



# FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative



## Africa's Emerging Herbicide Revolution Farm-level impacts

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Presented to the World Bank/ICABR Conference

Washington, DC

June 13-14, 2018





# Herbicide use comparisons

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	<b>Mali</b>	<b>Uganda</b>
<b>Cereal farmers using herbicides (percent)</b>	<b>61%</b>	<b>38%</b>
<b>Glyphosate as share of herbicides used (percent)</b>	<b>67%</b>	<b>75%</b>

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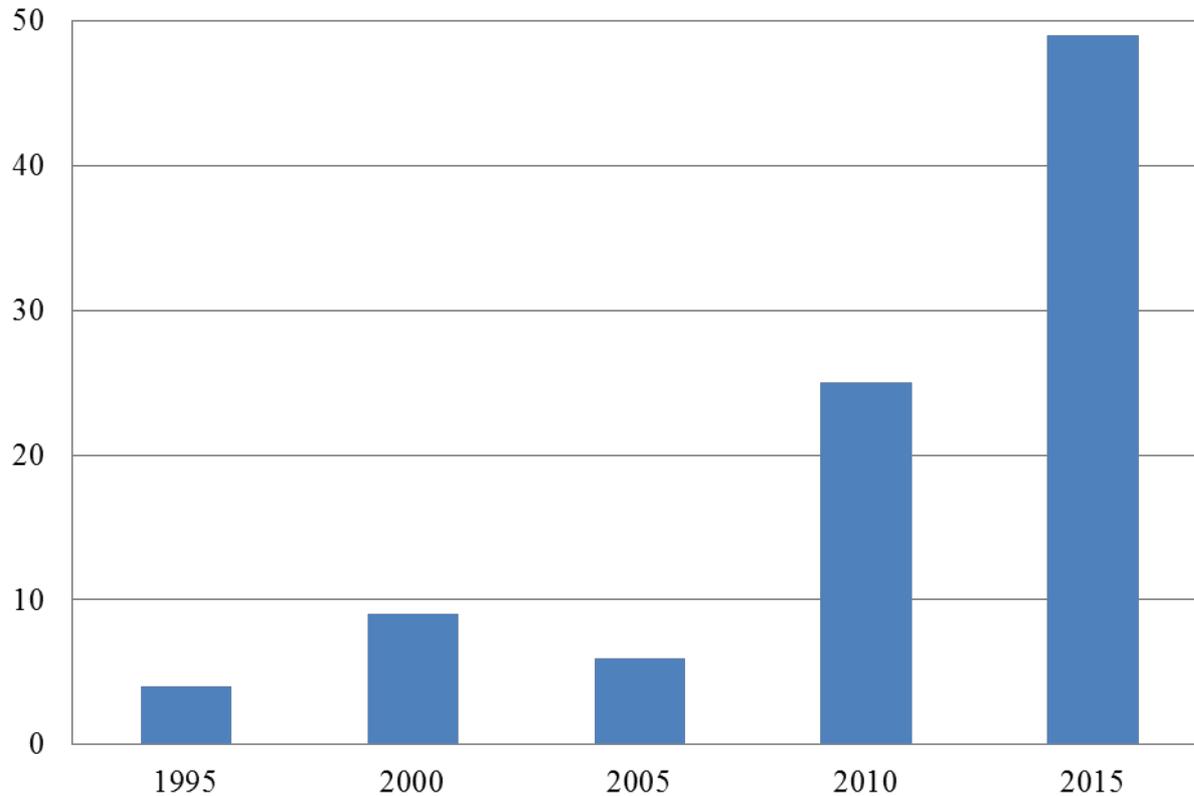
Source: Haggblade et al. (2017), Ashour et al. (2016)

# Herbicide price trends, Mali

Price in US dollars/liter

Brand	2008	2009	2010	2011	2012	2013	2014	2015	Change
Kalach 360	10.8	9.1	8.7	5.9	5.8	6.4	6.8	5.3	-51%
Roundup 360	10.8	11.1	10.0	12.7	9.8	9.0	9.1	7.4	-31%

# Proliferating herbicide products



Trends in the number of herbicide products registered for sale in Mali

# Farm impacts: adoption by plot manager

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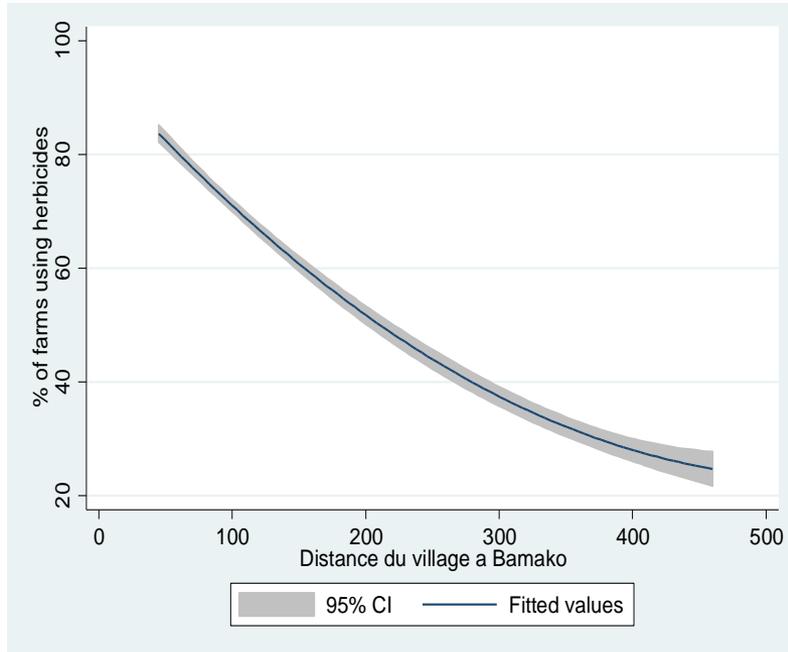
Plot manager	Plot type	% use	Mean l/ha
Household head	collective	58	1.4
Female	individual	79	2.6
Male	individual	80	3.1
All		61	1.6

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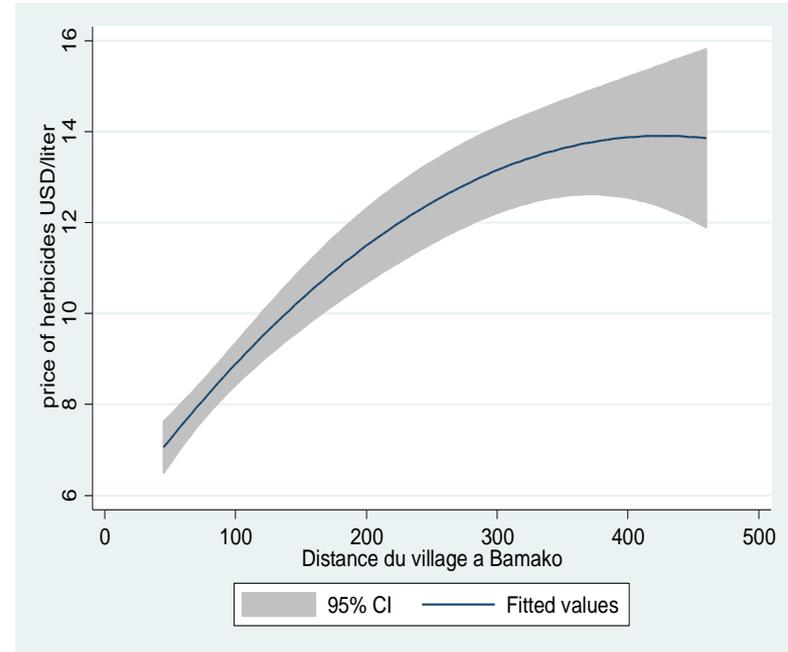
***Herbicide cost per ha: \$23***

***Weeding labor per ha: \$52***

# Farm impacts: distance from Bamako



% of farmers using herbicides



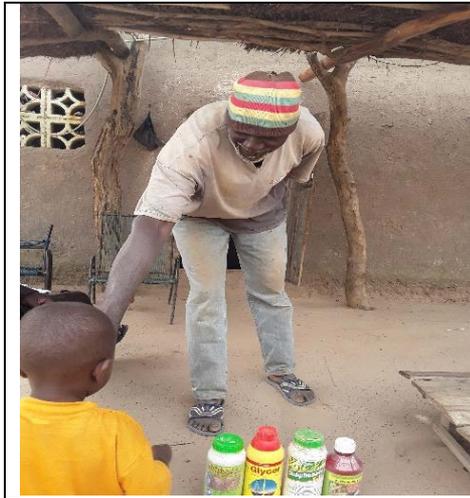
price of herbicides

# Farm impacts: demand for farm labor

	RA	AIPW	IPWRA
Men			
not registered	-4.67**	-5.44**	-6.28***
registered	-7.97***	-8.67***	-9.33***
Women			
not registered	-1.06	-0.92	-1.32
registered	-1.40	-1.79*	-2.14**
Children			
not registered	-1.62	-1.79	-2.28*
registered	-1.91*	-2.24**	-2.71**

Average treatment effect on weeding labor days per ha

# Farm impacts: counterfeit complaints



Salif Camara



Fousseyni  
Camara



Djan  
Diakite

Consulting with other farmers and buying inputs together at the local market does not ensure product quality.

# Farm impacts: Mali lab results

	Lab1	Lab2
Registration status		
CILSS	1.18	0.91
none	0.95	0.82
other	0.95	0.81
All samples	1.08	0.87

Ratio of tested to stated glyphosate concentration (on the bottle)

# Farm impacts: Uganda beliefs

Farmer beliefs	Percent of farmers
Glyphosate quality	
Quality is sometimes intentionally altered (counterfeited or adulterated)	80%
Have discussed counterfeiting with neighbors	50%
What share of glyphosate is altered?	40%

Source: Ashour et al. (2016)

# Farm impacts: lab results

Ratio of tested to stated glyphosate concentration	Uganda
< 0.75	31%
0.75-0.99	40%
1.0-1.1	14%
> 1.1	15%
	100%

Source: Ashour et al. (2016)

# Key market and regulatory issues affecting farmers

1. The simplest quality control measure farmers can institute themselves is to avoid the purchase of unregistered pesticides.
2. Farmers should also avoid purchasing smuggled pesticides from surrounding countries.
3. Governments will need to invest in a program of laboratory upgrading.