Rice Development in sub-Saharan Africa

Recent performance and continuing challenges

Mahabub Hossain
Executive Director, BRAC

Presented in the JICA meeting on the Consortium for African Rice Development (CARD), Kampala, Uganda, 7-8 November, 2011

Methodology

- Trend analysis with time series data
- Compare growth in yield for 1970-90 and 1990-2005

Trend Equation:

$$LnY = a + bD + cT + d(D*T) + m$$

Y	=	the variable for which the rate of growth is calculated
T	=	time series
D	=	dummy for time period with value 0 for 1970-90 and 1 for 1990-2005
c	=	parameter showing the trend rate of growth for 1970-90
(c+d)	=	parameter showing the rate of growth for the period 1990-2005

Recent performance of rice production in Africa compared to South Asia, 2000-09 vs 1980-2000

Region	Population		Rice production		Rice yield	
	1980-2000	2000-2009	1980-2000	2000-09	1980-2000	2000-09
Africa	2.66	2.22	4.04	4.25	1.18	1.80
East Africa	2.83	2.57	2.23	5.18	0.95	2.58
West Africa	2.68	2.53	4.39	4.79	0.59	2.27
South Asia	2.24	1.62	2.71	2.01	2.21	1.92

- Over the last decade Africa has done much better than South Asia in increasing rice production
- Much of the increase in production is now coming from the growth in rice yield
- However the population growth still remains very high

Countries with early signs of green revolution: Good performers in the last decade

Growth in area:

Sierra Leone (8.8), Uganda (7.5), Tanzania (6.4), Mali (5.1), Senegal (4.4), Liberia (3.9), Guinea (3.6)

Growth in Yield:

Liberia (5.0), Sierra Leone (4.9), Madagascar (4.2 Mali (4.1), Senegal (3.7), Nigeria (2.6)

Growth in Production:

Sierra Leone (13.7), Mali (9.3), Liberia (8.9), Senegal (8.0), Tanzania (6.0), Uganda (5.9), Mozambique (5.3), Madagascar (5.1) Guinea (4.3)

Changing sources of growth in rice production in Africa, 1980-2000 to 2000-2009 (growth, %/year)

Country	Area		Yield		Production	
	1980-2000	2000-09	1980-2000	2000-09	1980-2000	2000-09
Chad	5.6	2.2	4.8	0.7	10.4	2.9
Congo DR	2.9	-0.5	-0.7	0.1	2.2	-0.4
Cote d'Ivorie	1.4	1.3	1.2	-0.5	2.6	0.8
Ghana	2.5	1.5	5.5	0.3	8.0	1.8
Guinea	4.3	3.6	0.0	0.6	4.3	4.3
Liberia	2.6	3.9	-0.5	5.0	-6.3	8.9
Madagascar	0.0	0.9	1.3	4.2	1.3	5.1
Mali	4.9	5.1	4.6	4.1	9.5	9.3
Mozambique	3.3	-3.3	0.3	-2.0	3.6	5.3
Nigeria	8.2	0.1	-1.7	2.6	6.5	2.7
Senegal	0.3	4.4	2.7	3.7	3.1	8.0
Sierra Leone	-1.9	8.8	-0.4	4.9	-2.4	13.7
Tanzania	3.6	6.4	1.6	-0.5	5.2	6.0
Uganda	10.6	7.5	0.5	-1.7	11.1	5.9

Consumption of rice and import dependence continue to grow despite recent production growth

Country	Consumption (000 t)		Imports (000 t)		
	2000-02	2007-08	1990-92	2000-02	2006-08
Burkina Faso	269	248	77	189	159
Cote d'Ivorie	1,031	1,339	348	601	825
Ghana	458	588	169	283	409
Guinea	969	1,093	204	252	245
Liberia	197	287	117	91	178
Madagascar	1,983	2,323	44	147	171
Mali	604	738	27	111	165
Nigeria	3,180	3,427	290	1,264	803
Senegal	822	920	388	670	930
Sierra Leone	452	604	124	156	123
Tanzania	695	884	55	136	69

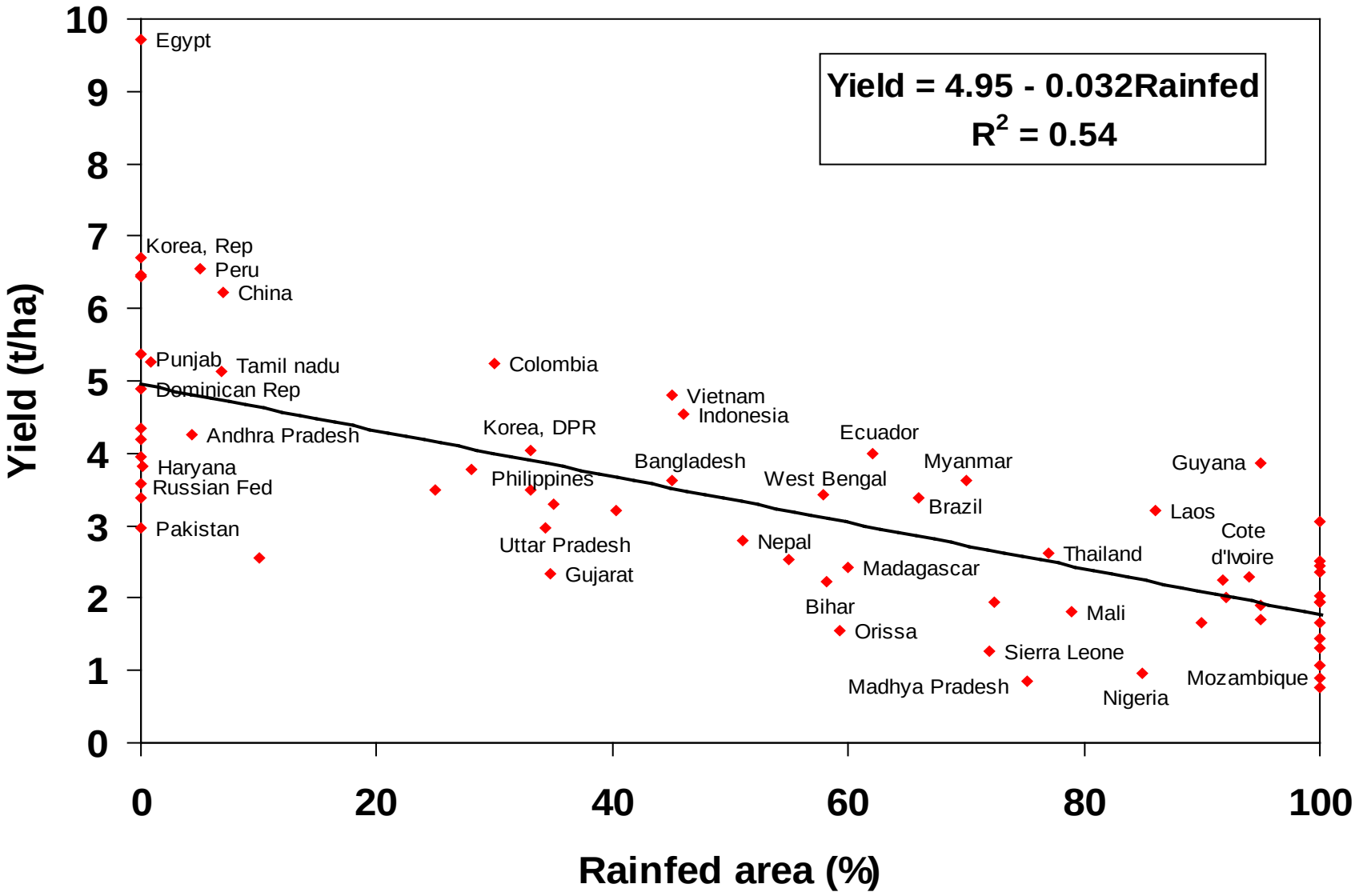
Analysis of rice yield in Africa

- The level of rice yield in most African countries has remained substantially lower than in South and Southeast Asia
- In Eastern Africa expansion of rice area on marginal land has led to reduction in yield
- Western Africa as better rice growing environment
- The increase in yield in countries like Senegal and Mali has been achieved with expansion of irrigated rice farming

Level of rice yield (t/ha) achieved

Country	1980-82	2000-02	2007-09
Chad	0.94	1.21	1.28
Congo DR	0.81	0.75	0.76
Cote d'Ivorie	1.20	1.86	1.76
Ghana	0.74	2.15	2.13
Guinea	1.71	1.72	1.81
Liberia	1.29	1.10	1.54
Madagascar	1.70	2.13	2.84
Mali	0.99	2.03	2.81
Mozambique	0.83	0.96	0.86
Nigeria	2.04	1.38	1.65
Senegal	1.47	2.33	3.09
Sierra Leone	1.27	1.03	1.43
Tanzania	0.99	1.92	1.97
Uganda	1.35	1.50	1.30

Negative association of rice yield (t/ha) with rain fed area (%)



Note: Covers 61 developing countries and 16 Indian states with rice area >20,000 has

Challenges and constraints to growth in rice production in Africa

- Africa has done well in improving high yielding cultivars (NERICA)
- Key constrains to growth in production remains to be water resource development
- The low rice yield in Africa is due to predominance of upland and rain fed rice environment
- Higher use of fertilizer would not give good response without good soil moisture and water control
- Farmers may not adopt high yielding NERICA varieties unless high yields are demonstrated with farmer-participatory experiments
- The other constraints are marketing of surplus rice
- Due to under-developed infrastructure the cost of transporting surplus to urban centers would be high
- Rice produced in remote areas would not be able to compete with imported rice unless the unit cost is reduced with substantial increase in yield
- Poor quality seed and irregular supply
- Infestation of pest and disease
- Human and Social capital building and formation of institution

- BRAC, a development organization founded by (Sir) Fazle Hasan Abed KCMG in February 1972
- BRAC Vision: A world free from all forms of exploitation where everyone has the opportunity to realize their potential
- Today, BRAC is the largest southern NGO with development interventions in Asia and Africa
- BRAC is currently expanding into Africa where is collaborating with a number of governments

BRAC Launched Agriculture programme to strengthen rice production in Africa with focus on small holder farmers:

1. **Tanzania (2007)**
2. **Uganda (2007)**
3. **Liberia (2008)**
4. **Sierra Leone (2008)**
5. **Southern Sudan (2008)**

BRAC Agriculture activities on Rice Production

The components agriculture activities are as follows:

- Capacity building-training to farmers, inputs supply, follow up
- Demonstration (collective and individual farm)
- Extension services through Community Agriculture Promoter /Extension workers
- Seed production, processing and distribution;
- Adoptive R&D
- Linkages with credit support
- Networking & Collaboration

BRAC Experience with rice farming in Sierra Leone and Liberia

- Both countries have long rainy seasons and adequate rainfall which make them highly suitable for intensive rice farming as in Asia
- There is plenty of surface water in the swamps and low lands that can be lifted at low cost for second rice farming in the dry season
- The swamps and low-lands are substantial part of the landscape but remains fallow due to high cost of land reclamation
- Rice is basically produced in uplands under slash and burn system with use of traditional cultivars for subsistence production

BRAC Experience with rice farming in Sierra Leone and Liberia

- BRAC seed farms demonstrated high yields of NERICA varieties (over 4.0 t/ha) in the reclaimed low lands
- BRAC found limited demand for NERICA seeds and fertilizers in upland rice farming
- Farmers have access to enough uplands for producing rice for own consumption
- They are not interested to produce surplus rice due to poor transport infrastructure and marketing constraints
- Development of low-land rice farming would require heavy investment in land reclamation and water management, and investment in road transport for liking farmers to markets
- Farmers would need training on modern rice farming to generate demand for high-yielding seeds and chemical fertilizers

Where we are now

Agriculture Activities	Africa total	Tanzania	Uganda	S. Sudan	Sierra Leone	Liberia
Branch Offices under Agri. programme	174	55	60	19	20	20
Develop Community Agriculture Promoter (CAP)	1527	406	600	144	177	200
Farmers Trained	128530	56111	63936	200	1223	7060
Demonstration farm	307	45	76	2	80	104
BRAC Seed multiplication and Research farm	4	1	1	-	1	1

AREA OF INTERVENTION OVER THE NEXT FIVE YEARS

- Introduction of contract farming
- Introducing of smallholding farm equipments including irrigation devices to increase farming efficiency
- Value addition to the farm produces
- Strengthening of agricultural inputs supplies
- Enhancing adaptive R&D
- Strengthening market linkage

Training & Demonstration of Rice Farming Africa

Farmers Training & Demonstration in Field

Collective Farming

Individual Demonstration Farm

Rice seed packet

Thank you for your attention