How can inclusive agricultural health policy intervention promote shared agricultural productivity in Nigeria? Evidence from randomized control trial

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Outline of Presentation

- Motivation

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- Research Question

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Motivation

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- This food poverty is prominent in Africa, and the region has the lowest agricultural productivity in the world and the highest percentage of people living in poverty (World Bank 2007b).
- The race is on to produce enough food by engaging labour saving technologies including pesticides.

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- Which can in turn exacerbate the low productivity of farmers in Africa.
- Health is viewed as a tangible asset in production process (capital good) (Asenso-Okyere et al.,2011).
- It is not just a pivot for labour supply but a critical factor for agricultural labour productivity and quality.

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- Worldwide, agriculture-related health losses are massive, accounting for up to 25 percent of all disability-adjusted life years lost (DALYs) and 10 percent of deaths in low-income countries (Gilbert, Lapar, Unger, & Grace 2010).
- Furthermore, ILO reported the agricultural sector as one of the most hazardous to health worldwide (as cited in Loureiro, 2009).

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- World Bank estimated about 355,000 people yearly die from unintentional chemical poisoning from exposure to pesticides and other chemicals. Two-thirds of these victims are found in developing countries (World Bank, 2007).

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- Effects of unsafe agrochemicals use have been linked to some non-communicable diseases (NCDs) such as cancers and respiratory diseases.
- In spite of these numbers, occupational health in general, and in agriculture in particular, remains neglected in most developing countries (as cited in IFPRI, 2011).

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- Health is a major factor for labour supply, agricultural labour productivity and quality

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    - Systematic studies on agricultural related risks that are work related are rare in Nigeria.
    - The dearth of agricultural data in Nigeria on agricultural related health risks has provided no impetus for policy formulation in this regard
    - This research is an attempt to bridge this research gap

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Research Question

- Using a simple-unique RCT that combines mobile technology, we examine the impact of agricultural health training on sickness loss time, safety knowledge and safety attitudes among cassava farmers in Nigeria

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- Significant improvement in farmers' agricultural health knowledge and attitude ($p<0.01$).

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The Intervention

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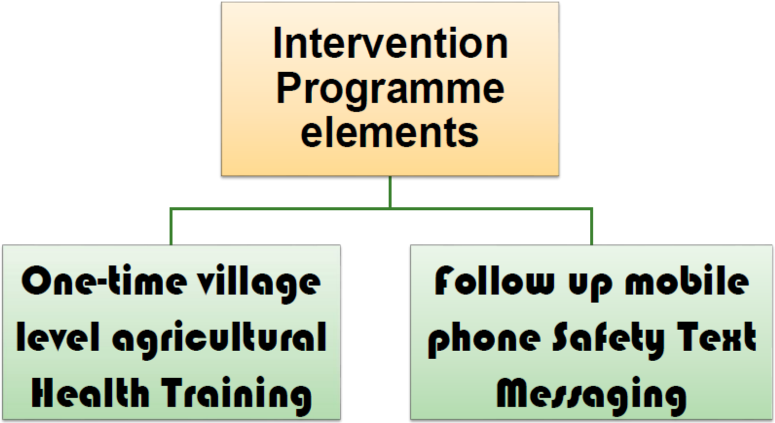

The Training Component

One of the Training Sessions

- Peer developed training modules
- Focused on safe agrochemical use and ergonomics
- One time training engaging a blended training approach

The SMS Component

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  - Follow up mobile phone safety text messaging
  - For 3months (twice a month) a total of 6 safety messages

Intervention Framework

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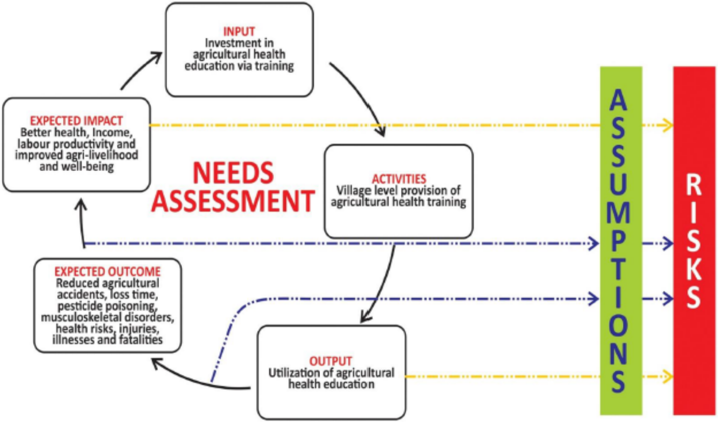

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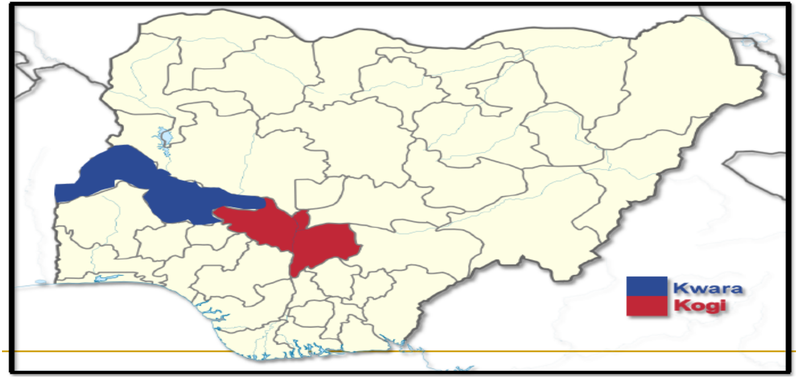
- 

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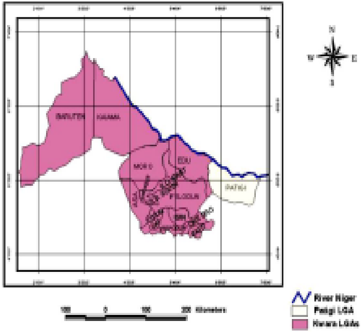
- 

KOGI STATE

Study design and setting

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- Post intervention data were collected between August and November, 2017

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- 10 villages received the intervention with 14 being in control.
- Using lottery design 20 respondents each were randomly assigned to the study in each of 24 cassava cropping communities with a power of 80% .
- Randomization of the intervention was at the community level.
- Thus, the sample included a total of 480 participants, with 200 receiving the intervention and 280 in control. 24

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- The post intervention data collection was collected 6months after the completion of the treated.

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- Difference-in-difference estimator

OLS in estimating effects of health risks on labour productivity

- Y $= \beta_0 + \beta_1 X_1 + \beta_2 X_2 + ...+ \beta_6 X_6 + e_t$ (2)
- Where Y is the average labour productivity of farmer derived from the formula
- Cassava Output (tons)/Labour (man days).
- $X_1 =$ Age of farmers (years)
- $X_2 =$ Farmers' Production loss time (days)/sickness absence
- $X_3 =$ Estimated duration of self-reported chemical symptoms exposure (hours)

OLS in estimating effects of health risks on labour productivity

- X_4 = Farming Experience (Years)
- X_5 = Number of ergonomic exposure
- X_6 = Educational level (years of schooling)
- e = Error term
- β_0, β_1 ... β_6 regression coefficients

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- Y_{it} is the outcome variable for an individual i at time t, α is the constant, $Treat_i$ is the dummy equals 1 if treated, and $Post_i$ is a dummy equals 1 if data is collected at post intervention and 0 if at baseline. β_1, β_2 and β_3 are coefficients.

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  - Control: largely due to unavailability of respondents during post intervention data collection.

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Results

Results and Discussion

Table 1: Baseline farmers' knowledge, attitude and practice in chemical use (N=480)

	Item	Frequency	%
1	Mostly used WHO chemical Class		
	WHO class II only	96	20
	WHO class III only	144	30
	WHO class II and III	240	50
2	Hand washing after spraying		
	Yes	256	53
	No	224	47
3	Cloth changing after spraying		
	Yes	336	70
	No	144	30
4	Other use of agrochemicals		
	Home surrounding spray	384	80
	Pest spray	48	10
5	Hand washing before eating in the field		
	Yes	64	13
	No	416	87
6a	Sprayer washing		
	Yes	304	63
	No	176	37
6b	Sprayer washing place		
	In the field	261	86
	Near the stream	21	7
	At home	21	7
7	Container management		
	Throw in the field	312	65
	Bury in the soil	48	10
	Burn in the field	48	10
	Washed and re-used as household container	72	15
8	Chemical measurement into sprayer		
	The use of chemical lid cap	288	60
	Measured by experience	192	40
9	Reading of chemical label		
	Yes (occasionally)	336	70
	Yes (always)	29	6
	No	114	24
10	Adherence to advice on chemical label		
	Yes (Sometimes)	254	53
	No	226	47
11	Information read on chemical label		
	Expiration date	480	100
	Safety instructions e.g Protective gear use	96	20
	Re-entry time	24	5
	General Instruction of use e.g mixing volumes	400	83
12	Understanding of safety instructions on label		
	Yes	144	30
	No	336	70

Source: Baseline Survey, 2017

Results

Table 2: Baseline Characteristics of randomly assigned treated farmers and control

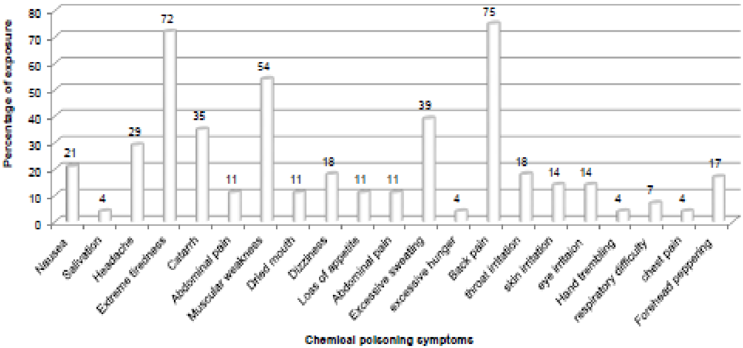
	Treatment (N=200) Mean (Sd)	Control (N=280) Mean(Sd)	t-value for test of difference in means(p-value)
Socio economics			
Age	38.0(8.0)	39.0(8.4)	0.1(0.91)
Household Size	5.0(2.7)	5.3(2.3)	0.8(0.43)
Years of Schooling	13.6 (2.5)	13.3(3.6)	1.3(0.10)
Farming Experience	13.7(7.6)	14.4(7.4)	0.3(0.76)
Farm Size	2.1(2.9)	2.4(2.4)	0.4(0.68)
Monthly Health Expenditure	1193(1187)	1135(1028)	0.1(0.92)

Results

Table 3: Baseline Characteristics of randomly assigned treated farmers and control

	Treatment (N=200) Mean (Sd)	Control (N=280) Mean(Sd)	t–value for test of difference in means(p–value)
Chemical and ergonomics			
Frequency of chemical spray/3months	12.5(3.5)	13.4(4.2)	0.4(0.7)
Daily duration of spray (hours)	5.9(2.4)	6.2(2.5)	0.04(0.9)
Years of chemical usage	9.0(2.6)	10.0(3.8)	0.5(0.6)
Re–entry time (hours)	15.0(7.4)	17.0(7.5)	0.2(0.8)
Spray times till harvest	3.0(2.5)	3.0(2.4)	0.6(0.4)
Number of symptoms	5.0(6.3)	4.0(5.2)	0.7(0.6)
Length of symptoms (hours)	13.0(2.5)	11.0(3.7)	0.8(1.2)
Ergonomic discomfort per week	2.0(3.3)	3.0(3.6)	0.4(0.6)
Production Lost time (days)/season	5.0(3.5)	6.0(4.4)	0.7(0.6)
Care time (days)/season	3.0(4.2)	2.0(3.6)	0.2(0.8)

Self Reported Chemical Poisoning Symptoms



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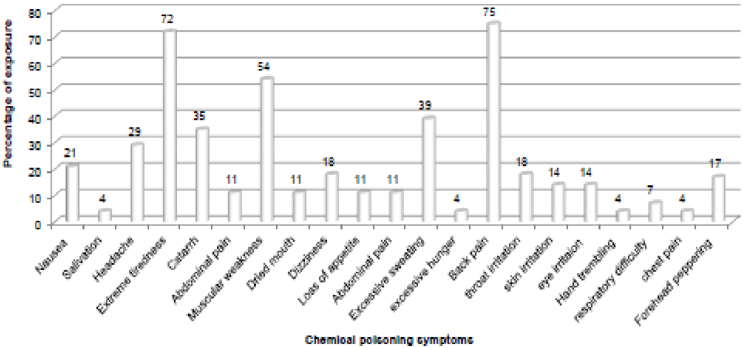

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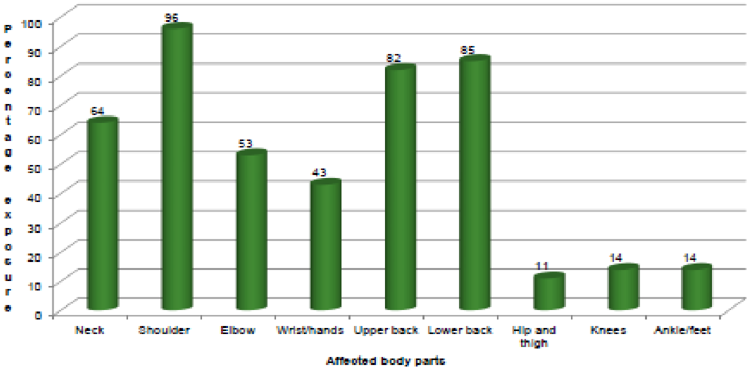
- The average number of self-reported pesticide poisoning symptoms per farmer was found to be 4.

Self Reported Ergonomic Symptoms



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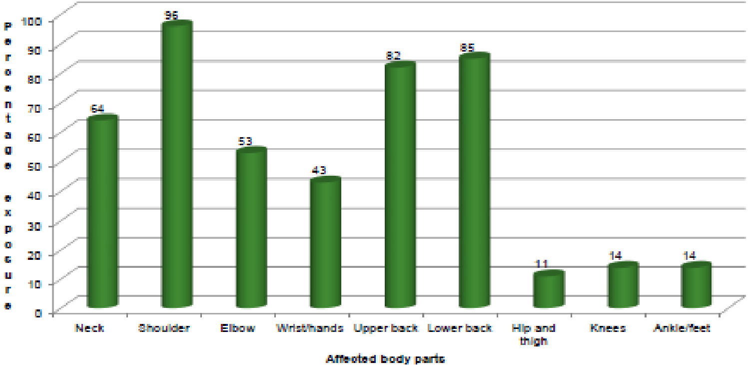
- 

- 96% reported shoulder pain, 85% lower back pain, and 82% upper back pain.

Results

Table 4: Sickness absence determinants

OLS estimates		
Y Sickness absence (days)	Co-efficient	t-value
Age in (years)	0.837	3.68***
Educational qualification (years)	-0.352	-2.37**
Daily duration of chemical spray	0.146	2.45**
Care time	0.296	7.49***
Number of ergonomic exposure	-0.053	1.63
Constant	3.97	6.89
R-square	0.16	

Note: *** , and ** represent significance at 1% , and 5% respectively

Source: Data analysis 2018

Results

Table 5: Effect of health risks exposure on farmers' productivity

OLS estimates		
Y average labour productivity	Co-efficient	t-value
Age (years)	0.00	0.19
Estimated duration of self-reported chemical symptoms exposure (hours)	-0.00	-0.76
Farming experience (years)	0.00	0.46
number of ergonomic exposure	-0.00	-0.82
Educational qualification (years)	0.00	1.36
Production loss time	-0.03***	-4.06
Constant	1.37	8.95
R-square	0.14	

*** represent significance at 1% level

Source: Data analysis, 2018

Results

Table 6: Average program effect on sickness absence/days

Difference in difference estimates		
Y production loss time/sickness absence	Co-efficient	t-value
Treatment	0.11	0.28
Time trend	-0.95	-2.39
DID(Interaction)	-1.88***	-3.34
Constant	6.50	23.16

- *** represent significance at 1% level

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Table 7: Estimating Average program effect on farmers' safety knowledge

Difference in difference estimates		
Y Farmers' safety knowledge	Co-efficient	t-value
Treatment	0.43	1.60
Time trend	-0.23	-0.64
DID (Interaction)	2.45***	4.97
Constant	2.86	15.08

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Results

Table 8: Estimating average program effect on farmers' safety attitude

Difference in difference estimates		
Y Farmers' safety attitude	Co-efficient	t-value
Treatment	0.48	1.50
Time trend	-0.29	-0.67
DID (Interaction)	2.65***	4.39
Constant	3.29	14.66

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- Farmers' exposures to health risks affect their labour productivity.
- Farm safety education was found to have the potential of reducing farmer's exposure to health risks.
- The blended training model with farm safety text messaging engaged in this study was found to be effective reducing farmers' production loss time in short term.

Recommendations

- Based on the findings from the study there is a need for inclusive agricultural health policy in Nigeria addressing:
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  - Agricultural health services for the teeming Nigerian farming population.

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  - Test out the impact of voicemails in local languages.
  - Importantly, for external validity reasons, scale-up the intervention to cover cocoa farmers in both in Ghana and Nigeria

AGRICULTURAL HEALTH TRAINING IN PROGRESS

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- THANK YOU