

# Agriculture and nutrition: what does the evidence show?

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# Outline

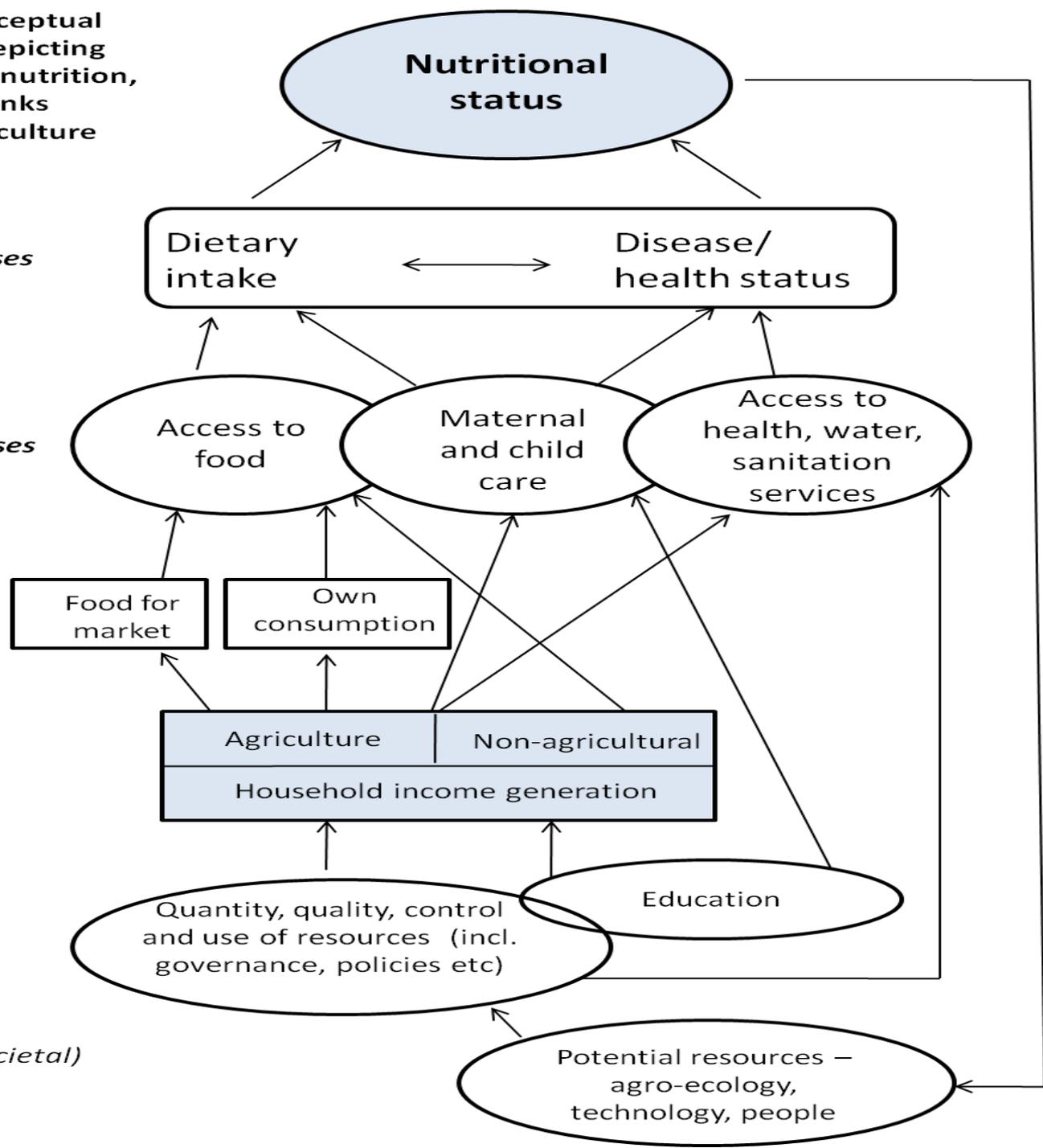
- How agriculture affects nutrition (pathways)
- What do we know about the role/contribution of agriculture in improving nutrition
  - Reviews of evidence
  - Recent systematic literature reviews
- Remaining gaps and how to address them

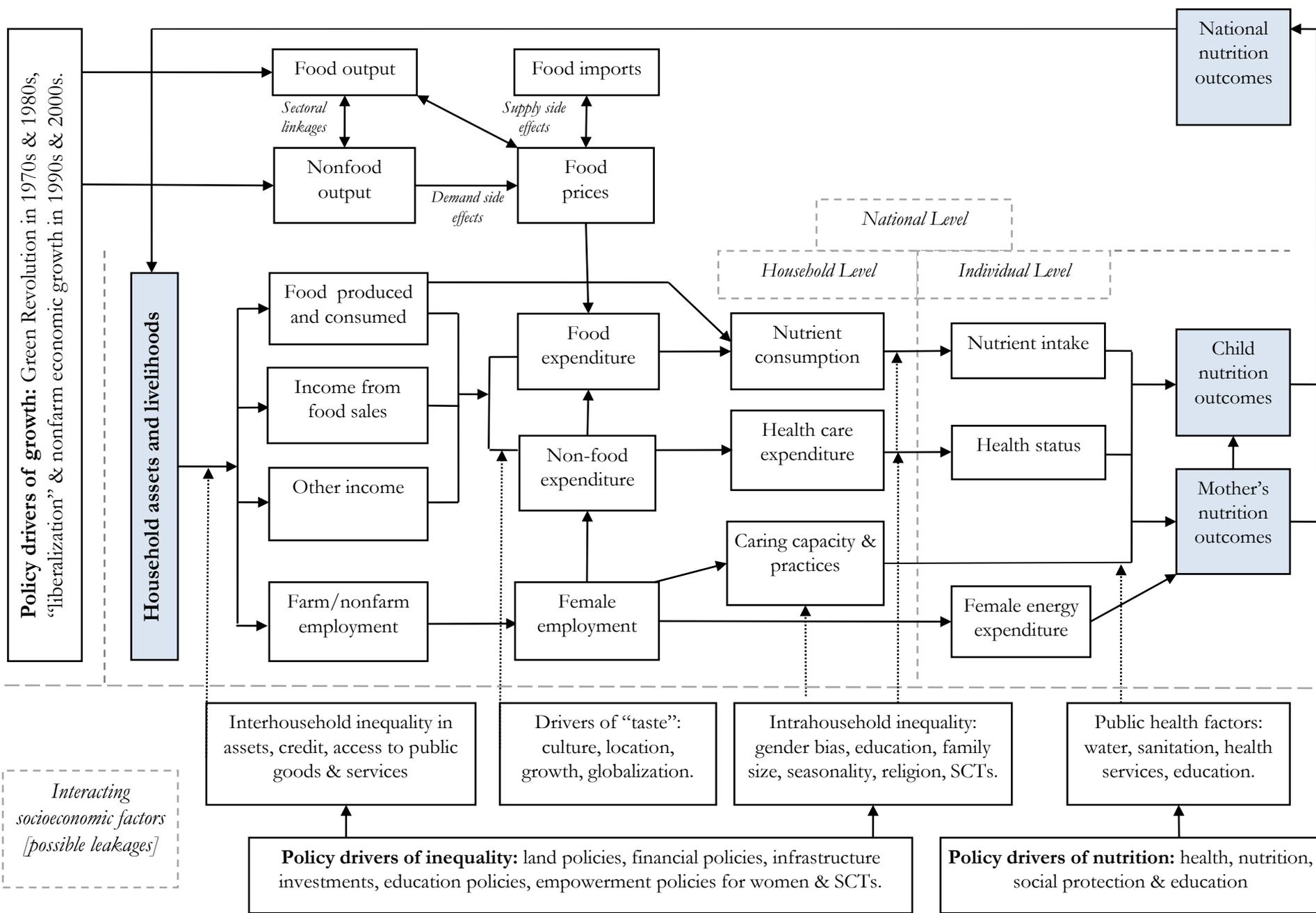
**Figure X: Conceptual framework depicting causes of malnutrition, highlighting links between agriculture and nutrition**

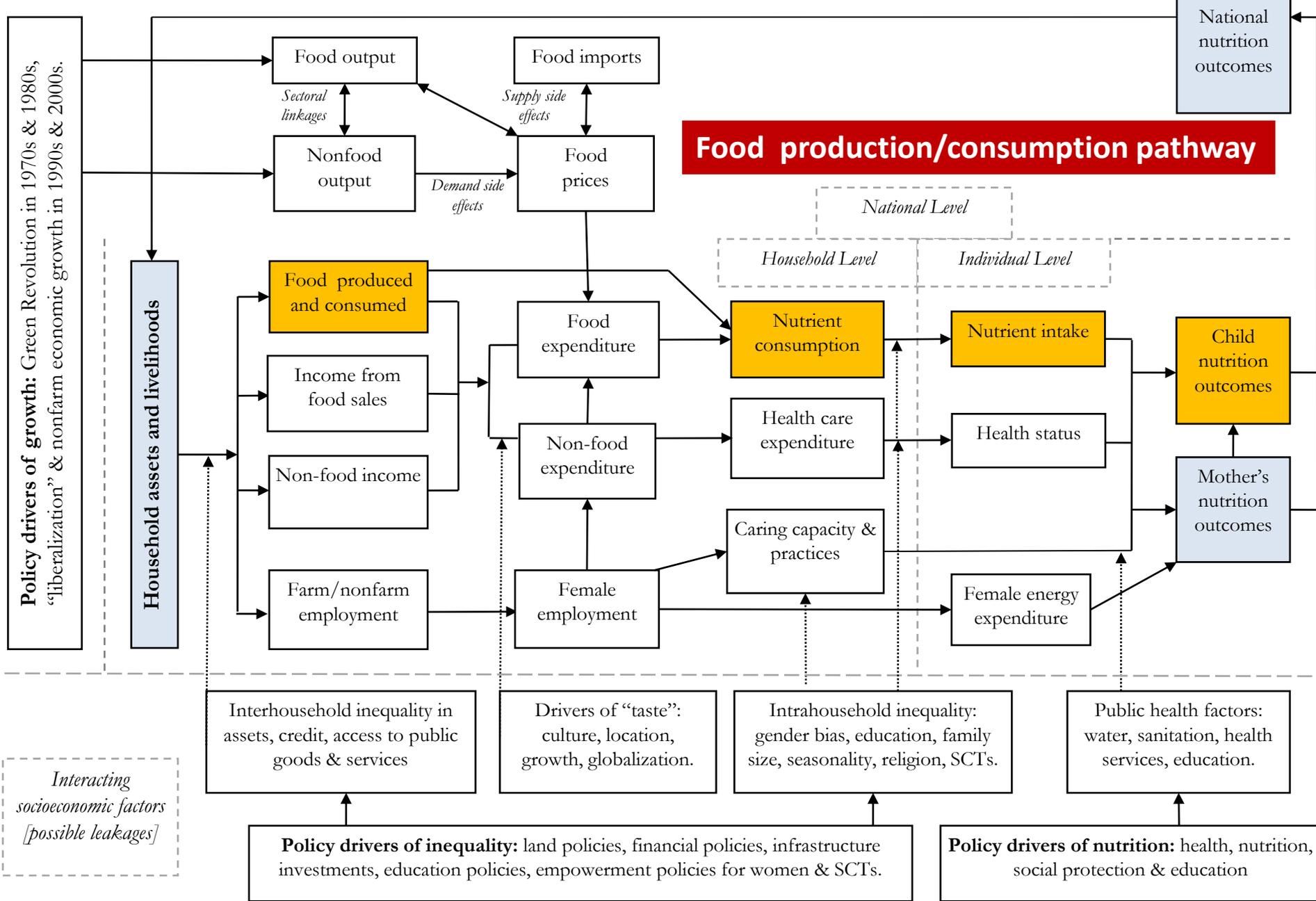
*Immediate causes (individual)*

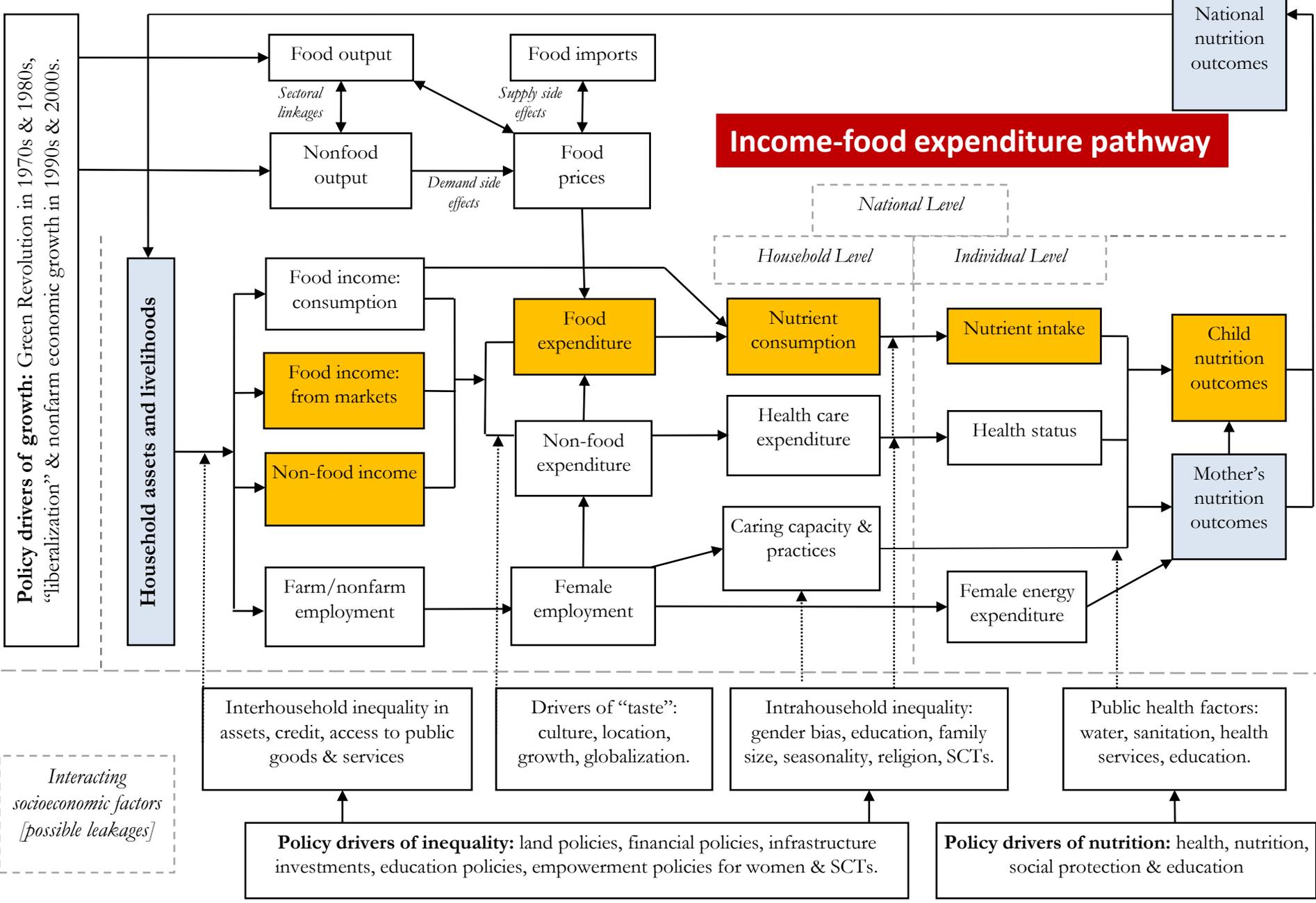
*Underlying causes (household and community)*

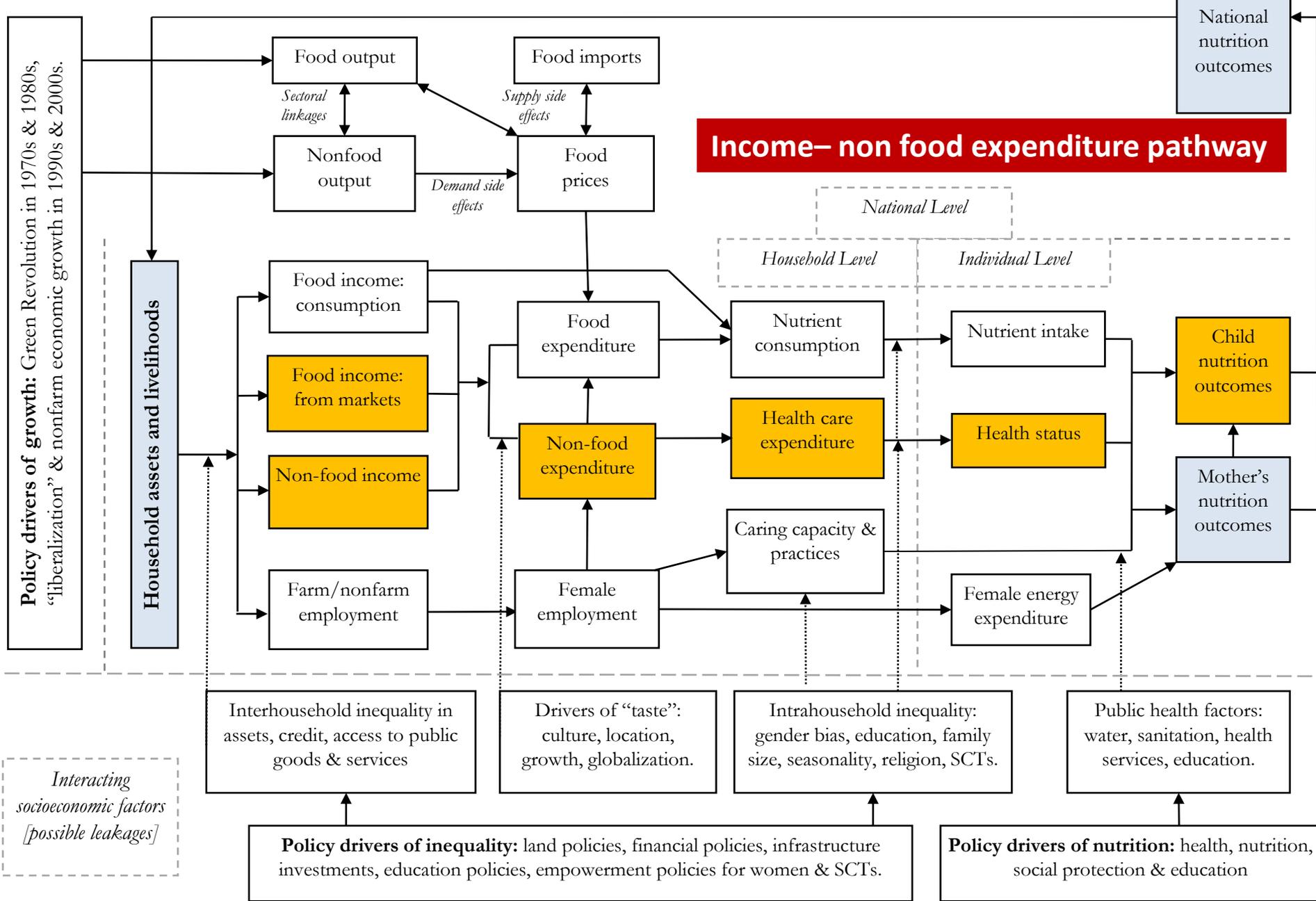
*Basic causes (national/societal)*



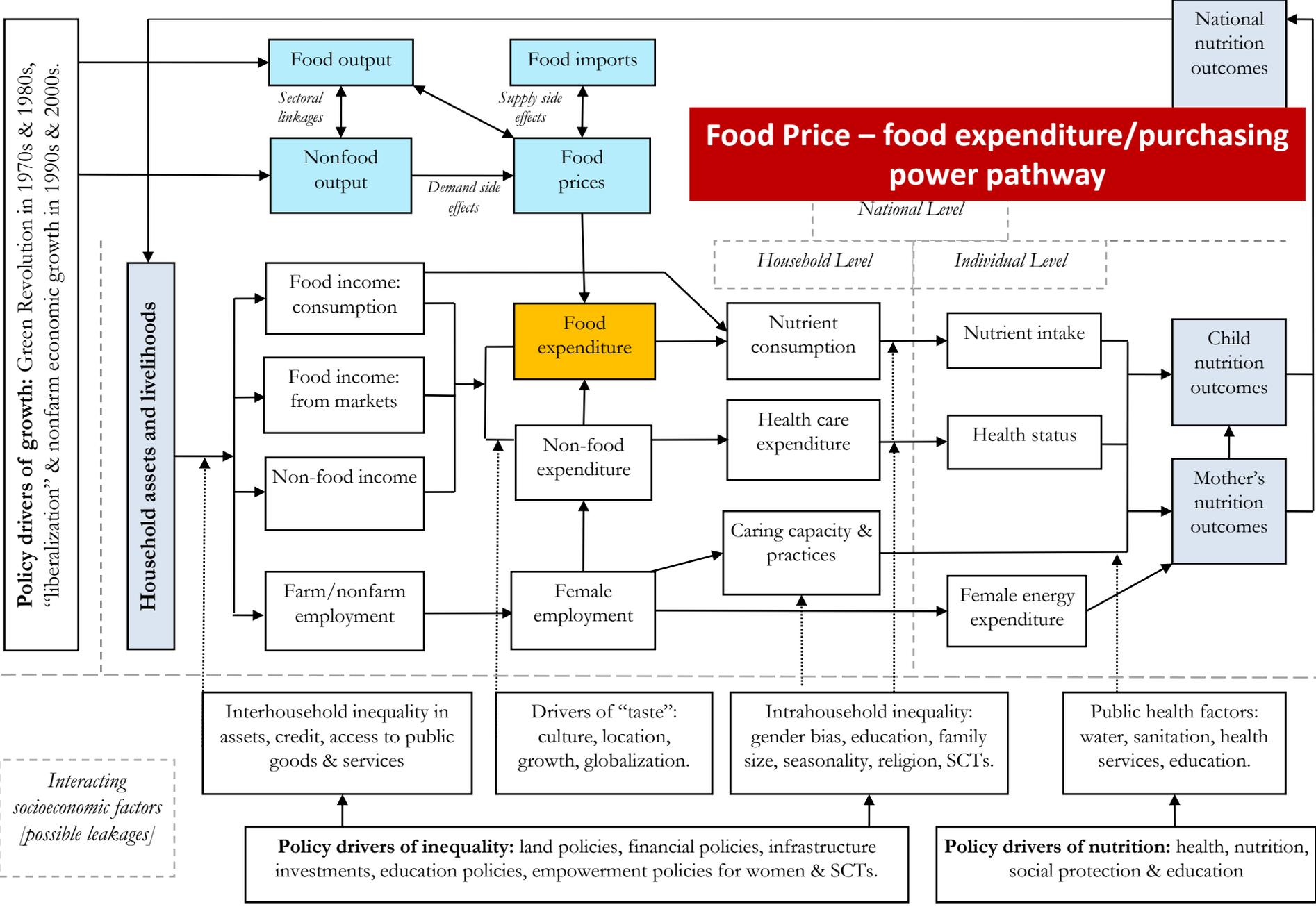


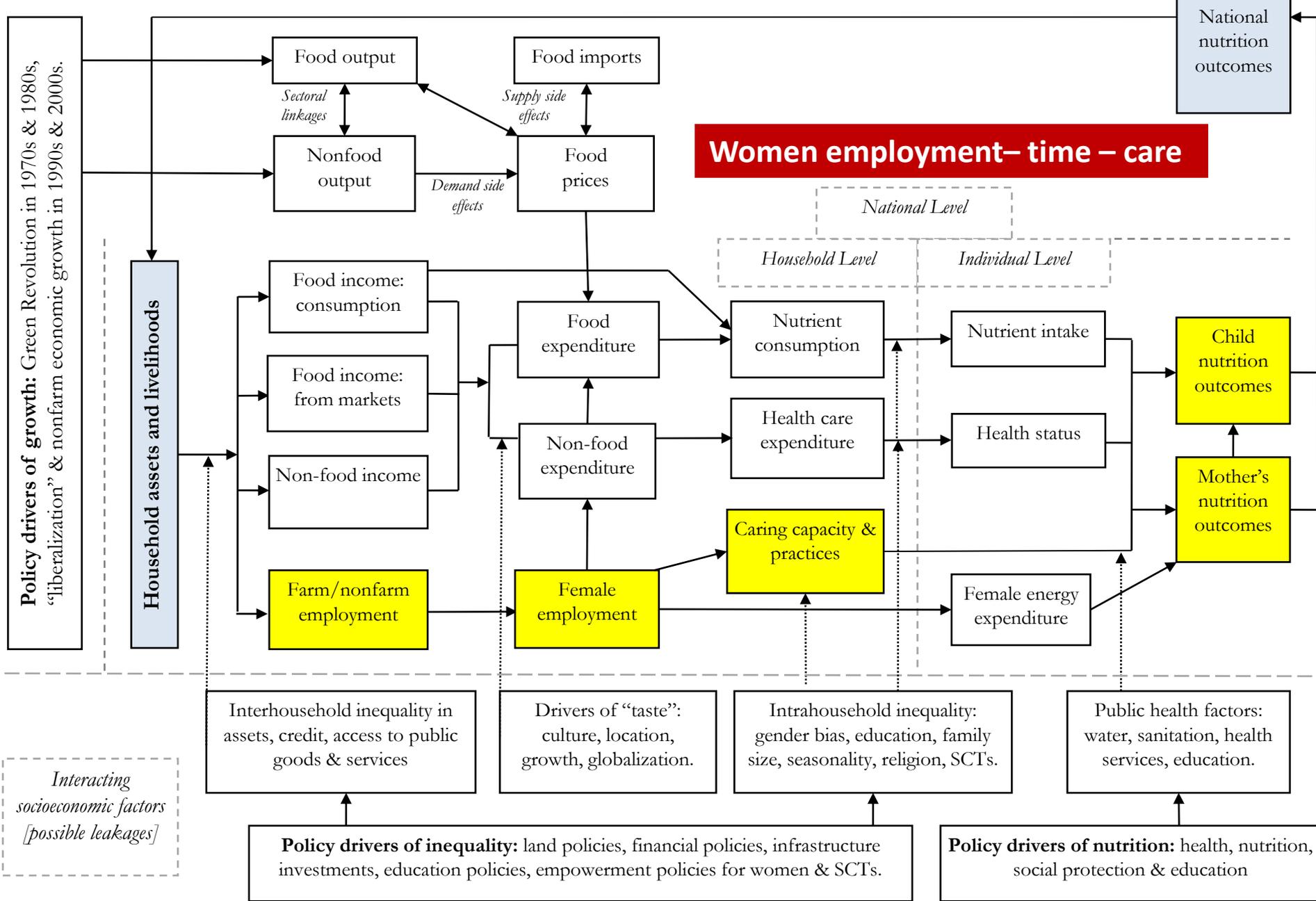


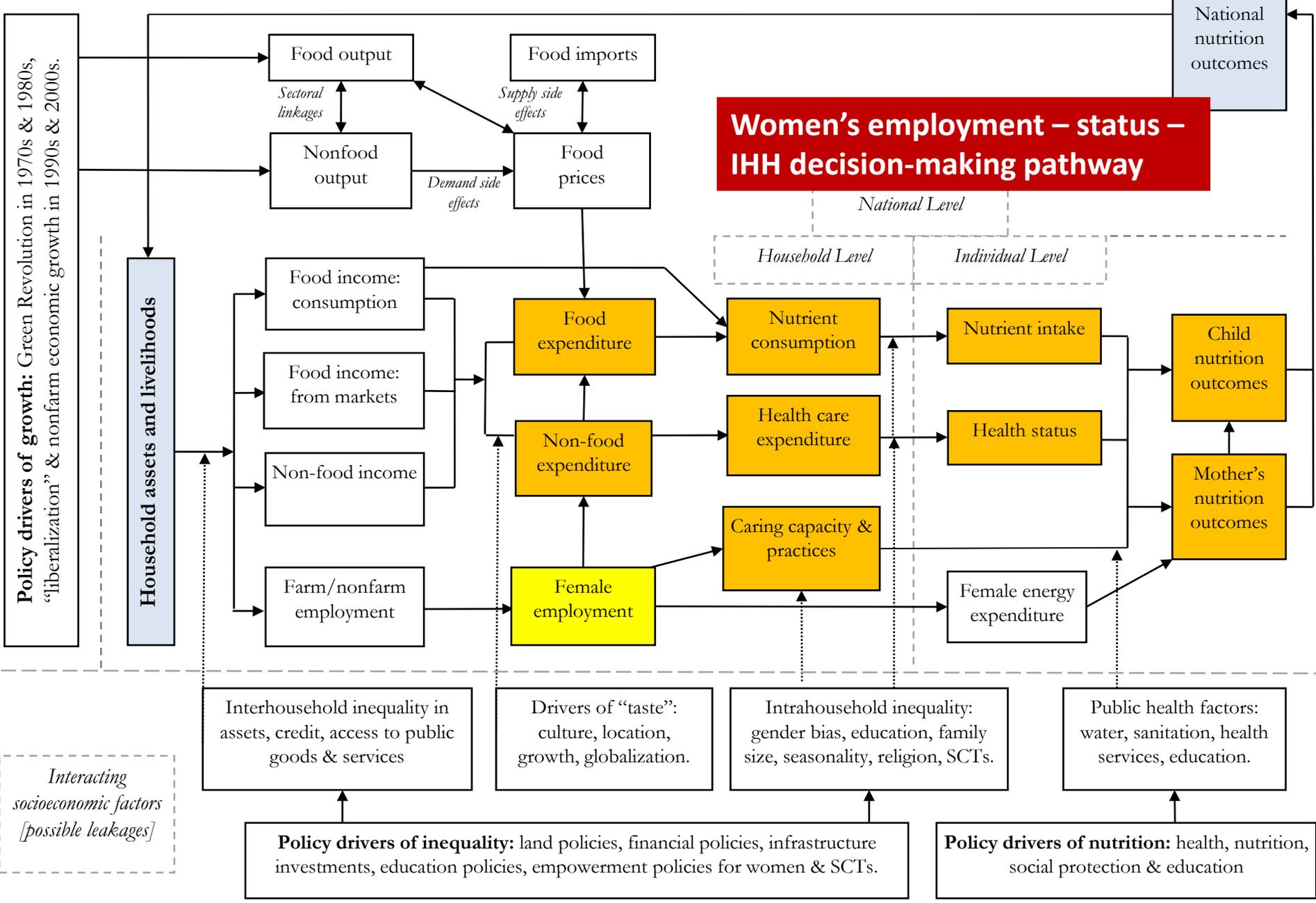




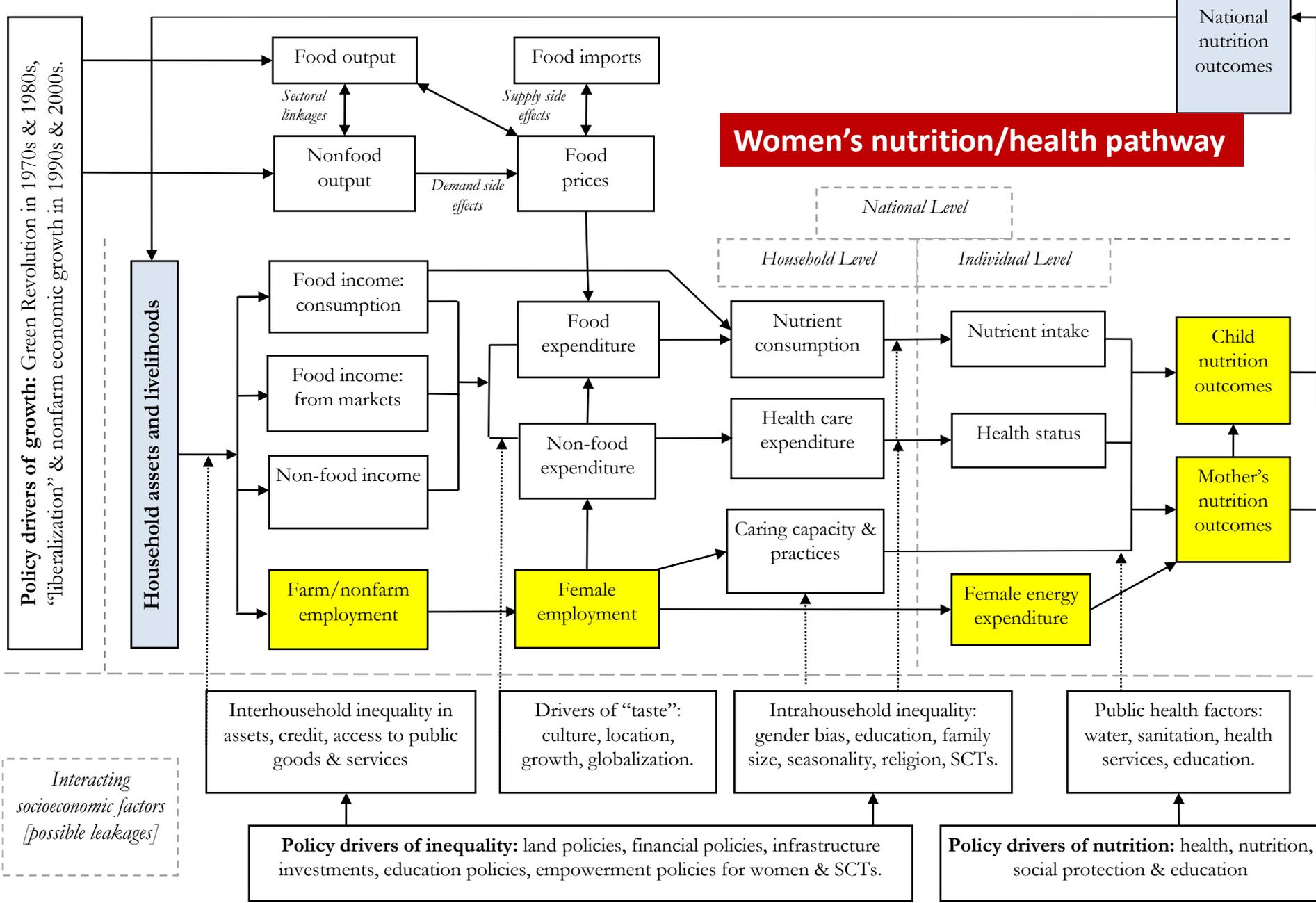
Source: Gillespie et al., TANDI project







Source: Gillespie et al., TANDI project



# Conceptualizing the pathways between agriculture and nutrition

Agriculture is a key driver of poverty reduction

but...

Pathways to nutrition are diverse and interconnected

1. Agriculture as a source of food
2. Agriculture as a source of income:
  - how income from agriculture/non agriculture is spent on food and non food (other basic needs)
3. Agricultural policy and food prices

## **Gender dimensions**

4. Women's employment, time and ability to manage young child care
5. Women's status, decision making power and control over resource allocation
6. Women's own health and nutritional status

# Main reviews

- Ruel, 2001
  - Focused on impact of ag programs (garden, HFP, livestock, aquaculture, mixed, cash cropping), dietary modification and diversification on vitamin A and iron
- Berti et al. 2004
  - Review same types of programs; assessed whether programs invested in 5 types of capital: physical, natural, financial, human and social
- Leroy and Frongillo 2007
  - Focused on animal production programs (aquaculture, dairy, poultry)
- World Bank/IFPRI 2007
  - Reviewed same types of ag programs; included changing context (policy, technology, food marketing systems, food consumption patterns) and institutional frameworks
- Leroy et al. 2008
  - Used impact pathway approach
- Bhutta et al. 2008
  - Focused on same programs, including dietary modification and diversification
- Masset et al. 2011
  - Systematic review of same programs plus biofortification (without dietary modification/diversification)
- Girard et al 2012
  - Systematic review of studies, post-1990 (36 articles, 27 unique studies)

# Main conclusions

- Ruel, 2001
  - Little evidence of impact on micronut status (only a few programs actually measured impact on micronut indicators)
- Berti et al. 2004
  - Mixed results in terms of improving nut status
- Leroy et al. 2008
  - Mixed results; less than ½ studies measured impact on nut outcomes; little measured impact in those that did, except VA
- Masset et al. 2011
  - Impact on micronut status unclear, except biofortification on VA; little or no impact on anthropometry (due to small sample size and low statistical power)
- Girard et al 2012
  - Limited evidence of impact on maternal or child anthropometry (those that did focused on production of food rich in micronut, energy and protein)

# What works better

- Ruel, 2001
  - Stand alone production strategies did not increase MN intake or status.
  - Projects that included well-designed BCC successful at increasing MN intake
- Berti et al. 2004
  - Broader-based investments had greater impact; nut educ is key
- Leroy et al. 2008
  - Impact more likely when strong gender and nut educ approaches; complementary interventions needed to sustain improvements; targeting women works.
- Masset et al. 2011
  - No comment in paper
- Girard et al 2012
  - Impact on MN intake more likely when nut educ, gender objectives included.

# Evaluation designs

- Ruel, 2001
  - Poor evaluation designs prevent conclusions on program effectiveness.
  - Evaluation difficult: complex programs
- Berti et al. 2004
  - Study designs often unsuitable to assess impact on nut status. Heterogeneity makes comparisons difficult.
- Leroy et al. 2008
  - Highly variable evaluation designs, generally poor. Unable to detect impacts on nut status due to poor design, sampling.
- Masset et al. 2011
  - Poor eval designs, studies too small.
- Girard et al 2012
  - substantial limitations in study design and quality of studies reporting nut outcomes. Research limited in quality and quantity, but evidence base growing

# 2011 Masset: Systematic review

Figure 2.1 Stages of the screening process

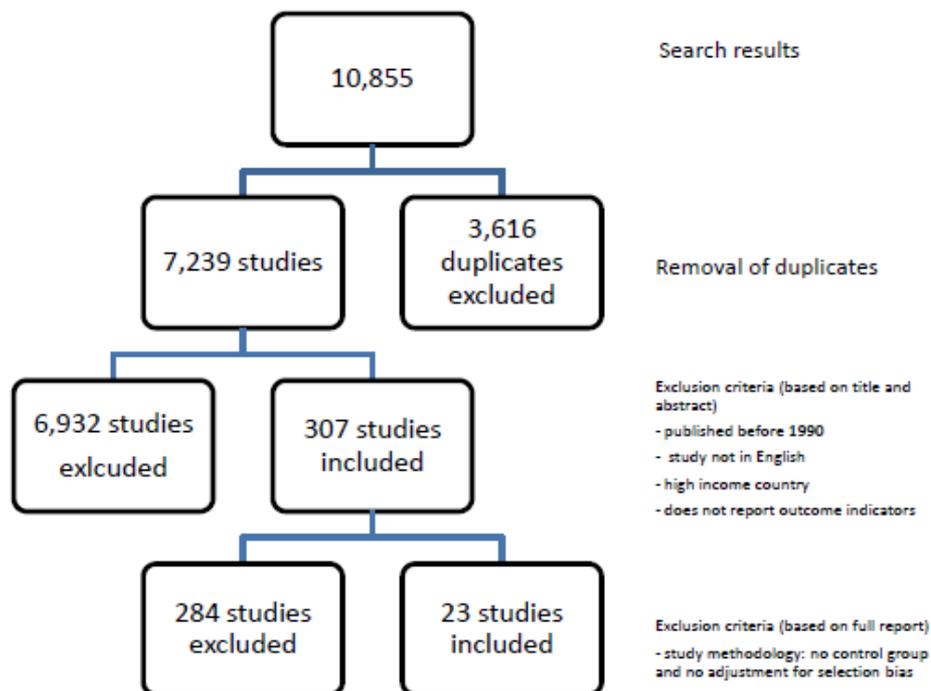


Table 3.1 Screening of studies by type of agricultural intervention

Programme type	Search results	1 <sup>st</sup> stage screening	2 <sup>nd</sup> stage screening
Bio-fortification	833	87	2
Home gardens	1,347	65	16
Fisheries	2,088	81	3
Dairy development	1,709	38	1
Animal husbandry	1,262	36	1
<b>TOTAL</b>	<b>7,239</b>	<b>307</b>	<b>23</b>

# Conclusion

- Programs vary; several studies, but very few high-quality.
- Evidence to date is minimal, and mixed
- More rigorous evaluations needed, not more systematic reviews
- “Need research that utilises robust randomised or quasi-experimental designs, evaluates biologically appropriate nutrition indicators, is adequately powered for these indicators and includes appropriate assessment and control for confounding and/or effect modification” (*Girard et al 2012*)

# But also.....

- Need to avoid mechanistic approach to reviews
- need to be analytical as well as methodological
- qualitative contextual evidence is extremely important
- discuss pathways, contexts, implications, recommendations...

# What evidence do policy makers need to take action?

- **What:** Can agriculture interventions, programs and policies contribute to reducing maternal and child undernutrition? If so what types of agriculture programs/policies have the greatest impact?
- **How:** what are the *pathways* of impact? Which ones are more important, in which *contexts*? How can agriculture be leveraged to contribute more to improving nutrition?
- **Where and who** are the populations most likely to benefit from nutrition sensitive agriculture?
- What is the *cost-effectiveness* of agriculture interventions to improve nutrition? What is their *sustainability*?
- What *design* options and *indicators* do we have for rigorous impact and cost-effectiveness assessments?

# Conclusions

- We have some evidence, but need more, and better
- Agriculture has a great potential for simultaneously addressing underlying + immediate determinants of undernutrition
  - Relieve resource constraints at hh level
  - Focus on women (power, time, access, resources)
  - Target direct nutrition interventions to poor hh
  - Strengthen links to health and care inputs
- But evidence of effectiveness is not enough
- Need to know how to work cross-sectorally...
- Consider:
  - Knowledge and evidence
  - Politics and governance
  - Capacity and resources

Thank you

# Three examples

- Biofortification
- Homestead food production programs
- Nutrition-sensitive value chains

# Biofortification for Improved Nutrition



# OFSP in Mozambique and Uganda (HarvestPlus)

## ➤ Intervention:

- Seed systems (dissemination of vines, farmers' training)
- Demand creation (nutrition education)
- Marketing and product development

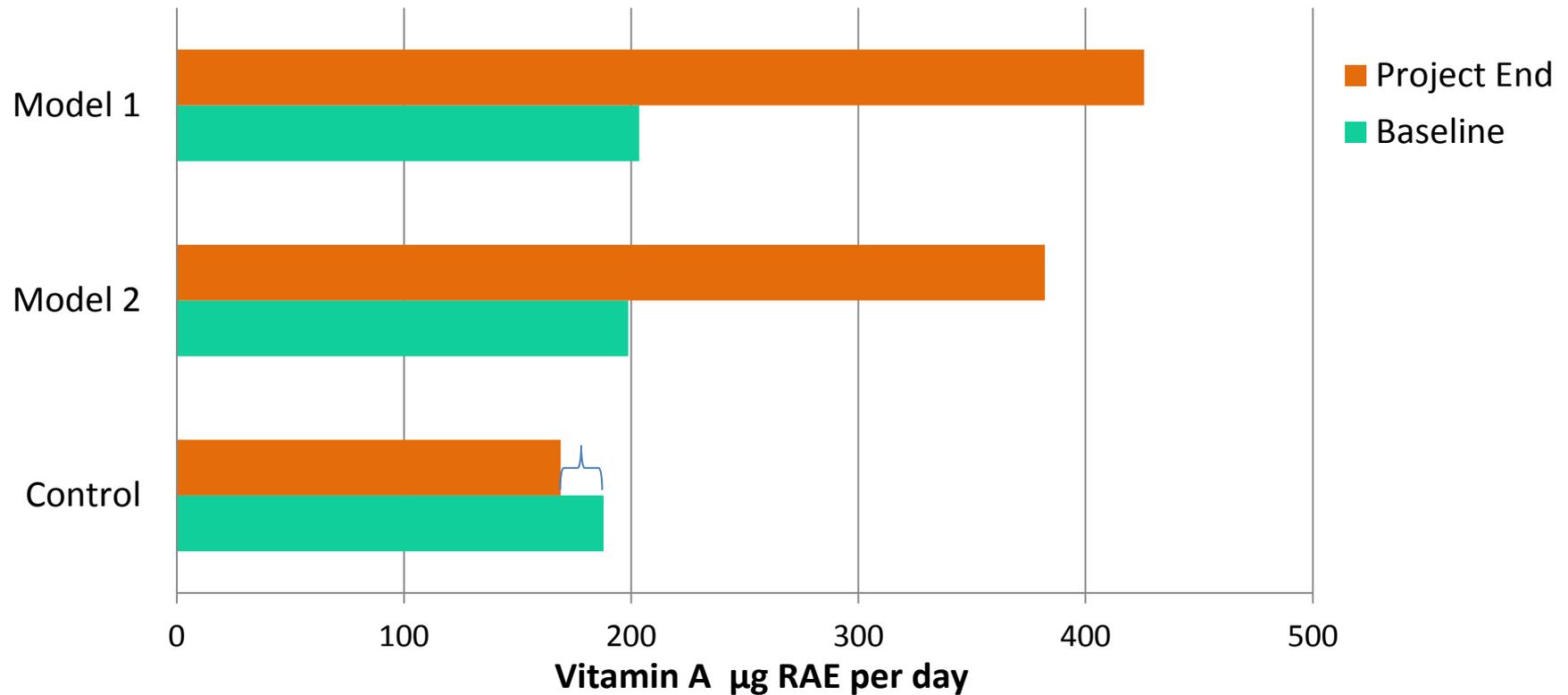


## ➤ Reached:

- 14,000 hh (Mozambique)
- 10,000 hh (Uganda)

# Vitamin A intake doubled

Children 6-35 months in Mozambique



# Nutrition-Sensitive Value Chains



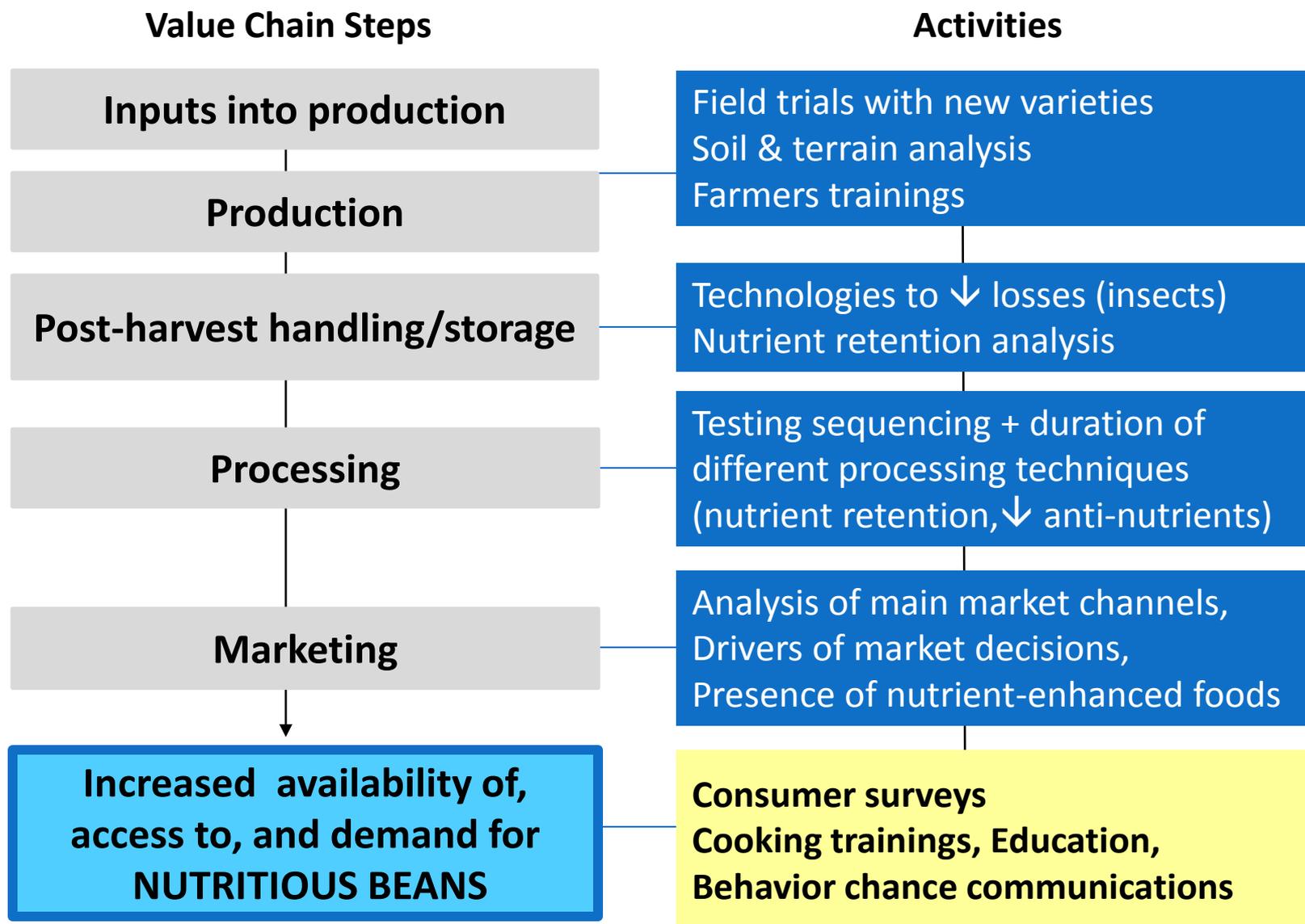
Photo: Andrew Westby

# Bean value chains in Uganda and Rwanda

## 4 objectives:

- Improve yields and quality of harvested beans
- Enhance nutritional value and appeal through appropriate post-harvest handling + processing
- Increase market access
- Increase demand and consumption

# A nutrition-sensitive value chain for beans (Uganda)





## Homestead Food Production to Improve Nutrition



Photo: One Acre Fund

# HKI's Homestead food production in Bangladesh

*Integrating agriculture and nutrition at household and community level*



- Program:**
- Production-focused: micronutrient-rich vegetables, small livestock production
  - Nutrition education to promote consumption
  - Focus on women: income generation, empowerment
  - Nutrition objective: Improve diet diversity, micronutrient intake
- Impact:**
- Tripled vegetable production; increased income
  - 73% of gardens managed by women
  - Improved food security for 5 million people