

Potential Impacts of Improved Cowpea under Improved Seed Systems in Sub-Saharan Africa

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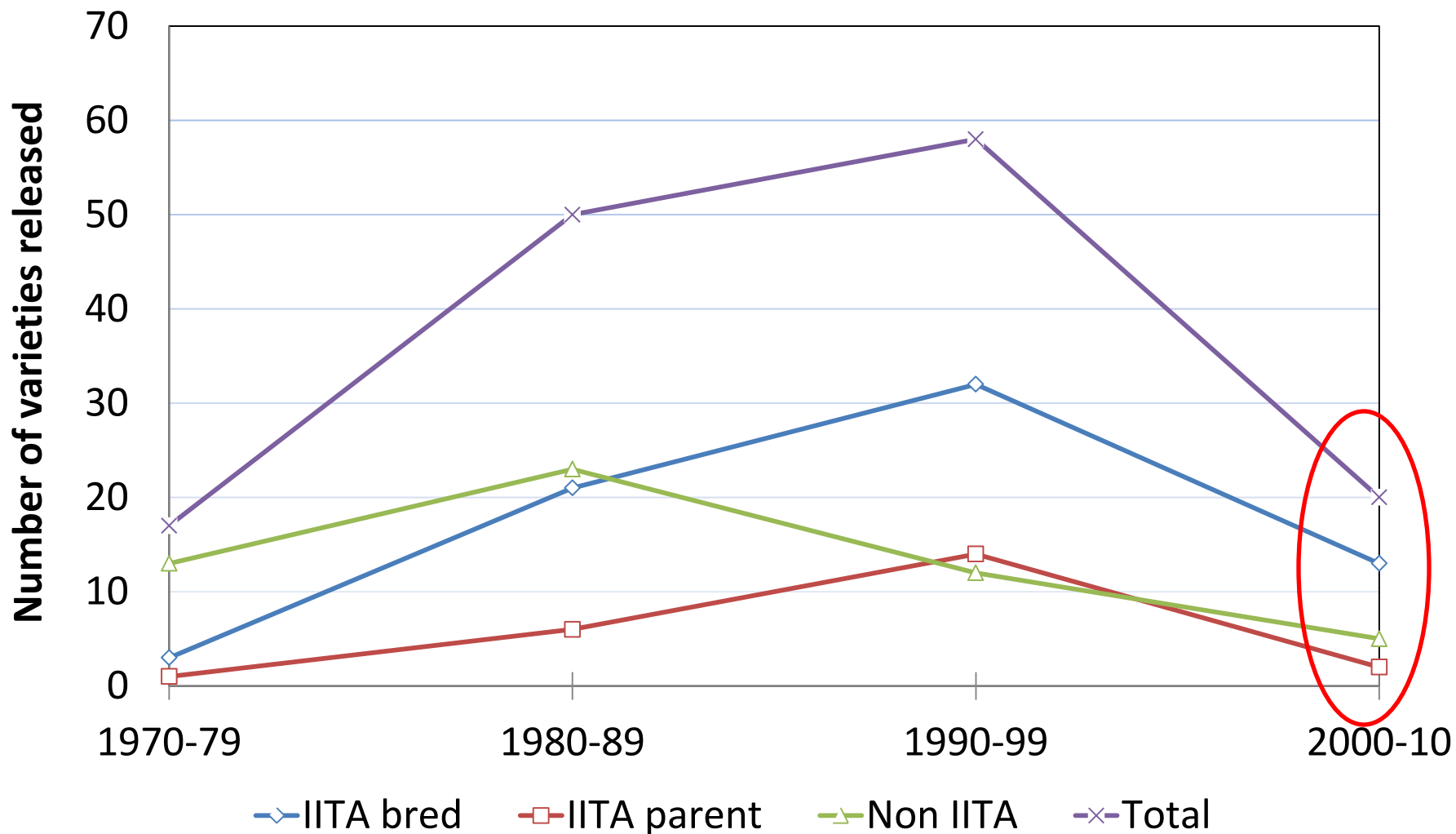
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- Assess potential economic impacts and returns to accelerated cowpea research for appropriate variety development and improved seed systems for higher and faster variety adoption in SSA.

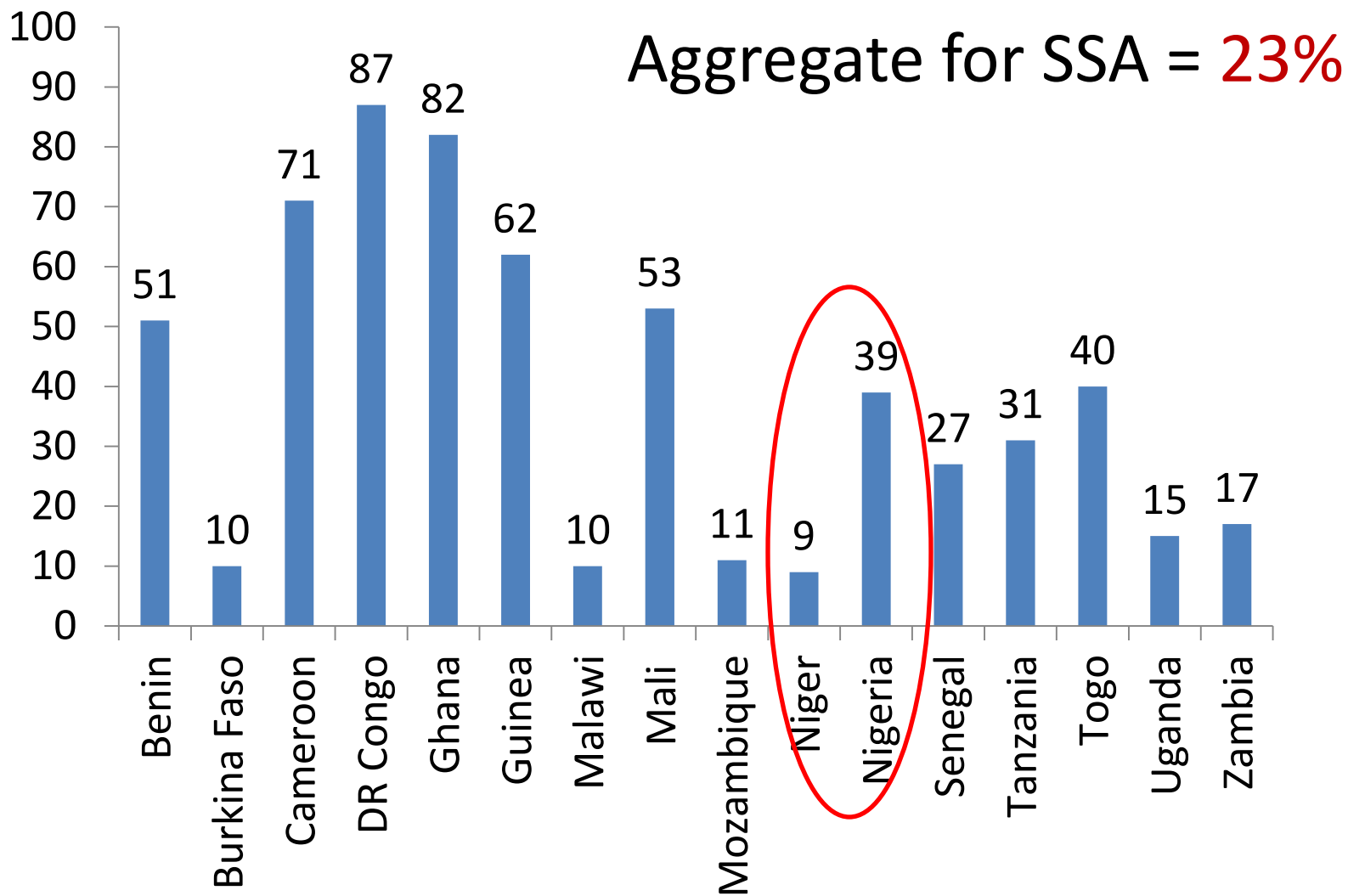
- The study builds on results and experiences from:
 - Cross-country survey of 18 national cowpea improvement programs in 2010 to gather variety release data and to elicit expert estimates of adoption under the DIIVA project.

 - Improved seed systems intervention during 2008-2013 in Mali, Nigeria, Niger, and Mozambique.

Variety Release (1970-2010)



Variety Adoption (2009/2010)

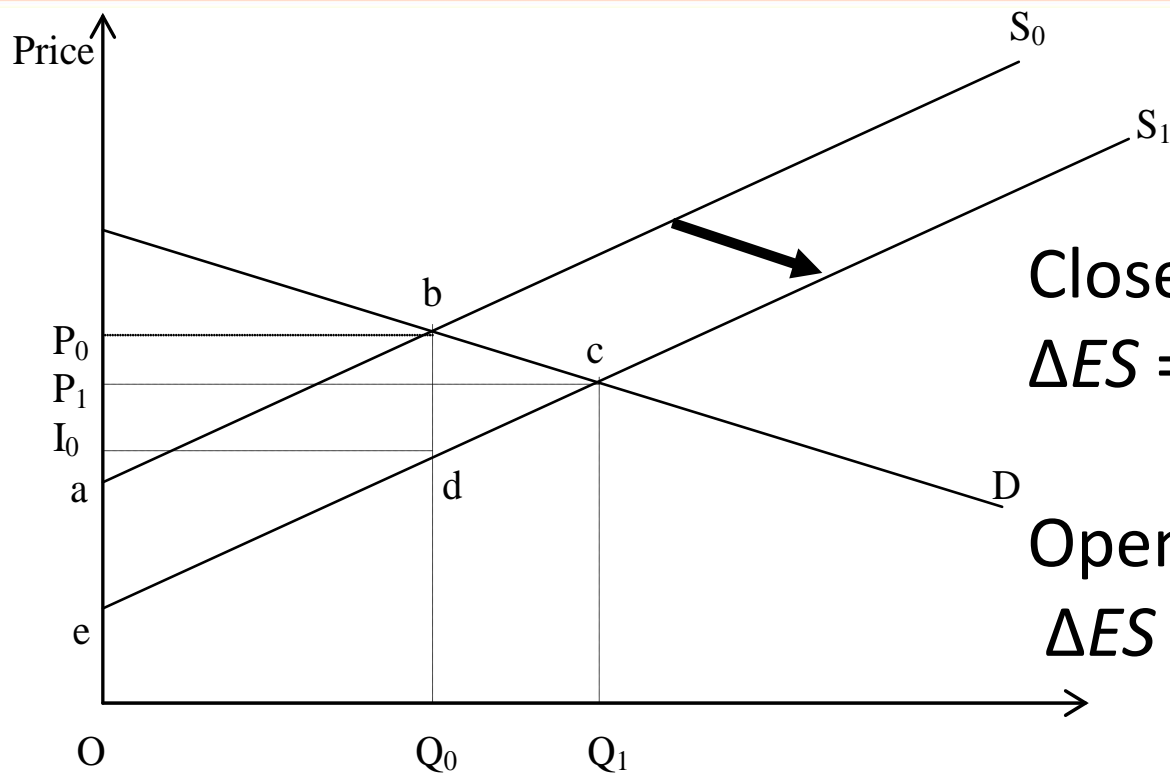


Dominant Varieties (2009/2010)

Country	Dominant Variety	Release year	Adoption (% area)
Benin	IT 82 E- 32	1985	13
Burkina Faso	Gorom locale	1982	4
Cameroon	IT81D-985 (BR1)	1985	30
Cote d'Ivoire	KN1	Informal	16
D.R. Congo	DIAMANT	2000	18
Ghana	IT82E-32 (Asontem)	1988	23
Guinea	VITA-7	1993	22
Malawi	Sudan-1	2003	7
Mali	Korobalen (IT89KD-374)	1993	18
Mozambique	IT-18	1995	8
Niger	TN5-78	1984	2
Nigeria	IT90K-277-2	2008	11
Senegal	Mélakh	1995	18
Tanzania	IT85F-2020 (VULI-2)	2003	11
Togo	VITOCO	1978	27
Uganda	SECOW1T (K21)	2002	8
Zambia	Bubebe (IT82E-16)	1995	11
Zimbabwe	IT-18	1994	45

Country	Seed Production (tons)	Area under MVs (ha)	Adoption rate (%)	Yield gain over local check (kg/ha)	Value of Additional Production (US\$)
Mali	448	17,920	7	400	8,780,800
Mozambique	873	8,730	12	300	3,208,275
Niger	3,711	37,110	3	300	5,844,825
Nigeria	2,813	46,883	4	420	37,905,175
TOTAL	7,845	110,643	4		55,739,075

Economic Surplus Model



Closed economy:
 $\Delta ES = P_0 Q_0 K_t (1 + 0.5 Z_t \eta)$

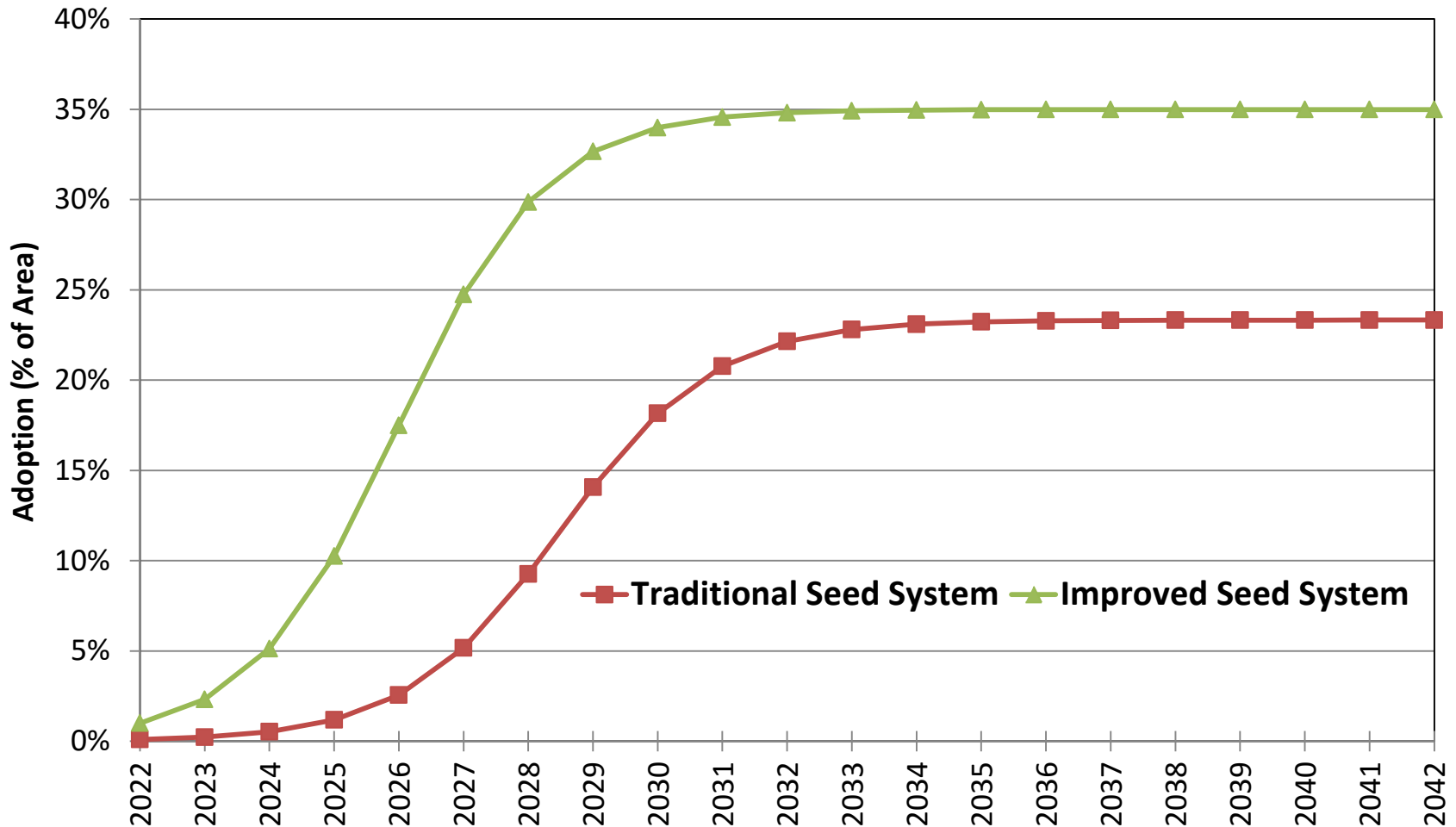
Open economy:
 $\Delta ES = P_0 Q_0 K_t (1 + 0.5 K_t \epsilon)$

$$A_t = \frac{A_{\max}}{1 + e^{-(\alpha + \beta t)}}$$

Supply Shift: $K_t = [(\Delta Y/Y)/\epsilon] \times A_t$

- Adoption:** Faster & higher under improved seed systems
- Yield gains:** Higher under improved seed systems (seed + agronomic information)

Estimated adoption profiles of improved cowpea under traditional & improved seed systems in SSA



Assumptions/Parameter Values

Parameter	Improved Seed System	Traditional Seed System
Yield gain (%)	18-100	9-50
Maximum adoption (%)	35	23
Initial adoption (%)	1	0.1
Gestation lag (years until start of adoption)	5	5
Adoption lag (years until maximum adoption)	10	15
Elasticity of supply	1	1
Discount rate (%)	5	5
R&D cost (US\$ million/year)	10	6.5
Prices (US\$/ton)	125-633	125-633
Period of analysis	2017-2042	2017-2042

Returns to Cowpea Improvement & Seed Systems in SSA

Measure	Benefits/Returns		Impact of improved seed systems
	Improved seed systems	Traditional seed systems	
Present value of gross benefits (US\$ million)	4,148	1,482	2,666
Present value of annual benefits (US\$ million)	198	71	127
Present value of net benefits (US\$ million)	3,775	1,263	2,512
Internal rate of return (%)	54	35	
Benefit–Cost ratio	11	7	



Thank You