

# Food Security and Human Development Outcomes

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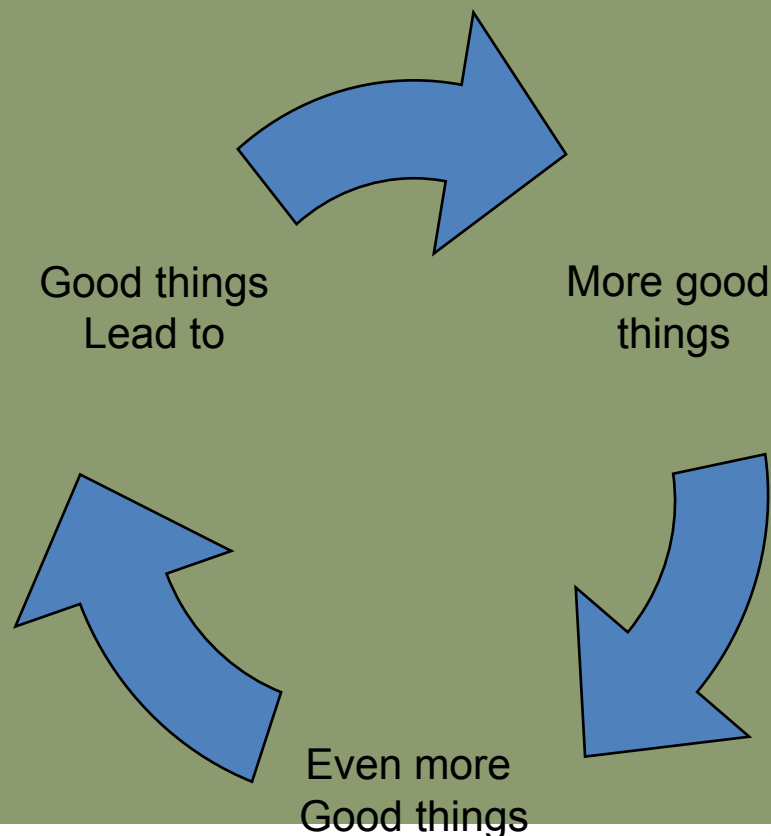
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# The Dream

When development economists dream, they dream of virtuous cycles. Cycles that generate future prosperity forever without outside help, but are just waiting for a small push



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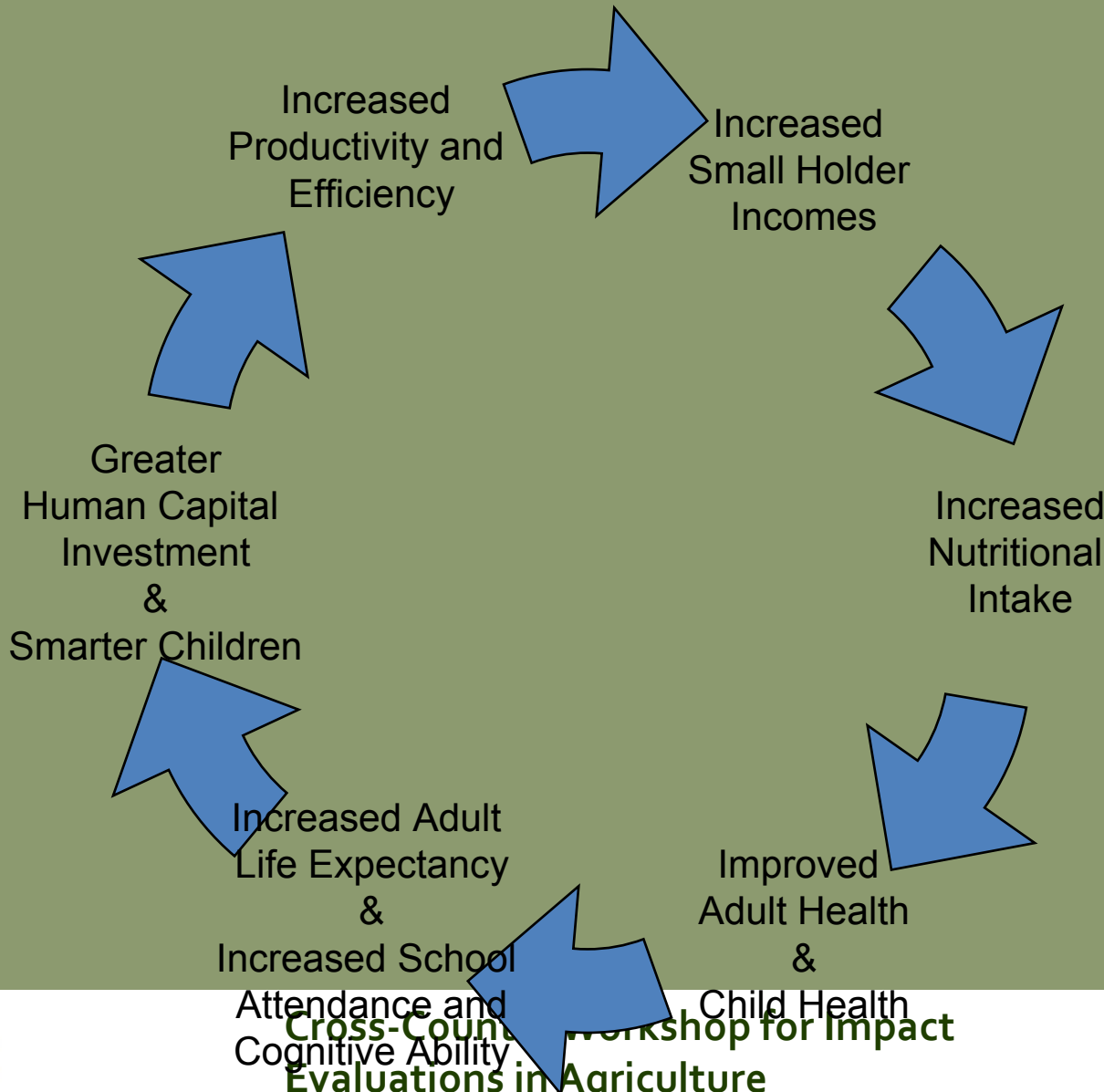


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# All of these things are possible, and have been documented

- Increased nutritional intake improves health at all levels below mildly malnourished
- Nutritional intake during the first two years of life can improve:
  - Cognitive ability
  - Future Stature (height)
  - Health

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# More evidence

- Guatemalans who received nutritional supplements before they were three grew up to be taller, earn higher wages, had higher levels of education and better cognitive ability.

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# Evidence on Micro Nutrients is Astounding

- Targeted micro nutrients (iron, vitamin A, etc) appear to almost transform adult livelihoods even in middle income countries such as Indonesia.
- But of course they have to be targeted.

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# Increased food intake is aided by

- Increased aggregate availability of calories and protein (total production, not just household)
- Increased household incomes to purchase calories
- Improved diet and dietary habits

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# But, it can also fail

- Imagine increasing corn yields in a village:
  - Fathers control all income
  - Corn is polished before being consumed
  - Sources of other important nutrients are few
  - There are no schools, or no teachers
  - There are no health facilities
- You will still see very poor human capital investment, despite improvements in yields

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# The great thing about Agriculture

Is that it increases incomes and aggregate food availability at the same time.

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# Human Development Outcomes are by design, not happenstance

- Does the intervention:
  - Change crops? → better nutrition content, more income or both?
  - Change recipient of cash income? → women often invest in human capital more than men
  - Reduce variability of output or just the level? → Children are most vulnerable to variable nutritional intake

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# Does the intervention take place in a context where human development is possible?

- Are there schools for the children to attend?
- Are there teachers in these schools?
- Do they teach anything that children would want to learn? Do they increase the future earning potential of all students?

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- Are there health facilities? Good nutrition cannot save a woman from dying in childbirth, and when women face a high likelihood of death, their parents will not invest in their human capital.
- Nutrition improves health, and greatly improves survival, but it is not a substitute for health care.

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# 1 in 20 outcomes are positive

- If you compare two groups and look at 20 different outcomes,
  - one group will experience statistically better outcomes than the other group for at least one outcome...
  - even if you have no implementation.
- So you have to expect an outcome from your design, not just hope for it after the program.

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# OK, we have good design now, how do we measure these outcomes?

- What do we expect?
  - Adult or Child Gains?

Remember gains can only come when people are undernourished. If I eat more food, it will not make me more productive.

- Short term or Long term?

Are we reducing vulnerability or improving cognitive ability?

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# Vulnerability

- Vulnerability Indices, such as Household Food Insecurity Access Scale for Measurement of Food Access
  - For example: “How many days out of the last month did you [your children] go without adequate food?”
  - Generate a score [0-21] for food insecurity based on questions like these
  - Potentially sensitive to small changes

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# Issues

- Survey data collection can bias results:
  - If one group is “treatment” and the other is “control” then you should expect treatment to give different answers/ see the questions in a different light.
  - Has to be done during the vulnerable season and at the same point in the vulnerable season every year (which may not be the same calendar day)

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- Other similar measures are more robust, but of course are less sensitive to small changes, so are less likely to show a positive result even if there was a gain.
- These measures should work over a large enough sample, if vulnerability was an issue before the intervention.

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# Consumption Surveys

- Measuring calories consumed:
  - These are very intensive instruments, expensive to collect and require a very qualified survey team.
  - Very difficult to assign calories to individual family members
  - Act of collecting data affects outcomes
- Dietary diversity is much easier (i.e. did you eat egg/milk/meat in the last week)



# How about income data?

- This is not adequate to show nutritional or development gains.
- But it is probably the easiest data to collect, and any agricultural intervention project would be collecting this data already.
- Make sure you know total income (net of remittances)

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# Nutritional Outcomes

- For Adults:
  - You cannot change height, only weight
  - Body Mass Index (BMI) is possible, and gains in BMI would mean something,
  - But for below average BMI, there is not much research on what are appropriate levels. I.e. it would be hard to make a clean case that person A is unhealthy, but person B is OK.

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- Children 6 to 19:
  - You should expect to see bigger gains if nutrition is increasing.
  - BMI is informative. It must be translated into z-scores based on reference populations
  - As with adult BMI, this is not well refined or studied.
    - Its harder to say, for example that a gain of 0.5 in a BMIZ from -2 will have X long run impact.

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# Z-score

Z-scores measure how far someone is from “normal” where normal is usually a population in a developed country.

“Normal” is for all people of a given height (weight for height) or age (height for age) or BMI.

This is more sophisticated than just how far below average someone is, but it is a similar idea.

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- Children 6 to 19:
  - Will increase in stature, but not necessarily because of increased nutritional intake.
  - It is hard to attribute gains from one year to the next to any program.
  - There is some evidence for the possibility of catch-up for children who are stunted (short), but the evidence is patchy, so you couldn't prove anything positive from results that look good.

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- Children under 5:
  - Weight for height Z-score is the standard.
  - Well documented and relatively easy to compare across years:
    - I.e. if a child is -1.5 when they are 3 and -1.0 when they are 5 you can sell this as a positive result.
  - But it is not very sensitive to overall caloric intake except at extremely low levels
  - It is sensitive to micro nutrient intake so if you are changing crops or access to diversity, you may be interested.

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- Children under 5:
  - BMI is collected and it is much more sensitive to caloric intake
  - But it isn't clear what gains mean, and the variability is very sensitive to changes in height.
    - I.e. BMI can fall if children gain in stature and it is a good thing, not a bad thing.

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- Children 2 and under:
  - This is where the biggest gains are possible
  - But it is hard to have a panel
  - If your data set is large enough you can compare average WHZ of those under 2 and hope you aren't dealing with increased fertility, survival, etc.

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# Long Run Impact Gold Standard

- Height for Age Z-score.
  - Best gains in outcomes are tied to this score (well documented support for claims of impact)
  - Heavily determined by nutrition in the first two years of life (so it is not very sensitive on average)

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# How do we collect this data?

- You need the following
  - Scales (appropriate for age)
  - Measuring tapes, boards
  - People who know how old they are and how old their kids are.
  - Skilled enumerators
  - Willing participants

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# Or

- Reliable medical records collected for almost all residents (children) at local health facility at reliable intervals.
- You cannot tie this information to individuals (you shouldn't be able to at least!)
- But you can look at village averages if your intervention is at the village level

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# Other outcomes for long term projects

- I would not be confident in any of these results if you had not shown other intermediate results, but if you have those, then these are good:
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- School attendance
- Test scores

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# Conclusion

- The data is not cheap, but neither is it impossible to collect
- Detailed consumption data is unlikely to be worth the cost
- Income is very helpful in showing links between agriculture and outcomes, especially when you are not introducing new nutritious crops that would directly impact health outcomes.

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# Caveats

- Do not collect the data because you hope to have this impact.
- Collect the data when you believe you have a project that is well designed to meet these goals.

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