Agricultural Yields in Sub-Saharan Africa: Policies in Zambia, Rwanda, Malawi and Mozambique

Growth Week 2013

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YIELDS AND INPUT USE IN AFRICA SAA

(Source: FAO, 2007)

Region	Yields(t/h)	Fertilizers (Kg/h)
Africa SAA	**1,33**	**9**
Asia	2,80	100
South America	2,67	73
Developed Countries	3,92	135

GREEN REVOLUTION

- **Most African countries have not yet implemented a Green Revolution.**
- **Instead of high mechanization GR is based on Scale Neutral Technologies: fertilizers, hybrid seeds, irrigation and pesticides.**
- **Take off: subsidized credit due to the high risk in agriculture (weather, plagues and prices)**

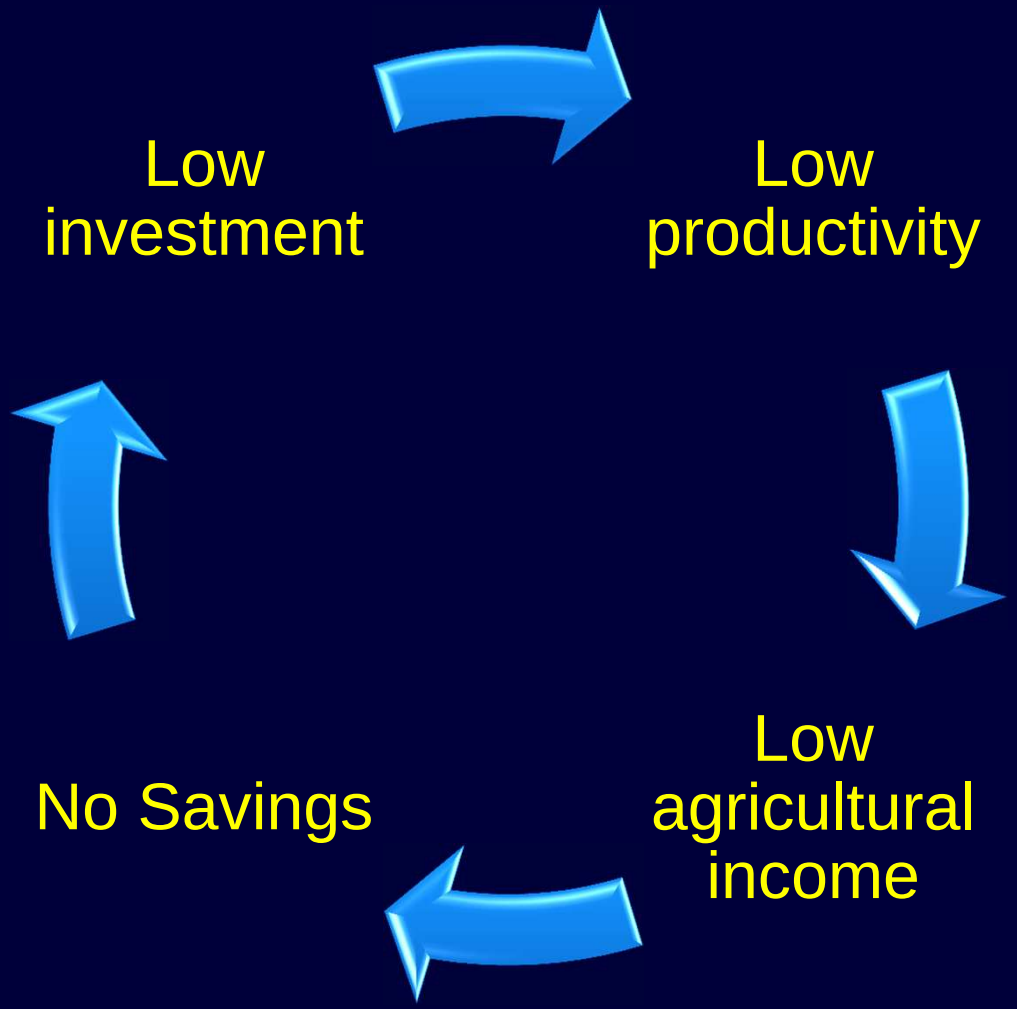
CEREAL´S YIELDS AND USE OF FERTILIZERS (Source:FAO STATA, 2012)

	t/h	kg/h		t/h	kg/h
South Africa	4,2	49,2	Nigeria	1,4	2,1
Malawi	3,8	28,5	Benin	1,3	1,6
Madagascar	3,0	2,7	Burundi	1,2	4,9
Zambia	2,5	27,3	Senegal	1,1	6,8
Rwanda	1,9	1,1	Gambia	1,1	9,1
Ghana	1,8	20,3	Burkina	1,0	4,4
Gabon	1,8	12,1	**Mozambique**	**0,8**	**4,6**
Costa de Marfil	1,7	15,9	Congo	0,8	28
Cameroom	1,7	6,7	Zimbawe	0,6	1,1
Etiopia	1,7	17,7	Angola	0,5	2,8
Mali	1,6	7,6	Eritrea	0,5	0,4
Uganda	1,6	2,1	Niger	0,5	7,9
Algeria	1,6	7,8	Sudan	0,4	1,6

LOW PRODUCTIVITY IN SAA AGRICULTURE: CONSTRAINTS

- **Poor and eroded soils after centuries of shifting cultivation (Burning)**
- **Dualistic land structure of property: huge idle territories and millions of small properties (average size: 1 hectare)**
- **Lack of access to credit to buy fertilizers**

Vicious Cycle of Poverty (Nurkse)



PROGRAMS FOR YIELDS INCREASE APPLIED IN AFRICA SAA

Less cultivated land and more people to feed increase pressure on governments to solve the problem.

Some countries in the 80´s applied universalistic programs of subsidies for the use of inputs in agriculture:

Rwanda: Crop Intensification Program (CIP)

Zambia: Fertilizer Support Program (FISP)

Tanzania: National Agricultural Input Voucher Scheme (NAIVS)

Malawi: Farm Input Subsidy Program (FISP)

Program features	RWANDA	ZAMBIA	TANZANIA	MALAWI
	2007	2002	2009	2005
Beneficiaries	57.000	300.000	800.000	1.500.000
Target Group	Small Farmers	Small Farmers	Small Farmers	Small Farmers
Modality	Voucher	Direct dist	Voucher	Voucher
Input Package	50kg NPK, 50kg Ureia, 10kg seeds	250 kg NPK	50kg NPK, 50kg Ureia,10kg seeds	50kg NPK, 50kg Ureia e 10kg seeds
Crop	Corn, rice, etc	Corn	Corn, rice	Corn,
Subsidy	50%	50%	50%	75%
Cost	U$ 624 million	2% do PIB	U$ 100 ml	U$ 150 million
Benefits	200% increase output and yields	300% increase output ,yield	200% increase corn and rice	300% increase output and less poverty

PROGRAM´S PERFORMANCE

They had an important impact on yields and output.

BUT:

- They did not strengthened private market channels: State control of input distribution.
- Expensive and over-reliance on continuous government support: unsustainable.
- Linked to political patronage.

ALTERNATIVE: SMART SUBSIDIES

- Focus : emerging and medium size farmers.
- Private Market Channels to avoid trade deviation
- Exit Strategy: deadline for subsidies and government support.

Characteristics of Mozambican Agriculture

(Source: TIA 2008 and FAO STATA)

Product	Mozambican Productivity (kg/h)	Global Average
Corn	618	5,128
Rice	283	4,306
Sorghum (mapira)	328	1,488
Pearl millet (mexoeira)	248	951
Peanut	223	1,606
Beans *	265	770

Characteristics of Mozambican Agriculture

Source: TIA 2008

Farm's Average Size	1,59 hectares
Market Orientation	5% to 20%
Use of Inputs	3%
Access to Rural Credit	3%
Agricultural Potential	31,000,000 hectares of uncultivated land

INPUT CONSUMPTION IN AGRICULTURE (MZ)

	2002	2003	2005	2006	2007	2008	Variation 2002/2008
Fertilizers	3,8	2,6	3,9	4,7	4,1	4,1	**7,9**
Pesticides	6,8	5,3	5,6	5,5	4,2	3,8	**- 44,1**
Irrigation	10,9	6,1	6,0	8,4	9,9	8,8	**-19,3**
%Rural Credit		2,9	3,5	2,9	4,7	2,6	**-10,3**

Source: Kunguara, 2012

Percentage of “machambas” that use inputs (MZ 2008)

Income Quintile	Chemical Fertilizers use	Pesticides use	Improved seeds
1º Quintile	0,75	1,0	8,20
2º Quintile	1,42	2,0	8,21
3º Quintile	2,63	3,0	9,29
4º Quintile	7,37	5,0	11.43
5º Quintile	10,25	5,0	12,74
Total	4,0	3,0	9,74

Source:Mabiso e Hanlon (2011)

Our model and Kunguara & Kelly (2011)

- Our model:

$$ln(out\ put\ value)\text{-}i,t. = ,\beta\text{-}0. + ,\beta\text{-}1.,labour\text{-}i,t. + ,\beta\text{-}2.,Capital\text{-}i,t. + ,\beta\text{-}3.,Utilized\ land\ i,t. + ,\beta\text{-}4.,Inputs\text{-}i,t. + ,\beta\text{-}5.,Habilities\text{-}i,t. + ,\beta\text{-}6.,Quality\ of\ factors$$

Farmers that use fertilizers had greater yields, beyond what was revealed by previous studies (Mather, 2002)

Kunguara & Kelly: From all the tested variables (social organization, rural extension, animal traction), the use of fertilizers was the one that had the biggest impact on productivity.

Ghatak e Jiang,2002

- A model with homogeneous farmers and unequal wealth distribution is able to demonstrate that poor farmers, that have input market access restrictions, are not capable of maximizing their production function, unlike wealthier farmers.

- Therefore, by including credit to the model, it is possible to move away from the poverty vicious circle, once poorer farmers manage to use fertilizers and maximize their yields.

MOZAMBIQUE PROGRAMS OF AGRICULTURAL DEVELOPMENT

- PROAGRI I PROGRI II.
- Estratégia Nacional de Revolução Verde (ENRV)
- Plano de Ação para a Produção de Alimentos (PAPA)
- Plano Estratégico para o Desenvolvimento do Sector Agrário (PEDSA).
- Plano Nacional do Investimento no Sector Agrario (PNISA)

- IGC produced a program within the strategy of “Smart Programs” called:

- *(Plano Integrado de Produçao e Produtividade (PIPP)*

PROGRAMA INTEGRADO DE PRODUÇAO e PRODUTIVIDADE (PIPP): MAIN GOALS

1- Increase Yields and Total Output in agriculture.

2- Channel production to internal market in order to reduce consumers' prices.

3- Create a class of agri-entrepreneurs composed by medium size rural producers .

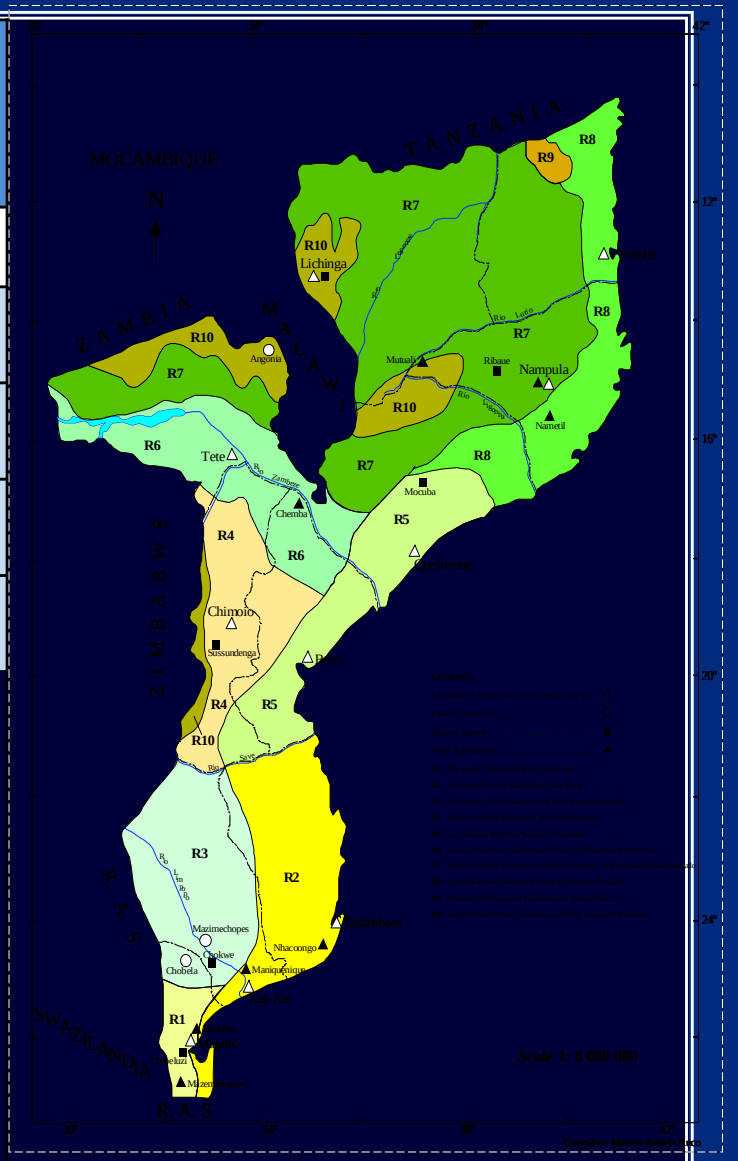
Focus

- **Emerging farmers with capacity for adoption of green revolution techniques of production (145.000 farmers);**
- **Regions with reasonable agro climatic conditions;**
- **Basic Food Crops (*corn, rice, beans, potato, tomato and onion*)**

REGIONAL FOCUS OF PIP

Product	Region 2	Region 5	Region 7	Region 8	Region 10
Rice		40,9		22,7	
Potato				37,6	
Corn	17,2				
Beans			22,7	19,7	14,7

NAMPULA
SOFALA
ZAMBEZIA
CABO DELGADO
TETE
NIASSA
REGIÃO SUL (NOS REGADIOS)



Loan package for plot with 4 hectares of cultivated area

Loan Item	Value (US$)	Modality
Fertilizers - 1 ton of NPK	600.00	VOUCHER
Seeds, other pesticides, mechanisation.	320.00	VOUCHER
Technical Support (technical cooperatives)	20.00	VOUCHER
Agricultural Insurance	20.00	Bank Withholding
Annual interest (4%)	40.00	Bank Withholding
TOTAL	**1,000.00**	

PIPP
Banking and financial Management

- State Fund guarantor of Risk: defaults are debited if the insurance is not covered.
- Interest Equalization: 10%= 13.18%- 4% annual interest.
- Overhead for commercial banks: 10% to select and provide credit to those with at least 4 hectares of land; monitor and collect from them.
- Viable Family Farmers (AFV) receive VOUCHERS for seeds, fertilizers, technical support and insurance from authorized companies.
- They pay back the debt to banks when due.

PIPP Piloto: Moamba, Boane. Prov. Maputo

- The Government of Mozambique decided to test the PIPP´s through a Pilot Project.
- It will benefit around 200 families living in irrigated areas producing: potatoes, tomato, cabbage, corn and beans.
- They will receive the input package through Vouchers and will pay for them in one year.
- Some storage facilities will be improved so as to facilitate the commercialization of agricultural products.

MONITORING AND EVALUATION

- The process will be monitored by a team composed by IGC consultants and government partners.
- The methodology of impact evaluation will encompass two researchers: one longitudinal, i.e to observe the variation of output and yields and one to test components of the project, mainly the technical assistance. For this purpose two control groups will be randomly selected.
- The beneficiary group will also be selected at random within the group of farmers that desire credit. Performance of beneficiary and comparison groups will then be compared.

LESSONS FROM AFRICA SAA EXPERIENCES

Sandra3

1- Farmers respond quickly to incentives and they are aware of the potential of fertilizers and seeds.

2- Their production function is constrained for the acquisition of inputs.

3- The input supply system is restricted and partially developed.

4- In order to avoid deviation programs must be focused on emergent farmers by using systems of VOUCHERS.

5- The program must be integrated with investment in roads, storage facilities and technical assistance.

6- Financial mechanisms to avoid risk to banks and farmers (i.e. Guarantor Funds)

Slide 25

Sandra3 repetitive slide? all of this was already said before
Sandra, 22/09/2013

THANKS