Mali for testing of NMR



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Weed management videos

- Two farmer-to-farmer videos on labor-saving weed management options:
 - 1) “rotary-hoe weeding in lowland rice”
 - 2) “safe and efficient use of herbicides”
- Languages: English, French, Portuguese, Swahili and Dagbani
- Produced by *Real2Reel Film Productions*:
 - 1) Filming in September 2012
 - 2) 3 locations: Ifakara, Morogoro and Moshi
- DVD production
 - 1) combined with previous AfricaRice “Weed Management” and “Transplanting” videos



Theme 4: Extracting more value from rice harvests through improved quality, processing, market systems and new products

<p>Determinants and technology development</p> <ul style="list-style-type: none"> ● Post-harvest losses ● Grain quality ● New products 	<p>Integration at farm level</p> <ul style="list-style-type: none"> ● GAPs from seed to rice miller 	<p>VC upgrading</p> <ul style="list-style-type: none"> ● Aggregation ● Proof of concept – ‘rice sector development hubs’ 	<ul style="list-style-type: none"> ● Public-private partnerships ● Re-packaging ● Policy 	<p>Wide Scale Diffusion</p> <ul style="list-style-type: none"> ● M&E, stewardship
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Harvest and post-harvest processes

**GRiSP
Product
4.1.1**



Marketing local rice (1)

GRiSP
Product
4.3.4



Figure 1: Presentation of the two alternative rice brands in the shop in Saint-Louis (left) and Dakar (right)



Figure 2: Eliciting preferences before the auction procedure in Saint-Louis (left) and Dakar (right)



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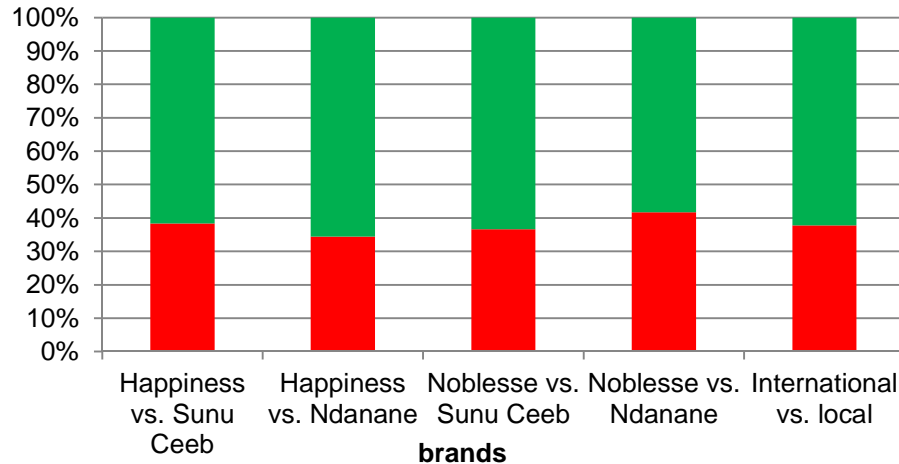


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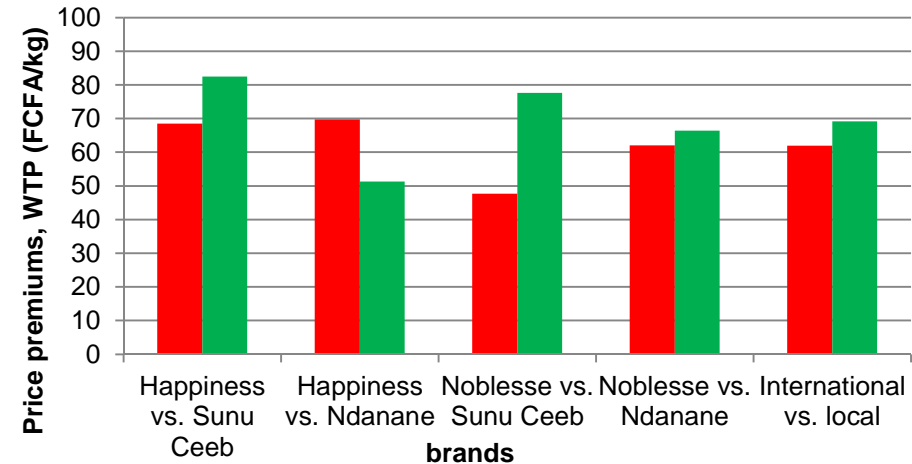
Marketing local rice (2)

GRiSP
Product
4.3.4

Preference



WTP



- Consumers pay 17% price premiums for preferred brand
- Higher preference for local brands
- But essentially two market segments
- Better target both segments through “hybrid” brand? E.g.: Durabilis’ Terral



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Rice databases to support rice policy, technology targeting and impact assessment.

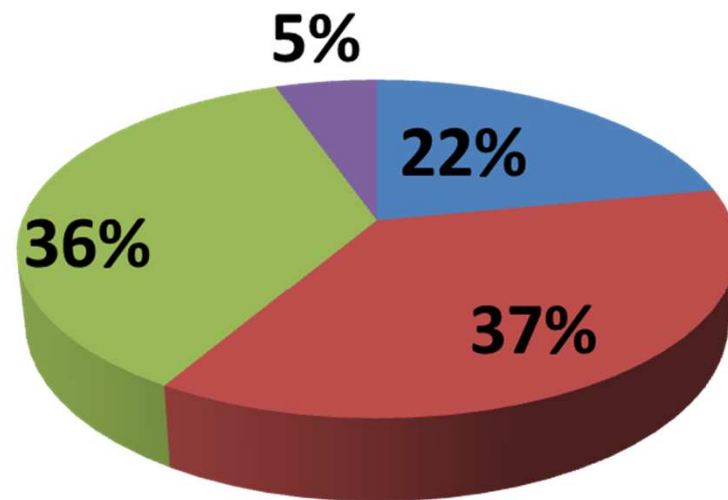
- Annual update of regional rice statistics on rice area, yield and production

2012 Africa Rice Trends updated,

Estimation of rice area by ecology in Africa,

Individual countries Rice Facts sheets

Share of area per ecology in all countries



■ Irrigated ■ Upland
■ Lowland ■ Other



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Theme 5: Regional integration of rice policies

**GRiSP
Product
5.3.4**



**Consultative workshop on the classification of rice in the tariff bands of ECOWAS common external tariff
Cotonou, Bénin 3 - 4 / 9 / 2012**



**African Union / Africa Rice Joint Consultation Meeting
Africa Rice Center Cotonou, Bénin 15 - 16 March, 2012**

Theme 6: Technical experts services for rice sector investment and disaster or post-conflict response

- Support to the Nigerian Rice Transformation Agenda
- Support to rice research programs in Sierra Leone and Liberia as part of WAAPP
- Technical support for re-development of small scale irrigation scheme in Central Mozambique

Linking millers and rice growers

- Southern Mozambique: Linking local rice mill and rice growers, involving 3 farmers groups from 2 villages (50 farmers)
- Three Central Africa countries (Cameroon, Chad and CAR): establishment of 6 'rice quality centres'



Weekly field schools with 400 Imbo plain farmers (Burundi)

**GRiSP
Product
6.4.2**



Individual Training – by Region

Criteria	Category	Year			
		2011		2012	
		AfricaRice	IRRI	AfricaRice	IRRI
Region	West Africa	76	2	74	
	East Africa (including Madagascar, Ethiopia)	14	3	21	14
	Central Africa	2		2	
	Northern Africa (only Egypt)	1		1	
	Other	2			
Gender					
	Male	73	3	74	10
	Female	22	2	24	4
	Grand Total	95	5	98	14

Note: IRRI's numbers only account for African participants



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Group training

	Year			
	2011		2012	
	AfricaRice	IRRI	AfricaRice	IRRI
Total organized	23	7	24	6
Gender				
<i>Male</i>	271	39	356	33
<i>Female</i>	72	16	60	10
Grand Total	343	55	416	43

Note: IRRI's numbers only account for African participants

Contents

- Working towards impact
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- Looking ahead

Looking ahead

- Keep clear product focus
- Strengthen interactions at GRiSP theme level
- Strengthen Task Forces (mechanization?)
- Backstop Hub activities (learn from experiences elsewhere in SSA, Asia and LAC)
- Pro-actively link with development partners to stimulate out-scaling of products / services
- Obtain better insight in capacity building efforts by GRiSP in Africa; co-develop coherent training curricula and Rice Information Gateway
- ...
- ...
- (!) Many events: CARD SC + general meeting, TICADV, NEC+COM meetings, GRiSP global forum, 3rd Africa Rice Congress...



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Thank you

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