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INNOVATION LAB ON SMALL SCALE IRRIGATION

Irrigation-nutrition linkages: Insights from the ILSSI project and beyond

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INNOVATION LAB ON SMALL SCALE IRRIGATION (ILSSI)

- ILSSI, a project of the U.S. Government's Feed the Future Initiative, is a five-year project in Ethiopia, Ghana and Tanzania aimed at benefiting the region's farmers by improving effective use of scarce water supplies through interventions in small-scale irrigation

- Activities include field interventions with water management technologies, capacity building, research on irrigation-nutrition-gender linkages, and provision of data and analysis of empirical models of irrigation impacts

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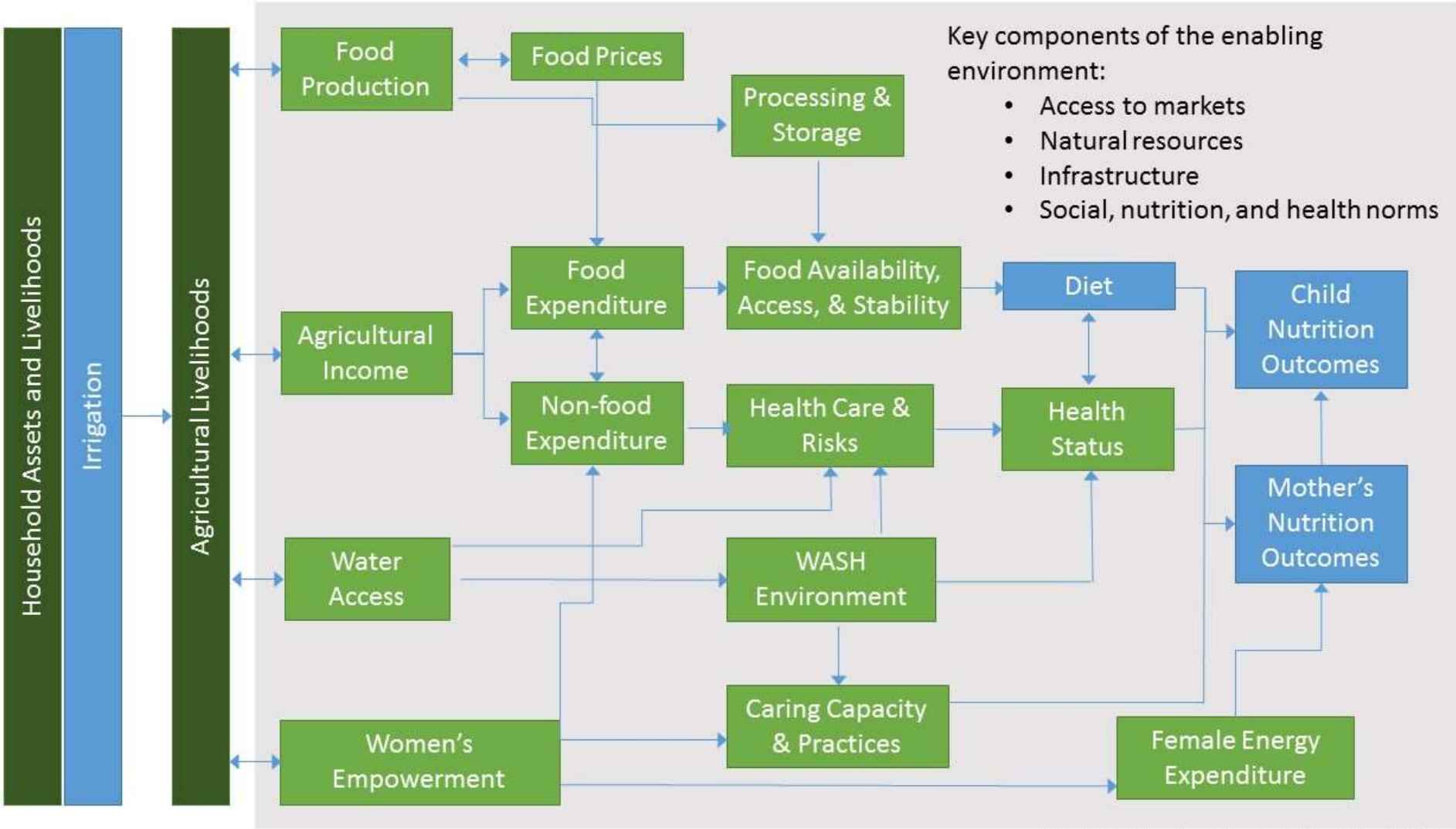
BACKGROUND: NUTRITION IN ETHIOPIA, TANZANIA, AND GHANA

	Ethiopia		Tanzania		Ghana	
Children under five	**2000**	**2011**	**1999**	**2010**	**1998**	**2014**
stunted	57.7	44.4	48.2	42	30.6	18.8
wasted	12.2	9.7	5.4	4.8	10	4.7
underweight	41.2	28.7	24.4	15.8	19.7	11

Data Source: Demographic and Health Survey (DHS)

IRRIGATION-NUTRITION LINKAGES



Adapted by the authors from Herforth and Harris, 2014

Production Pathway

- Irrigated yields larger (with improved varieties & complementary inputs) (e.g. Burney et al 2010)
- Growing in the lean season (e.g. Aseyehen et al 2012)
- Greater crop diversity (Namara et al. 2005, India), or no difference? (Namara et al. 2011, Ghana), or more monocropping? (Hossain et al. 2005, Bangladesh)
- More vegetables and fruits (Fraiture and Giordano 2014)
- Increased production of animal foods through irrigated fodder (Frenken 2005; Murphy and Allen 2003)

Income Pathway

- Higher gross revenue per ha for SSI as it is used mainly for cash crops (Burney et al 2013; Nkonya et al 2011)
- Food expenditures higher among irrigating households in South Africa (Sinyolo et al. 2014)
- Employment generation due to increased productivity and expanded production calendar

Water Supply Pathway

- Irrigation water may be used for other purposes such as drinking, washing, bathing or other productive purposes (e.g. livestock watering, aquaculture)

- Greater water for domestic purposes as a result of irrigation resulted in lower diarrhea and stunting in Pakistan (Van der Hoel et al. 2002)

**The extent to which women are involved in the design of irrigation systems may encourage more multiple uses of irrigation water*

Health Risks Pathway

- Increased risk of vector-borne diseases (i.e. malaria /dengue)
- Negative health outcomes from increased pollution (especially pesticides)
- Greater health spending (e.g. malaria treatment and prevention)
- Improved maternal and child nutrition through increased diversity and quantity of foods and/or increased household incomes

Gender Pathway

Irrigation projects targeted towards women may have differential impact on nutrition and health outcomes

- Women may allocate resources gained from sale of irrigated crops towards food and health expenditures
- Women may use irrigation to grow more nutritious foods for home consumption
- Contribution to women's empowerment (e.g. increase in assets owned by women, income controlled by women)
- With potential negative effect due to time burden (depending on type of technology)

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Main findings from an econometric analysis of irrigation-nutrition linkages

- Access to irrigation significantly improves both household income and the diversity of crops that farmers produce
- Increasing household income, in turn, leads to higher dietary diversity ⇒ Income Pathway ✓
- The relationship between production diversity and dietary diversity is not statistically significant ⇒ Production Diversity Pathway (?)

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Why not the production pathway?

- Foregone income benefits from specialization
  - Sibhatu et al. (2015)
  - Small land size (1.7 to 1.9 Ha), and producing 7 crops on average in Ethiopia and 4 in Tanzania
- Taste and habit persistence
- Survey timing may have a differential effect in picking dietary diversity for those highly diversified farmers who produce a little bit of many crops that may not be enough to last for months after harvest

Conclusion

- SSI has the potential for large-scale benefits beyond yields and income if health, sanitation, nutrition, and gender considerations are actively promoted during the design and implementation of irrigation schemes
- How small-scale irrigation development is implemented will be decisive for nutrition and health outcomes and for gender empowerment.
- There is a need for the WASH-Nutrition community to broaden its definition of nucleus-family to include the irrigation community as family members in the effort to reduce poverty and malnutrition

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