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Testing the Nexus of Income, Agriculture, and Nutrition in Indonesia

Evita Pangaribowo

Contributed presentation at the 60th AARES Annual Conference,
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Testing the Nexus of Income, Agriculture, and Nutrition in Indonesia

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Background

FAST FACTS

241.37 ⁽²⁰¹¹⁾

Population in millions

1.6% ⁽²⁰⁰⁹⁻²⁰¹¹⁾

Annual population growth rate

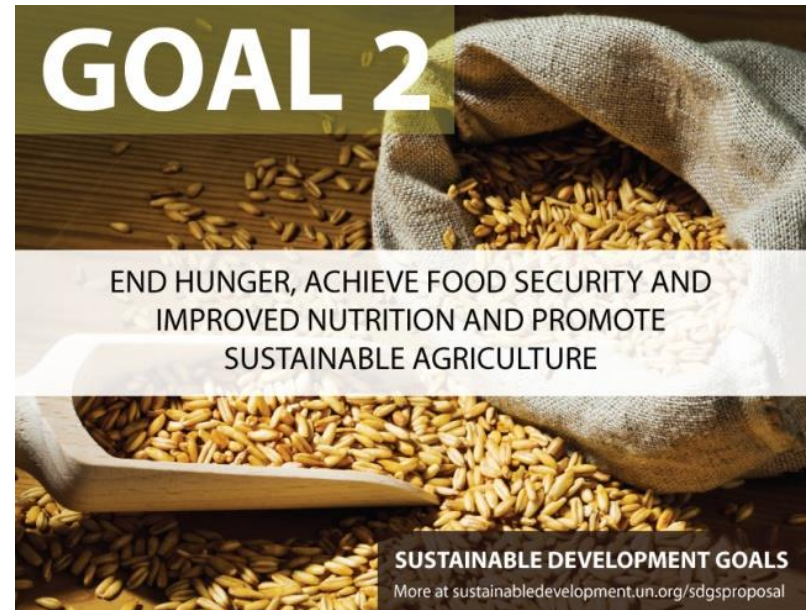
12.5% ⁽²⁰¹¹⁾

Population living below the national poverty line

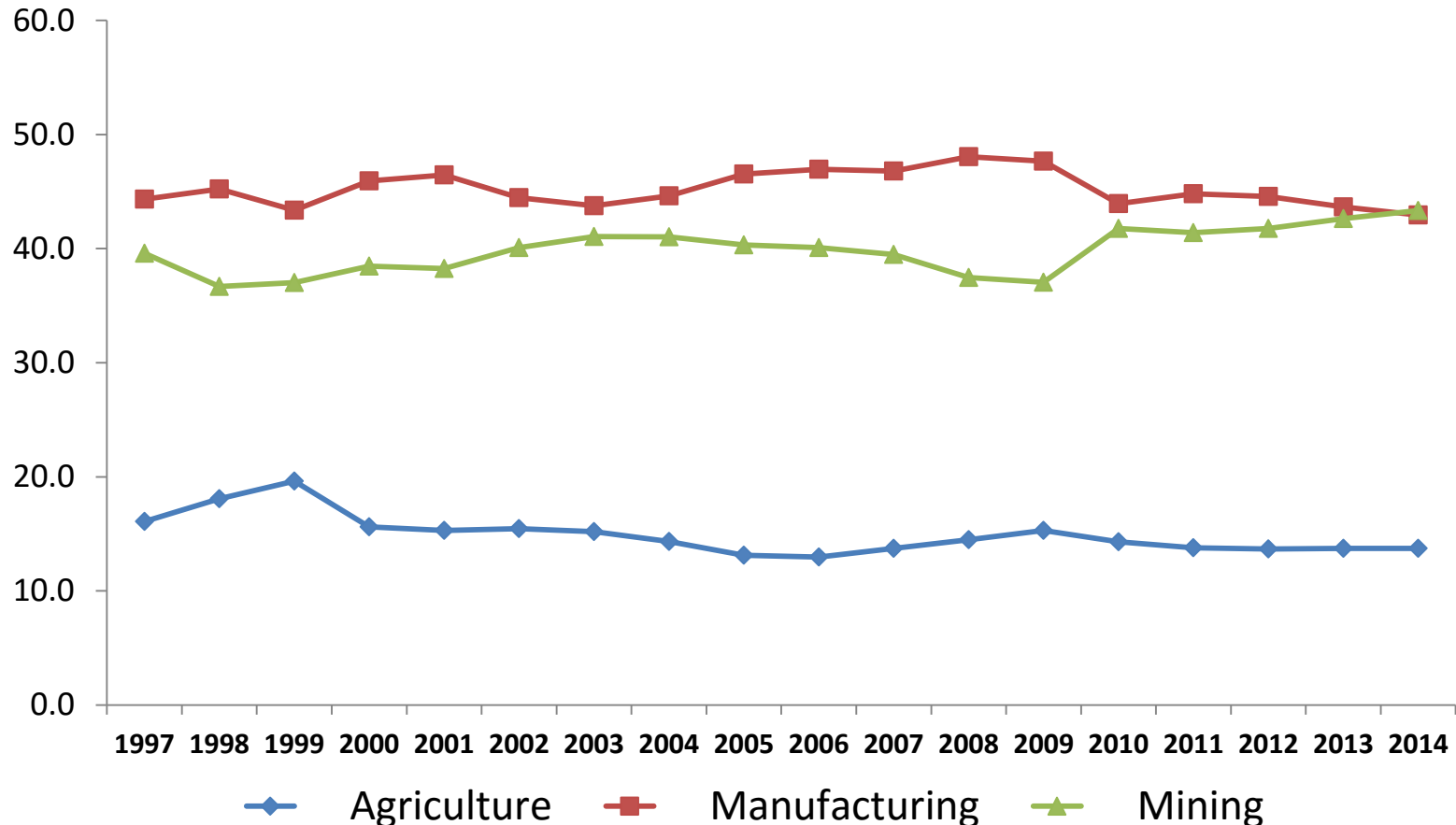
The prevalence of undernourished children under-five decreased from 31% (1989) to 17.9% (2010).

Indonesian Food Policies:

- Food and Nutrition Plan of Action
- Social Safety Net (Rice for the Poor Program)
- Integrated Nutrition Program at Community Level
 - Local Food Development
- Empowerment of “Food Security Areas”



Background



- Declining of agriculture contribution and labour force
- Notwithstanding, agriculture is still considered as a buffer for economy during crisis period (Suryahadi et al. 2011).

Background

- However, in many poor and marginalized households which mostly dependent on agricultural sectors as their source of livelihoods, the children suffer from inadequate nutritional status as revealed by the high incidence of underweight and stunted.
- Irrigation might play multiple roles, both positive and negative. On the positive side, irrigation might expand incomes and also reduce income volatility. Irrigation might also provide a source of relatively clean drinking water but also pose health risk (Bhagowalia et al. 2012; Tsegai et al. 2012).

Problem Statement

- Research on these issues in Indonesia have focused on nutrition-specific interventions (Sudarno et al. 2012, Giles and Satriawan 2014) rather than the broader processes through agriculture that also influence nutritional outcome
- Having this knowledge gap, this study explores linkages between nutrition and household incomes, as well as agricultural production.

Methodology

Data

This research mainly utilizes The Indonesian Family Life Survey (IFLS), both the household and community data.

The first IFLS was conducted in 1993 and followed by IFLS2 in 1997, IFLS3 in 2000 and the latest IFLS was fielded in 2007.



The sample is representative of about 83% of the Indonesian population and contains over 30,000 individuals living in 13 of the 27 provinces in the country.

Households are sampled based on stratification on provinces and urban/rural location, then randomly sampled within these strata.

In addition to individual and household level information, IFLS provides detailed information from the communities in which IFLS households are located and from the facilities that serve residents of those communities.

<http://www.rand.org/labor/FLS/IFLS/index.html>

Methodology

- Dependent variables:

Nutritional status of children, which is measured by their height-for-age Z-score (HAZ) and weight-for-height Z-score (WHZ).

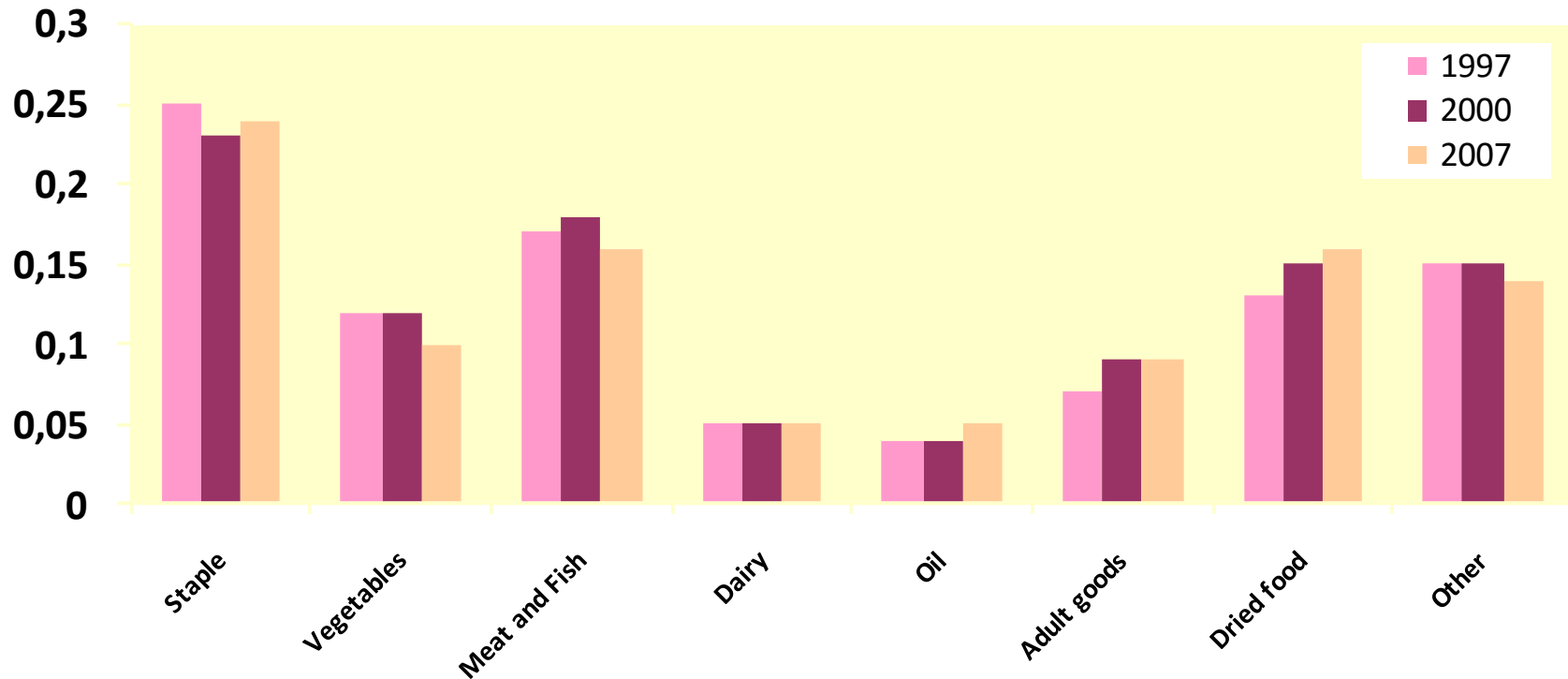
- Control variables

Characteristics: Parental (education and age), child (age, gender, vaccination), household characteristics (income, farm household, irrigation, water and sanitation infrastructures) and community characteristics

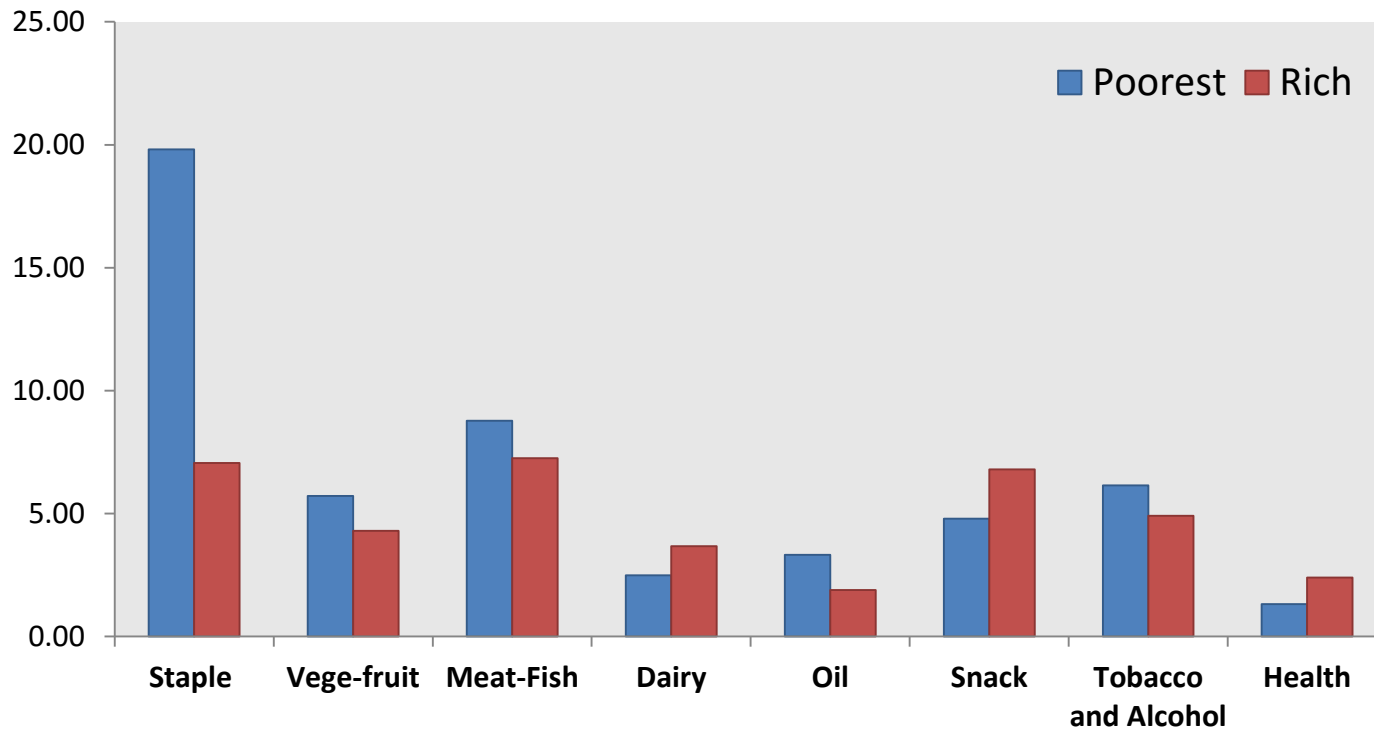
Results: descriptive statistics

	Mean	Std. Deviation
Household Head's Characteristics		
Age of household head (in years)	43.4637	15.1796
Education (in years)	10.3383	5.6289
Spouse education (in years)	10.1136	5.9702
Work (dummy, working=1)	0.8176	0.3862
Gender (dummy, male=1)	0.8118	0.3909
Household characteristics		
Household size	3.6462	1.8114
Farm household (dummy, farm=1)	0.3633	0.4809
Irrigation (dummy, irrigation=1)	0.1059	0.3077
Urban (dummy, urban=1)	0.5349	0.4988
Improved sanitation (dummy, impr=1)	0.6585	0.4742
Improved water resource (dummy, impr=1)	0.8934	0.3087
Community Remoteness		
Nearest bus stop in the village	0.1673	0.3733
District capital in the village	0.0169	0.1290
Technical irrigation	0.56028	0.49812
N		5269

Comparison of budget shares across wave



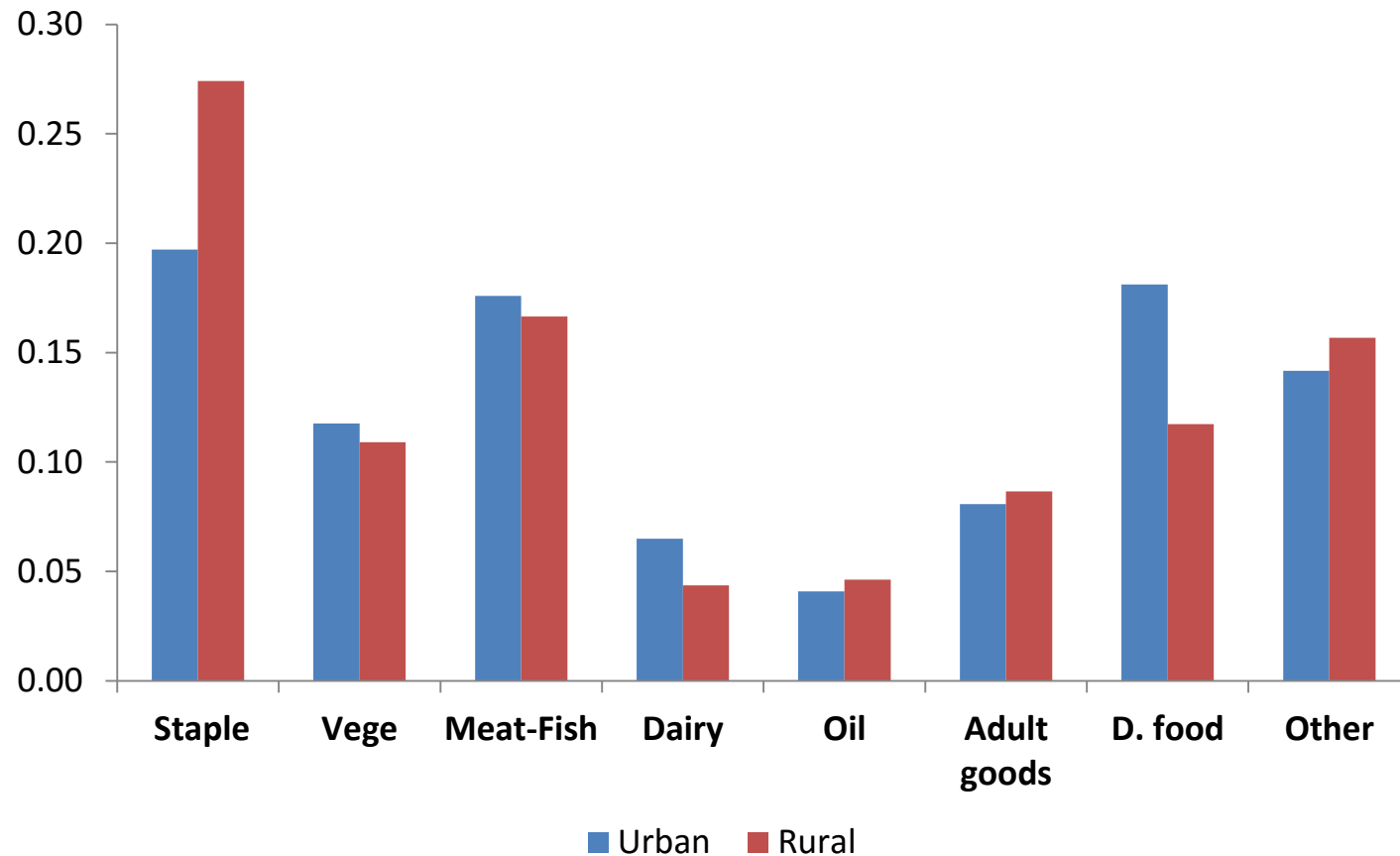
Comparison of budget shares and across income



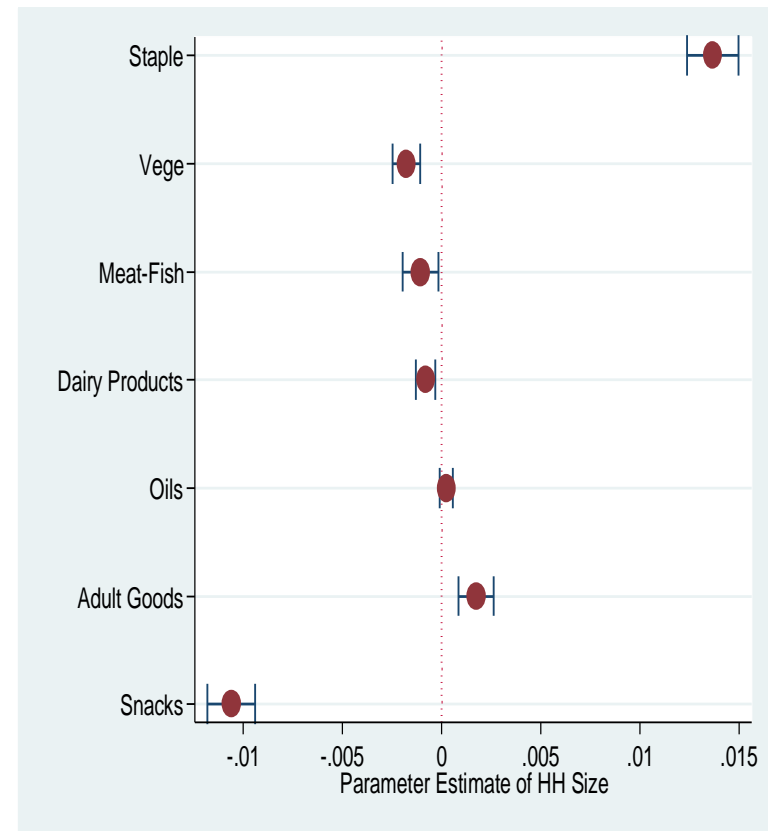
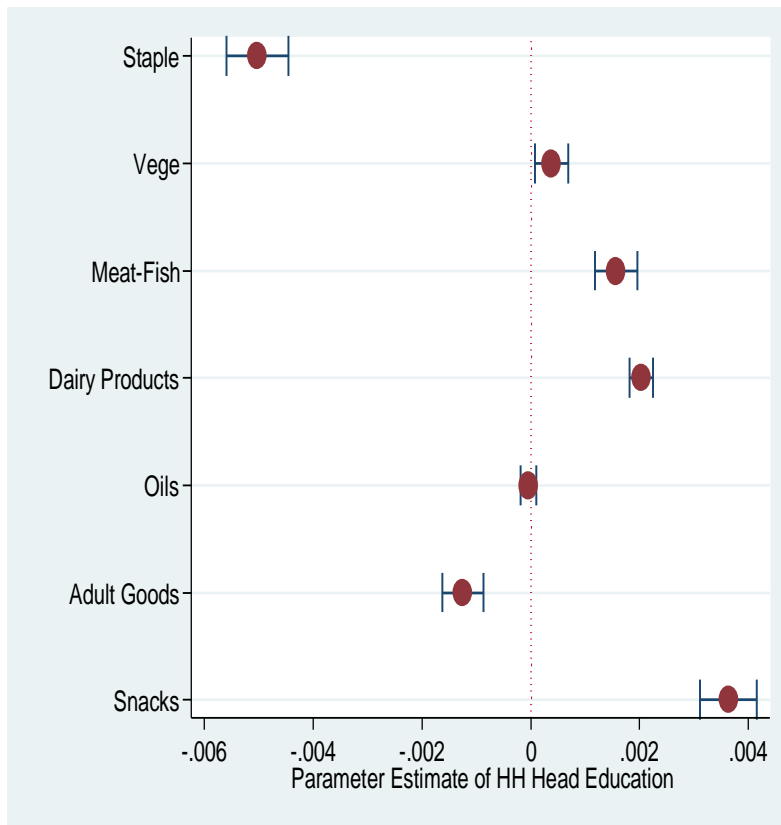
- The poorest households spent more on staple food and tobacco-alcohol goods, while the richest households spent more on dairy products and snack-dried food

Results contd...

Comparison of budget shares across region



Budget shares: *Education and Household Size Matters*



- More education contributes to the consumption of more nutritious foods
- Households with less educated heads were more likely to consume alcohol and tobacco goods
- Larger households tended to choose cheaper calorie sources rather than more expensive sources such as meat and fish or dairy products

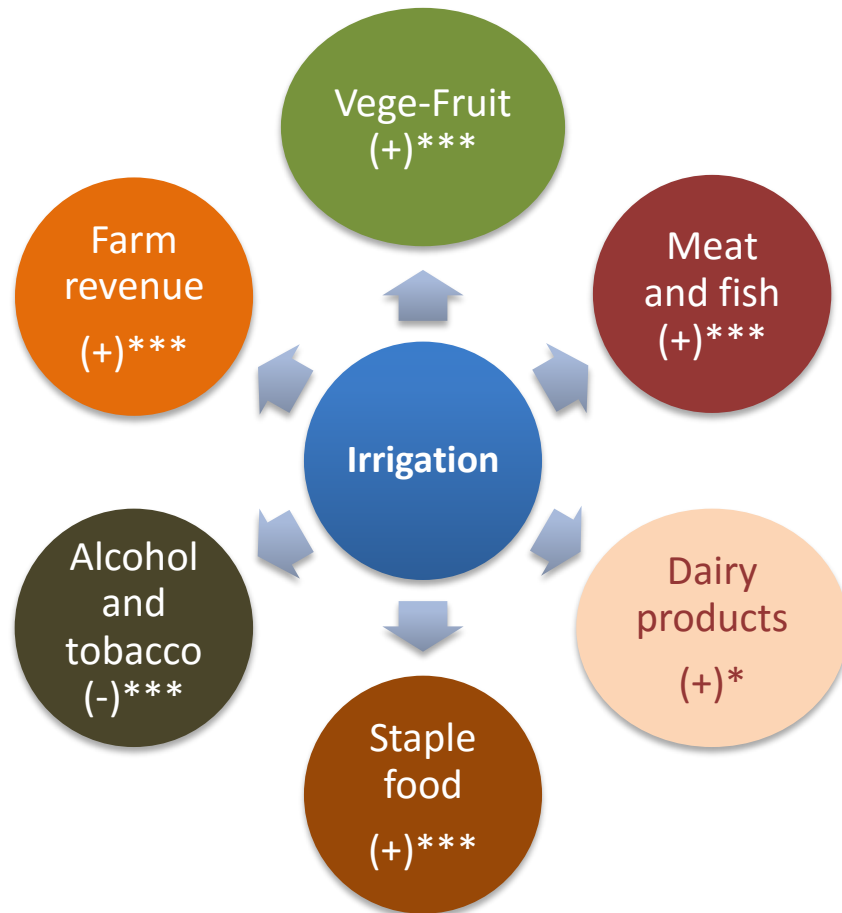
Linking Agricultural Income, Irrigation, Sanitation and Height

Dep var: Height	Java	Non Java	All
Improved sanitation	0.020***	0.029***	0.025***
Improved water sources	0.024***	0.029***	0.013***
Irrigation agriculture	0.019***	0.019***	0.019***
Income	0.078***	0.109***	0.092***
Parental characteristics	Yes	Yes	Yes
Child characteristics	Yes	Yes	Yes
Community characteristics	Yes	Yes	Yes
N	2490	2756	5269

Linking Agricultural Income, Irrigation, Sanitation and Weight

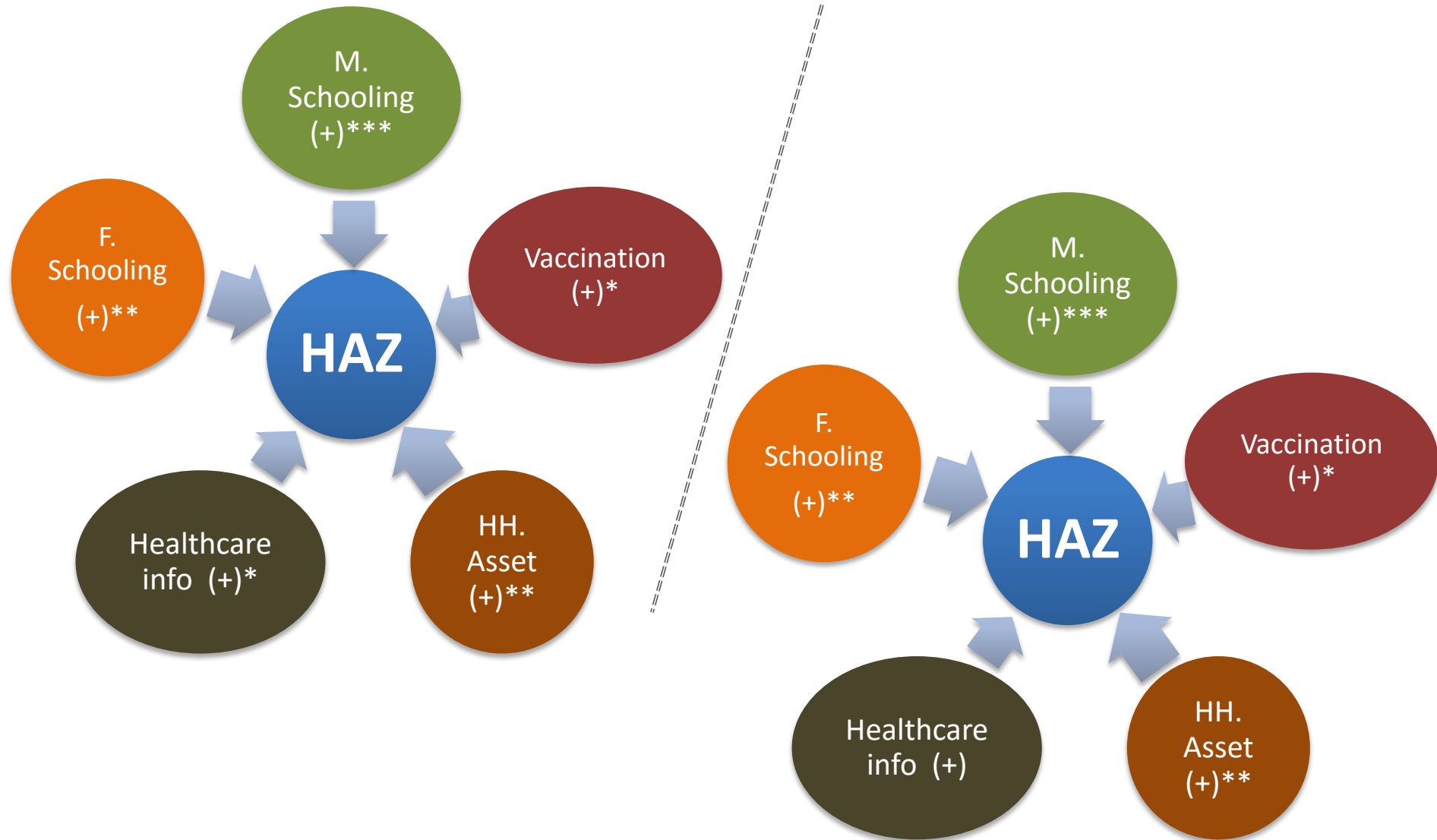
Dep var: weight	Java	Non Java	All
Improved sanitation	0.047***	0.021***	0.046***
Improved water sources	0.010	0.014*	0.014***
Irrigation agriculture	0.020***	0.025***	0.028***
Income	0.114***	0.162***	0.130***
Parental characteristics	Yes	Yes	Yes
Child characteristics	Yes	Yes	Yes
Community characteristics	Yes	Yes	Yes
N	2490	2756	5269

The Pathway of Irrigation to Budget Share



- Irrigation type (based on community data): technical (43%), semi technical (48%), simple (60.99%), and tubewell (80%)
- Irrigation and non irrigation households significantly difference on their farm revenue, food budget share and, livestock holdings

The Association of Selected Controls on Height and Weight



Conclusion

- Agricultural income and agricultural condition (specifically, irrigation) significantly and substantially explain budget share
- Access to safe water and proper sanitation exhibit a significant positive effect on child height for-age z-scores and weight for-age z-scores
- Other determinants of nutrition outcomes: health care and immunization access

THANK YOU

Income

Source of Income	Amout in Rp	% share
Wage Employment-Agr	312216	9.340117
Wage Employment-Non Agr	1133949	33.92272
Crop Revenue	514188	15.38222
Livestock Revenue	68411	2.046553
Non-ag self employment	774373	23.1658
Un-earned income	539605	16.14259
Total HH Income	3342742	100