Women’s empowerment in agriculture, production diversity and nutrition: Evidence from Nepal

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Roadmap

• Why we should care about women’s empowerment, production diversity and nutrition
• Key findings
• How we did it
• What we found
• Summary and some parting thoughts
Why agriculture for nutrition?

• Agricultural growth and development is effective in reducing poverty, but do NOT necessarily translate into improved nutrition outcomes

• A wide body of literature illustrates that links between agriculture, health, and nutrition are dynamic and multifaceted (Gillespie 2001; Headey 2011; Hoddinott 2011)

• How should agricultural policies and programs be designed and implemented to achieve nutritional objectives?
Gender matters!

• Direct links between agriculture and nutrition:
  1. Agriculture as a source of food
  2. Agriculture as a source of income and expenditures
  3. Agricultural policy and food prices

• 5 pathways through which agricultural interventions can affect nutrition (Arimond et al 2010):
  1. Increased food for own consumption
  2. Increased income
  3. Reductions in market prices
  4. Shifts in preferences
  5. Shifts in control of resources within households

All mediated by gender roles
Women’s Empowerment in Agriculture Index (WEAI)

- **Design**
  - Survey based index asking the same set of questions of both the primary adult *male and female* in a household
  - Piloted in 2011 - Bangladesh, Guatemala and Uganda
  - Developed by USAID, IFPRI and Oxford Poverty and Human Development Initiative (OPHI)

- **Innovation**
  - First index to directly capture women’s empowerment in agriculture rather than proxies (e.g. income, education)
  - Diagnostic: diagnose patterns of disempowerment and identify areas for policy intervention
  - Gender parity
  - Can be used to study the relationship between empowerment and desired outcomes in different socio-cultural contexts
How is WEAI constructed?

Five domains of empowerment (5DE)

Gender parity Index (GPI)

Women's Empowerment in Agriculture Index (WEAI)
Range: 0-1
Five Domains of Empowerment (5DE)

Ten Indicators
- Input in productive decisions 1/10
- Autonomy in production 1/10
- Ownership of assets 1/15
- Purchase, sale, or transfer of assets 1/15
- Access to and decisions on credit 1/15
- Control over use of income 1/5
- Group Member 1/10
- Speaking in Public 1/10
- Leisure 1/10
- Workload 1/10
Who is empowered?

A woman who has achieved ‘adequacy’ in 80% or more of the weighted indicators is empowered.
Study objectives

1. To examine how production diversity and key indicators of women’s empowerment are linked with mother and child nutrition outcomes in rural Nepali households.

2. To examine whether production diversity and women’s empowerment mediate each other’s relationship with mother and child nutrition outcomes.
Key findings (spoiler alert!)

- Production diversity is positively associated with nutrition outcomes for mothers and children (DD, WHZ, WAZ)
- Women’s autonomy in production is positively associated with children’s outcomes (HAZ, WAZ)
- Weak evidence that production diversity and women’s empowerment interact
- Domains of empowerment that are significant for mother and child nutrition may not always overlap
DATA AND METHODS
Data

- Baseline survey of an impact evaluation for *Suaahara*, a USAID funded multisectoral intervention, to address maternal and child undernutrition in Nepal
- Data collection: June 13- Oct 6, 2012 – New Era, IFPRI
- 4,080 households in 240 communities across 16 districts in 3 AEZs
Survey Questionnaires: Household Level

**Women**
- Child Health and Childcare
- IYCF Practices
- Household Food Security
- Maternal Dietary Diversity
- Empowerment
- Information Access
- Maternal Health
- IYCF Knowledge and Beliefs
- Water, Sanitation, and Hygiene
- Anthropometry and Hemoglobin
- Grandmother’s Perspectives

**Men**
- Household Roster
- Household Economics
- Social Assistance
- Agricultural Practices and Land Use
- Empowerment
- House and WASH Observations
Key outcome variables

1. Child level
   - Child anthropometry (HAZ; WAZ; WHZ)
   - Child dietary diversity using WHO recommended 7 food groups
     • Starchy staples; Beans, lentils and nuts; dairy; eggs; and all flesh foods including meat, fish, and poultry; vitamin A-rich fruits and vegetables; other fruits and vegetables

2. Maternal level
   - BMI (kg/m²)
   - Dietary diversity using 9 food group indicator
     • Starchy staples; Beans, lentils and nuts; Dairy; Meat; Eggs; Fish; Green leafy vegetables; Vitamin A rich fruits & vegetables; Other fruits and vegetables
Key explanatory variables

1. Agriculture production diversity
   - A 9 group production diversity index (PDI) analogous to the 9 food groups used for maternal dietary diversity

2. WEAI
   - Aggregate 5DE score
   - Decomposed indicators: Group membership; Control over use of income; Autonomy in production; Workload (indicators with largest contributions to women’s disempowerment)
   - Gender parity gap (for households with both male and female respondents)
WEAI Diagnostics

% Contribution of domains & indicators to women’s disempowerment

- **Production**: 23.5%
- **Resources**: 18.5%
- **Income**: 17.7%
- **Leadership**: 18.9%
- **Time**: 20.5%

- **Input into production decisions**: 17.7%
- **Asset ownership**: 14.6%
- **Access to and decisions on credit**: 5.0%
- **Group membership**: 16.6%
- **Workload**: 10.7%
- **Autonomy in production**: 17.7%
- **Rights over assets**: 6.3%
- **Control over use of income**: 16.6%
- **Speaking in public confidence**: 4.3%
- **Leisure**: 4.3%
# Empowerment measures

<table>
<thead>
<tr>
<th>Model #</th>
<th>Indicator</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aggregate empowerment</td>
<td>woman’s 5DE score, the weighted average of achievements in the ten indicators</td>
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<tr>
<td>2</td>
<td>Autonomy in production</td>
<td>Relative Autonomy Index (RAI) score</td>
</tr>
<tr>
<td>3</td>
<td>Control over income</td>
<td># ag and nonag activities in which she has input in income decisions or feels she can make decisions</td>
</tr>
<tr>
<td>4</td>
<td>Group membership</td>
<td># of groups in which she is an active member</td>
</tr>
<tr>
<td>5</td>
<td>Workload</td>
<td># hours worked in paid and unpaid activities</td>
</tr>
<tr>
<td>6</td>
<td>Gender parity gap</td>
<td>gap between 5DE scores of men and women; =0 if woman is empowered</td>
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</tbody>
</table>
Summary statistics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>mean</th>
<th>standard deviation</th>
<th>minimum</th>
<th>maximum</th>
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<tbody>
<tr>
<td><strong>Dependent variables</strong></td>
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<tr>
<td><strong>Mother's outcomes</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>diet diversity score (9 food groups)</td>
<td>2383</td>
<td>6.22</td>
<td>1.71</td>
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<tr>
<td>Body mass index</td>
<td>2382</td>
<td>20.34</td>
<td>2.63</td>
<td>0</td>
<td>34</td>
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<tr>
<td><strong>Children's outcomes</strong></td>
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<td></td>
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<tr>
<td>diet diversity score (7 food groups)</td>
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<td>3.56</td>
<td>1.07</td>
<td>0</td>
<td>7</td>
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<tr>
<td>height-for-age z-score</td>
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<td>-1.79</td>
<td>1.23</td>
<td>-5</td>
<td>4</td>
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<tr>
<td>weight-for-height z-score</td>
<td>2360</td>
<td>-0.86</td>
<td>1.04</td>
<td>-4.7</td>
<td>4</td>
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<tr>
<td>weight-for-age z-score</td>
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<td>-1.62</td>
<td>1.04</td>
<td>-4.7</td>
<td>3</td>
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<td><strong>Explanatory variables</strong></td>
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<tr>
<td><strong>Production diversity</strong></td>
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<td></td>
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</tr>
<tr>
<td>production diversity index (9 food groups)</td>
<td>2383</td>
<td>4.58</td>
<td>1.44</td>
<td>0</td>
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<td><strong>Women's empowerment indicators</strong></td>
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</tr>
<tr>
<td>woman's empowerment score</td>
<td>2383</td>
<td>0.58</td>
<td>0.21</td>
<td>0</td>
<td>1</td>
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<tr>
<td>number of groups woman is an active member of</td>
<td>2383</td>
<td>0.24</td>
<td>0.64</td>
<td>0</td>
<td>7</td>
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<tr>
<td>number of domains woman has some control over income decisions</td>
<td>2383</td>
<td>2.01</td>
<td>1.44</td>
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<td>9</td>
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<td>relative autonomy index score in agricultural activities</td>
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<td>1.47</td>
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<td>7</td>
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<tr>
<td>hours spent in paid &amp; unpaid work</td>
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<td>11.27</td>
<td>2.97</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>gender parity gap (=0 if woman has gender parity, 'gap' if not)</td>
<td>844</td>
<td>0.25</td>
<td>0.23</td>
<td>0</td>
<td>1</td>
</tr>
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</table>
Empirical specification

1. \( N(P, O) = b_0 + b_1\text{empowerment} + b_2\text{production diversity} + b_3 I + b_4 H + e \)

2. \( N(P, O) = b_0 + b_1\text{empowerment} + b_2\text{production diversity} + b_3 (\text{empowerment} \times \text{production diversity}) + b_4 I + b_5 H + \nu \)

\( N(P, O) \) – nutrition practice and outcome vector
\( I \) – individual characteristics; \( H \) – household characteristics

• Controls:
  – Child characteristics: under 2 years old dummy, girl dummy, age (in months), age squared
  – Mother characteristics: age, age squared, height, years of schooling
  – Household characteristics: dual adult household dummy, log of household size, dependency ratio, socio-economic status index, caste dummies, intervention group dummy, agro-ecological zone dummies
  – Climate variables: 2011 rainfall, maximum and minimum temperature
RESULTS
More diverse production is associated with more diverse diets for mothers…

Mother's dietary diversity and production diversity

- M1: women's empowerment score
- M2: group membership
- M3: control over income
- M4: autonomy in production
- M5: workload
- M6: gender parity gap

- Full sample
- Dual adult hhs
...and children

Children's dietary diversity and production diversity

M1: women's empowerment score
M2: group membership
M3: control over income
M4: autonomy in production
M5: workload
M6: gender parity gap

Full sample  Dual adult hhs
More diverse production is also associated with children’s weight-for-height z-score (WHZ)...

Children's WHZ and production diversity

- M1: women's empowerment score
- M2: group membership
- M3: control over income
- M4: autonomy in production
- M5: workload
- M6: gender parity gap

[/]
...and children’s weight-for-age z-score (WAZ) in the full sample

Children's WAZ and production diversity

- M1: women's empowerment score
- M2: group membership
- M3: control over income
- M4: autonomy in production
- M5: workload
- M6: gender parity gap

Legend:
- Full sample
- Dual adult hhs
Mothers with greater control over income consume **more** diverse diets, but for dual adult households, empowered mothers consume **less** diverse diets.
Empowered mothers are more likely to have higher body mass index (BMI)
Women’s autonomy in production is associated with better nutritional status for children (HAZ, WAZ)

Women's autonomy in production and child nutritional status

- HAZ: 0.040**, 0.077***
- WAZ: 0.035**, 0.061***

Graph shows the association between women's autonomy in production and child nutritional status (HAZ, WAZ) for the full sample and dual adult households.
5 Take aways

1. Production diversity is positively associated with nutrition outcomes for mothers and children (DD, WHZ, WAZ)

2. Different aspects of women’s empowerment matter for maternal dietary diversity and BMI
   - Unexpected signs for group membership and autonomy in dietary diversity regressions
   - WEAI is decomposable but may not necessarily be monotonic in indicators because of context-specific gender norms

3. Women’s autonomy in production is positively associated with children’s outcomes (HAZ, WAZ)

4. Weak evidence that production diversity and women’s empowerment interact

5. Domains of empowerment that are significant for mother and child nutrition may not always overlap
To conclude...

- In this context, where only a negligible share of production is sold, agricultural interventions that promote diverse production may improve nutrition outcomes.
- Different aspects of empowerment matter for different nutrition objectives – policy response will be different.
- Noteworthy link between women’s autonomy in production and child nutritional status:
  - Interventions to increase women’s agency and capability to make decisions in agriculture provides both an opportunity to engage them more visibly in agriculture, as well as contribute to children’s nutrition.
THANK YOU!