

Pathways from land ownership to maternal nutrition in rural India

Helen Harris-Fry, Sneha Krishnan,
Emma Beaumont, Sanghamitra Gouda,
Satyanarayan Mohanty, Matthew
Dodd, Audrey Prost, Elizabeth Allen,
Suneetha Kadiyala & UPAVAN team







Motivation





Wealth gradient for nutrition exists, however...



Source: Shankar et al 2019; Mulmi et al 2017; Harris-fry et al 2015

Heterogeneity could be due to

- Heterogeneity in measurement of land ownership and diets
- Estimates of land on diets may be confounded by wealth and environmental factors
- Access to markets
- Non-farm work
- Women's role and control of resources and decision-making

Understanding how landholdings might be associated with diets and nutritional status is critical for designing equitable nutrition-sensitive programs

Research objectives

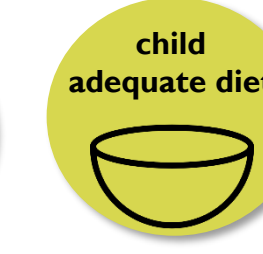
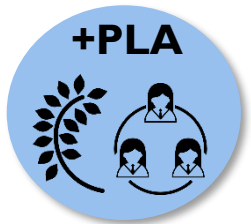
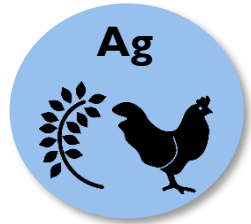
- What is the association between household land size and maternal nutritional outcomes in Odisha, India?
- Explore whether agriculture production and women's empowerment indicators mediate these associations



Methods

UPAVAN

Upscaling Participatory Action and Videos for Agriculture and Nutrition



Cross-sectional UPAVAN baseline data



Indicator	Variable construction
Land size (exposure)	Log land owned by the household in acres
Maternal Dietary Diversity (Outcome)	Count of 10 food groups
Maternal BMI (outcome)	Kg/m ² in non-preg, non-postpartum
Hypothesized mediators	
Value of agriculture production	Quantity of each crop/livestock produced X prices
Production diversity	Count of 10 food groups produced
Women's decision making (A-WEAI)	Women involved in ≥ 2 vs < 2 productive decisions/ 4
Social group participation (A-WEAI)	Women active in any of the groups
Women's time use (A-WEAI)	Women's leisure time (< 10.5 vs ≥ 10.5 hours of work)
Women's land ownership	None, joint or sole ownership

Confounders: caste group; count of household assets, HH size, maternal age, female headship

Analysis

- Standard multivariate regressions
- Mediation assessed following published mediation principles (preliminary):
 - Exposure > mediator
 - Mediator > outcome, adjusting for exposure
 - Exposure > outcome attenuated after adjusting for mediator



Results

Number of households in the sample	4477
Households owning any land, % (n)	94.0 %
Acres of land owned (if any), median (IQR)	1.15 (0.62 to 2.05)
<i>Does not own land, %</i>	5.8 %
<i>< 2.5 acres</i>	74.9 %
<i>2.5-5 acres</i>	14.7 %
<i>>5 acres</i>	4.1 %
Diets	
<i>Women's dietary diversity score out of 10 groups, mean (SD)</i>	3.7 (1.9)
<i>Minimum dietary diversity; ≥5 out of 10 food groups, %</i>	21.3 %
Maternal body-mass index, mean (SD)	19.2 (2.5)

Agricultural production

<i>Production diversity out of 10 food groups, mean (SD)</i>	3.6 (1.4)
<i>Value of agricultural production over 1 year in 1000 INR, median (IQR)</i>	4.5 (2.1 to 8.7)

Women's decision-making in agriculture

<i>Women have input into some or all of the decision, %</i>	
Food crop farming	67.4 %
Cash crop farming	18.0 %
Livestock raising	68.0 %
Non-farm economic work	29.4 %
<i>Women have at least some input in two or more decisions, %</i>	63.4 %

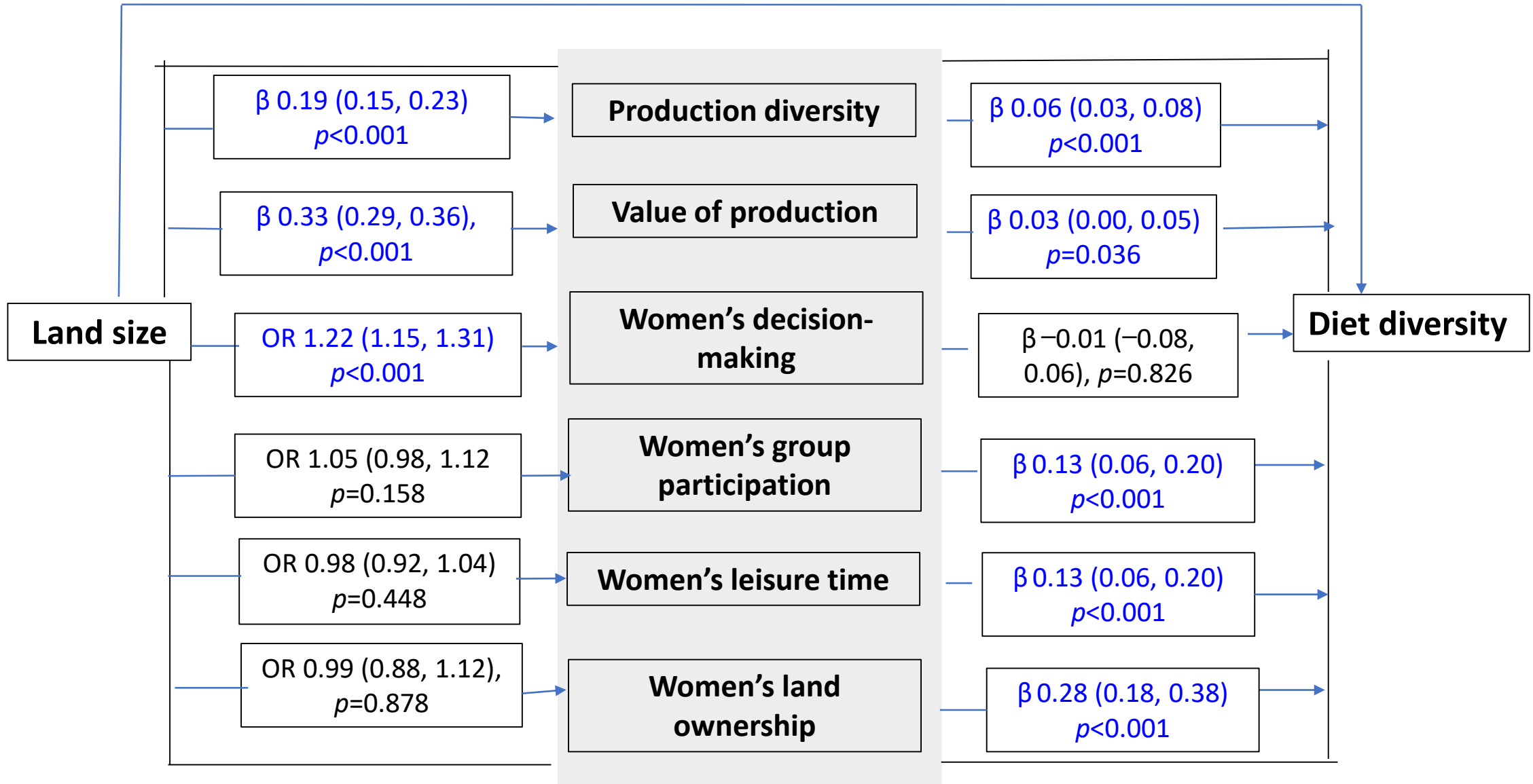
Women active member in at least one community group, % 30.0 %

Women worked less than 10.5 hours in last 24 hours, % 40.2 %

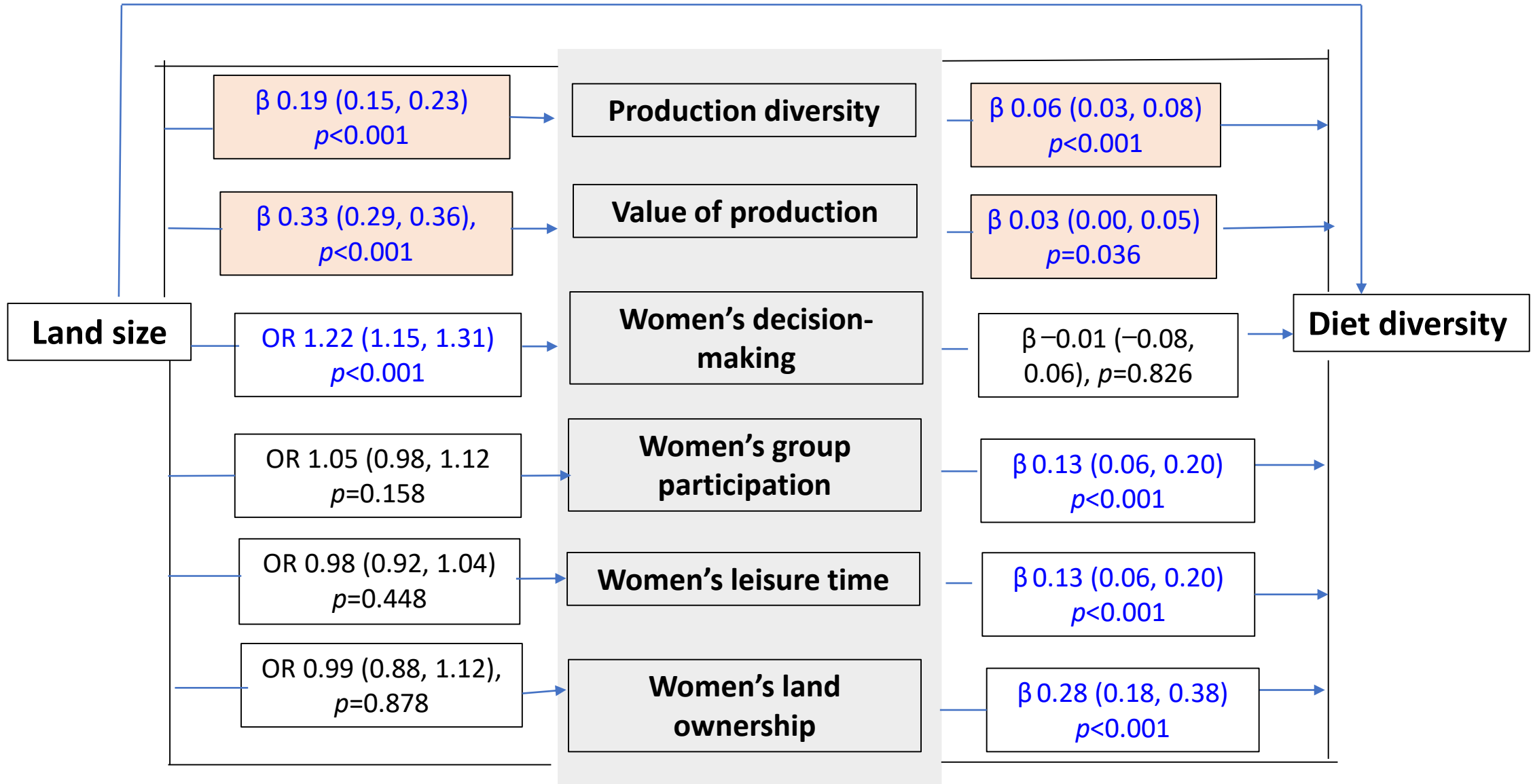
Women own land, %

<i>None owned</i>	83.1 %
<i>Jointly owned</i>	15.8 %
<i>Solely owned</i>	1.05 %

β 0.05 (0.02, 0.08) $p=0.002$



β 0.05 (0.02, 0.08) $p=0.002$

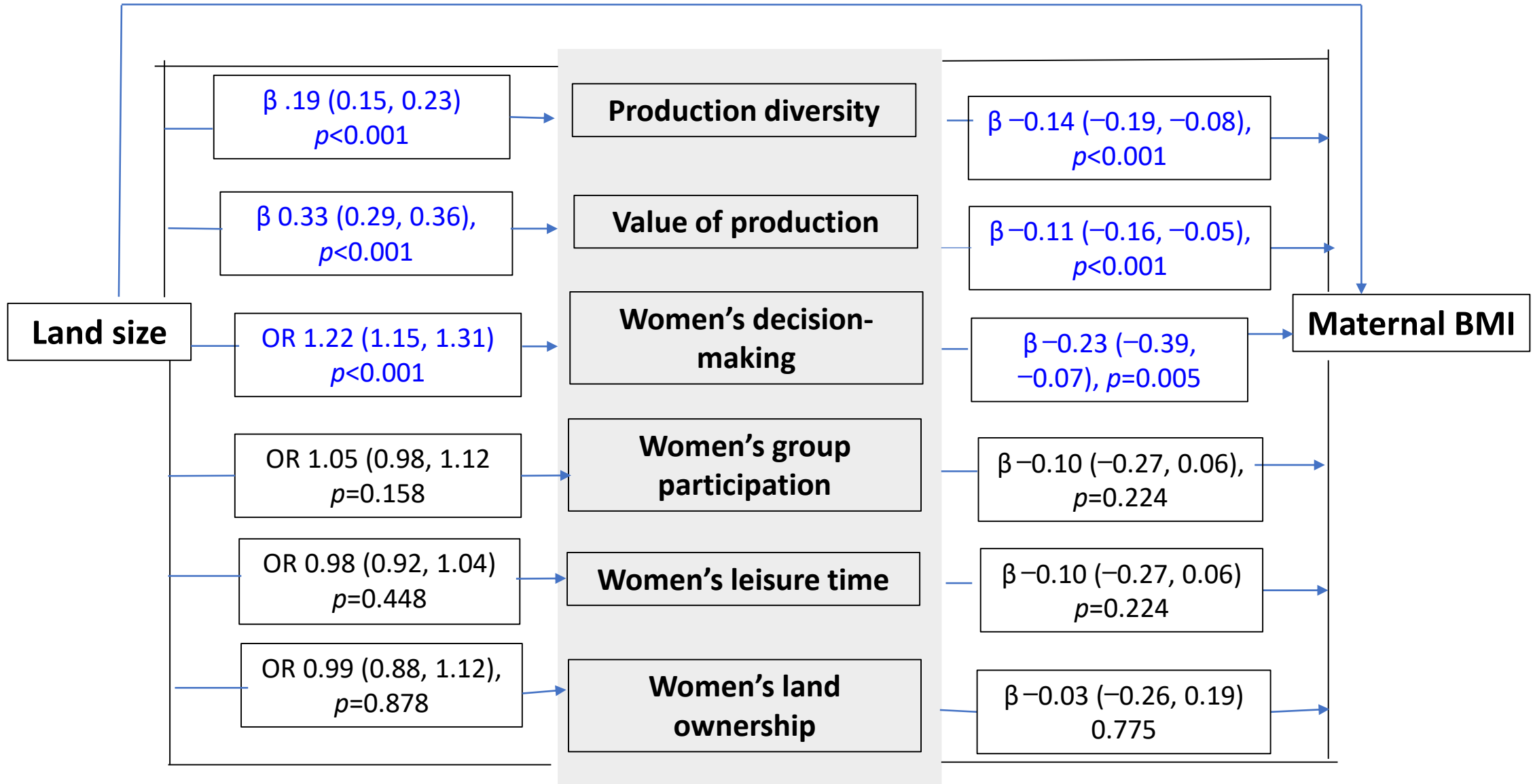


Mediator	Land → Dietary diversity <i>(adjusting for mediator)</i>	
	Coeff (95% CI)	p-value
Production diversity	0.04 (0.01, 0.07)	p=0.017
Value of production	0.04 (0.01, 0.07)	p=0.010

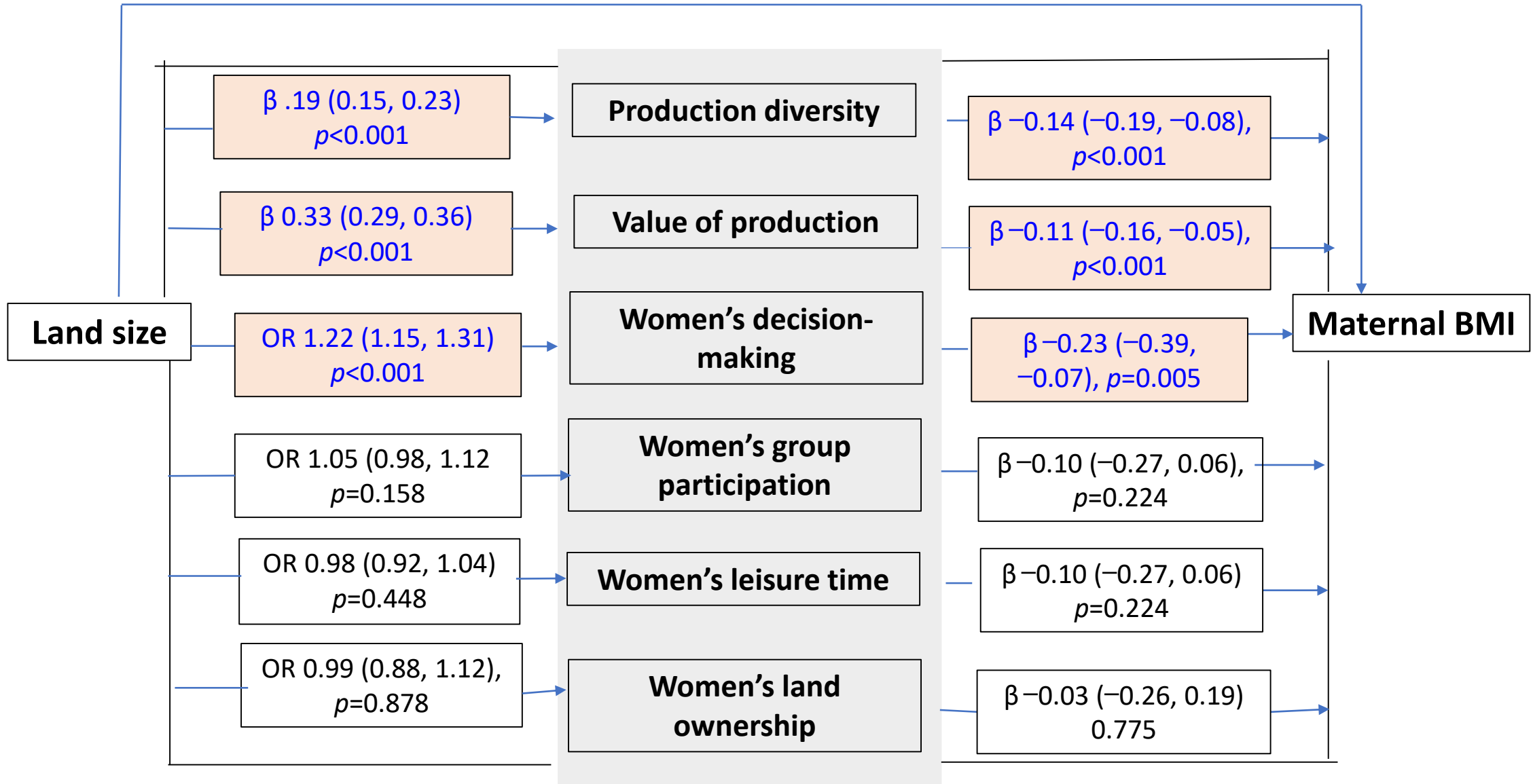
Land > dietary diversity not adjusted for mediator (previous slide):

β 0.05 (0.02, 0.08) $p=0.002$

β -0.02 (-0.09, 0.05), $p=0.650$



β -0.02 (-0.09, 0.05), $p=0.650$



Mediator	Land → BMI <i>(adjusting for mediator)</i>	
	Coeff (95% CI)	p-value
Production diversity	0.01 (-0.06, 0.08)	$p=0.758$
Value of production	0.03 (-0.04, 0.10)	$p=0.412$
Decision-making	-0.01 (-0.08, 0.06)	$p=0.864$

Land > BMI not adjusted for mediator (previous slide):

β -0.02 (-0.09, 0.05), $p=0.650$



Taken together

- Land and agriculture variables are independently associated with maternal nutritional outcomes
- A complex women's empowerment indicator story
 - ? “inconsistent mediation”
 - ? Better agricultural indicator and decision-making in ag → higher energy expenditure
 - ? workload \neq Energy energy expenditure

- Land transfer programs need to be made gender and nutrition-sensitive
- Ag programs need to consider land and women's energy expenditure in their design

