Agroecology-based alternative food networks may improve Ecuadorian farmers' diets while promoting food sovereignty and ecological regeneration

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Thanks!

- ★ Participants
- ★ M. Batal & G. Mercille
- ★ Ekomer team & Transnut
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transnut

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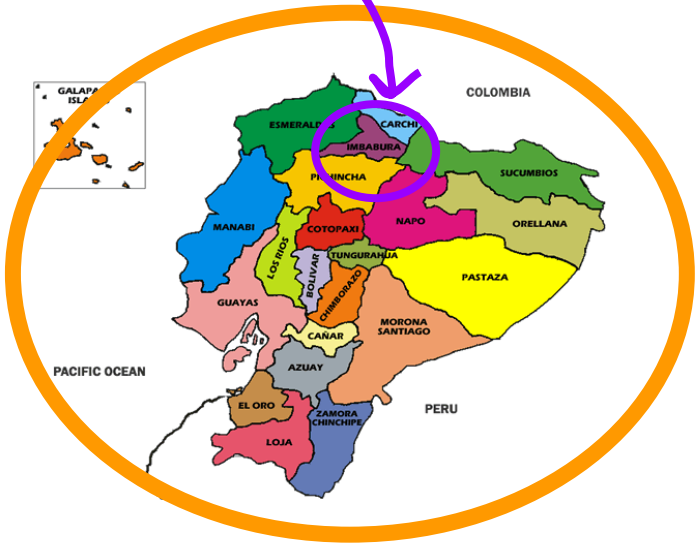
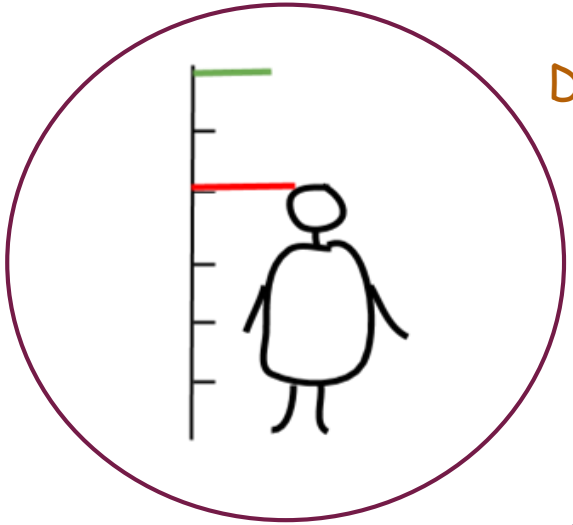
Ecuador

Imbabura Province



Rural Imbabura communities - poverty level: up to 99.8%

Sustainable food faces multiple challenges

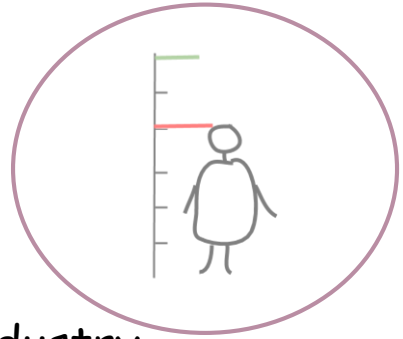


Double burden of malnutrition

35% of children <5 stunted
62% of adults overweight or obese

Freire et al 2014

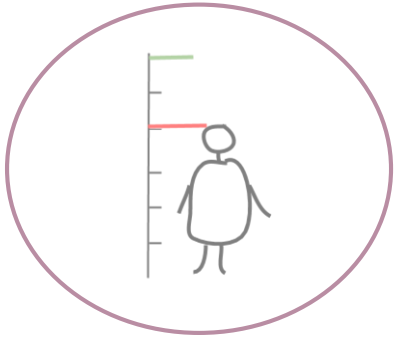
Agricultural industrialization



Environmental degradation
Exorbitant pesticide poisoning
Economic dependence on agro-industry

Sherwood 2009

Changing food markets

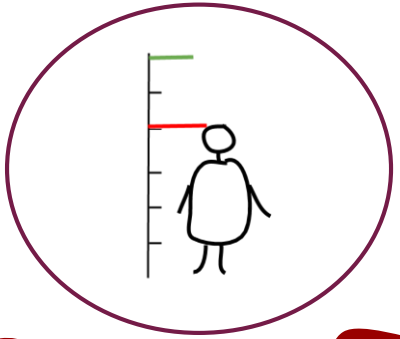


Gap between consumers and producers

Un-fair trade, undignified relationships

Sherwood et al. 2013

Double burden of malnutrition



Agricultural industrialization

Changing food markets

Farmers adopt agroecology in response

Agroecology

Sustainable agriculture

Organic, based on increased biodiversity
Combine ecological and ancestral knowledge
Long-term productivity increase independent of external inputs

Frison and IPES-Food 2016

Agroecology

Alternative food networks

Directly from producer to consumer
Fair, dignified trade
Healthy, organic products

Sherwood et al. 2013; Sherwood et al. 2018

Agroecology's impact on nutrition is unknown

Nutrition outcomes?

Sustainable agriculture

Alternative food networks

Key Informant Interviews

Ethnographic homestays

Cross-sectional study

Focus group discussions

Cross-sectional survey

Cross-sectional survey

comparing

production
diet
socioeconomics

Cross-sectional survey

comparing

production
diet
socioeconomics

between

Agroecological farmers

n=60

Conventional farmers

n=30

Cross-sectional survey

comparing

production
diet
socioeconomics

between

Agroecological farmers

Conventional farmers

Cross-sectional survey

comparing

production
diet
socioeconomics

24 hour recall

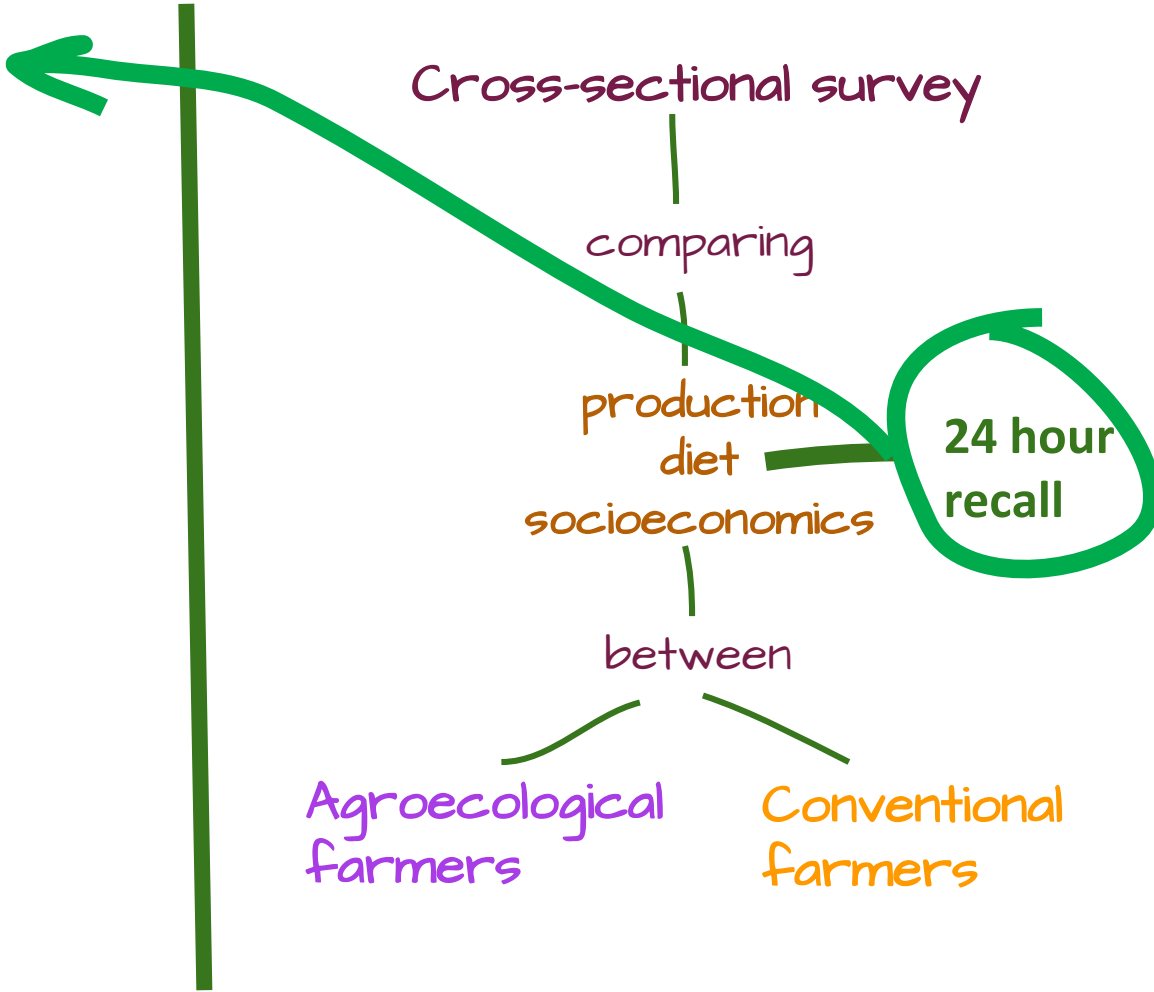
between

Agroecological farmers

Conventional farmers

Dietary Diversity Index

- Based on 10 food groups, for a total score of 10.
- Associated with micronutrient sufficiency



FAO & FHI 2016

Dietary Diversity Index

For each product, we asked for the **quantity** used, and **where** they got it

Cross-sectional survey

comparing

production
diet
socioeconomics

24 hour recall

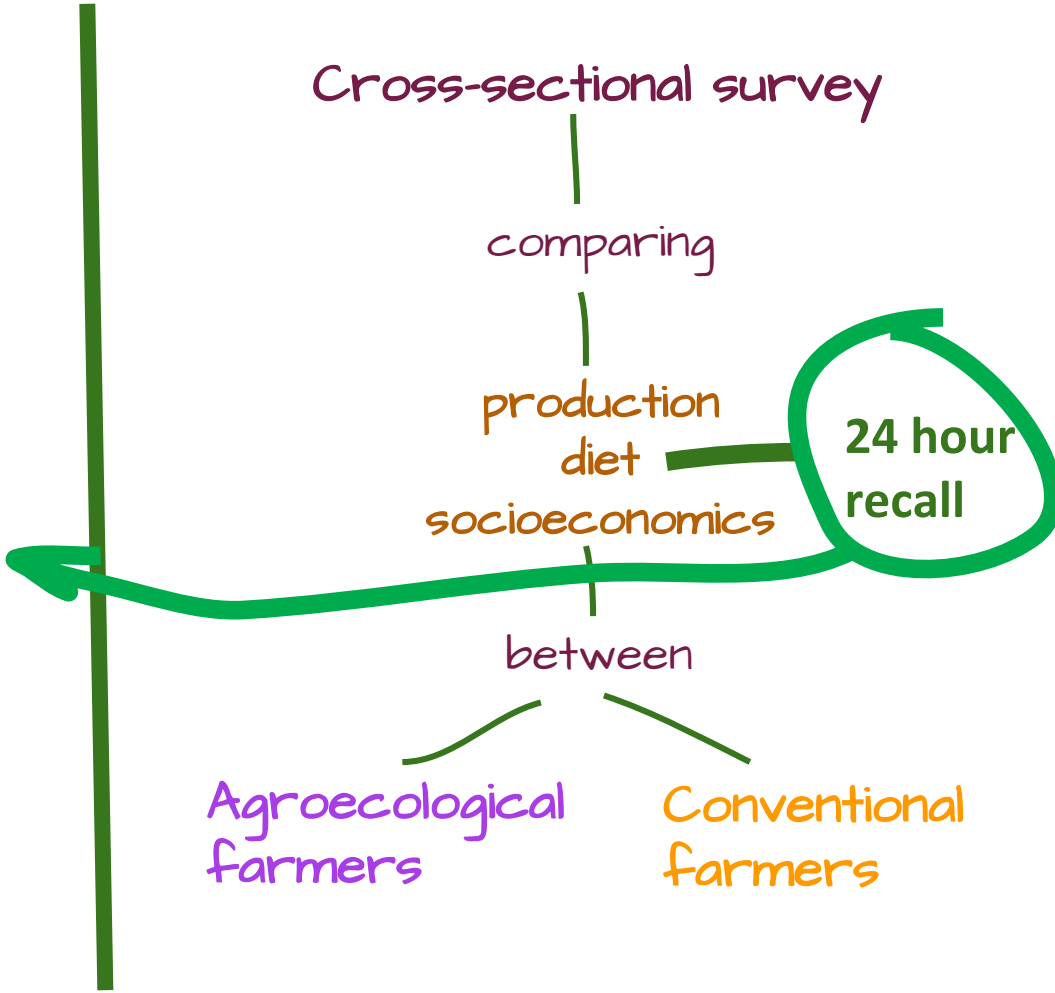
between

Agroecological farmers

Conventional farmers

Proportion of calories & nutrients by food source

- **Harvest**
- **Social economy** (direct purchase from other farmers, barter)
- **Market Purchase**



Key Findings

Nutrition outcomes

Sustainable agriculture

Alternative food networks

Sustainable agriculture

Production diversity of edible, caloric products:

Agroecological: 39 +

Conventional: 25 −

Average agroecology participation : 4 years

Farmers report:

+ fair, dignified trade
+ friendship
+ sharing of knowledge
+ barter of products and seeds

= food sovereignty

Alternative food networks

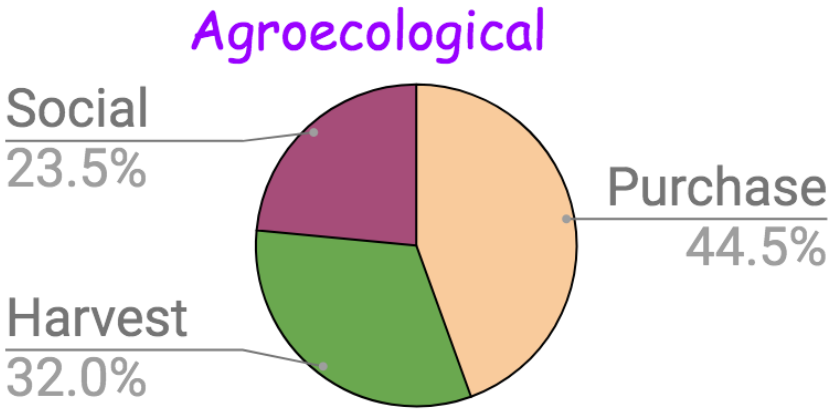
Nutrition outcomes

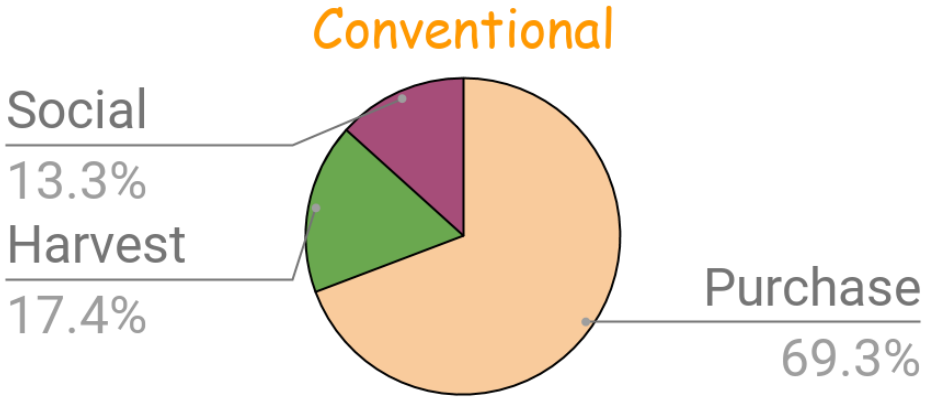
Dietary diversity index, mean scores:

Agroecological: 5.9 (+)

Conventional: 4.8 (−)

Where farmers get their calories

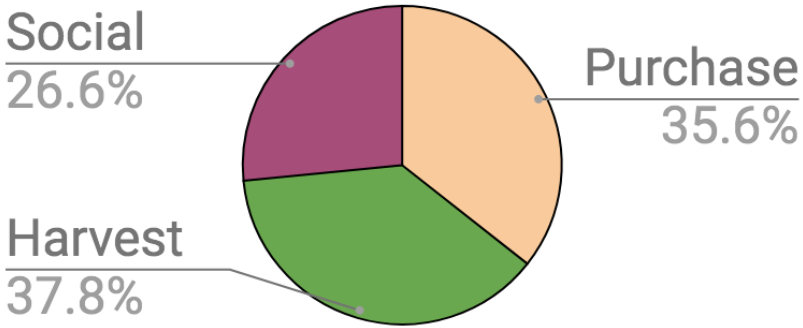




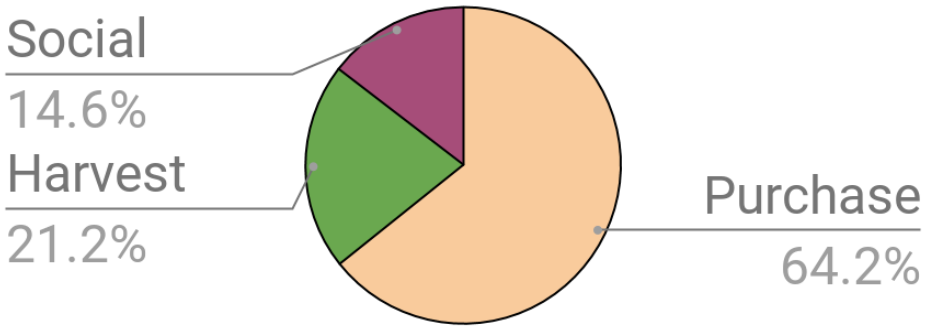
"Social economy": direct purchase from other farmers, barter, gifting

Where farmers get their micronutrients

Agroecological



Conventional

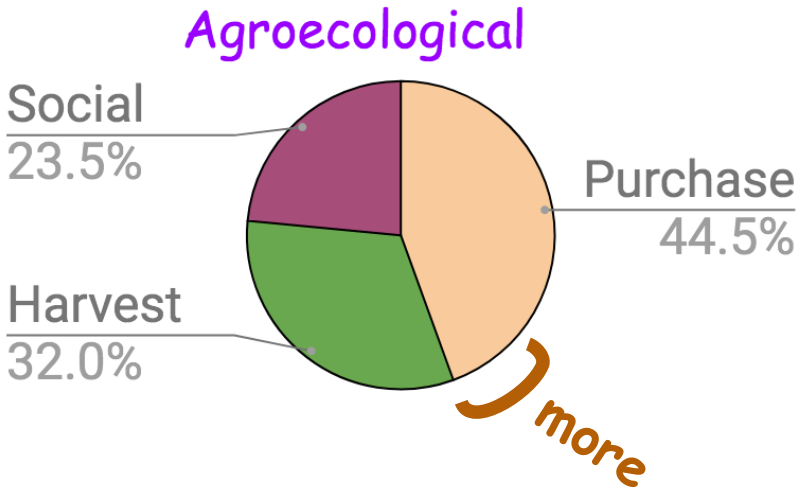


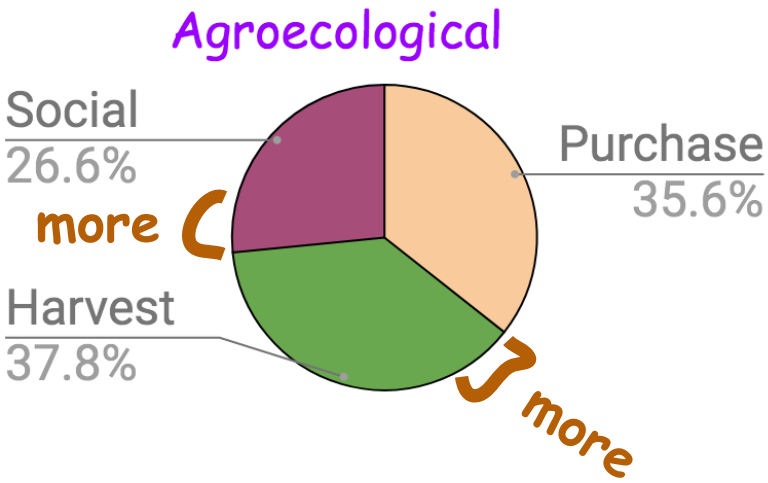
Average of sources for nutrients: Vit A, Vit C, Ca, Fe, Zn, Thiamin, Riboflavin, Niacin, Folate

Calories

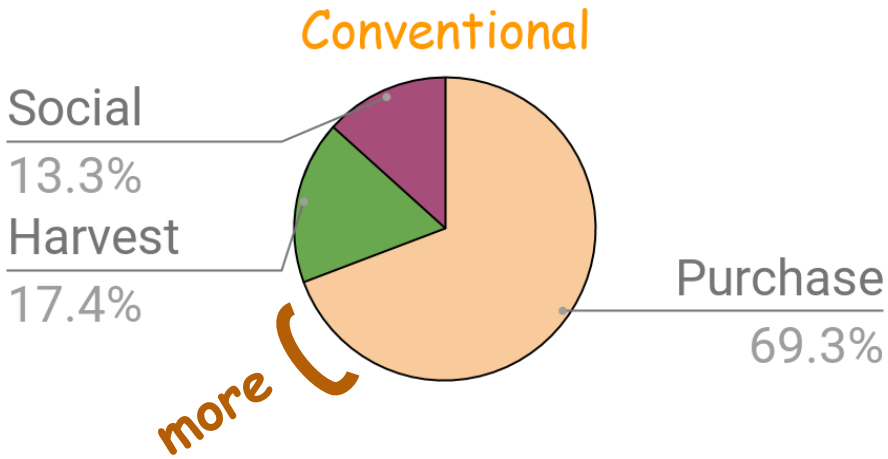
VS.

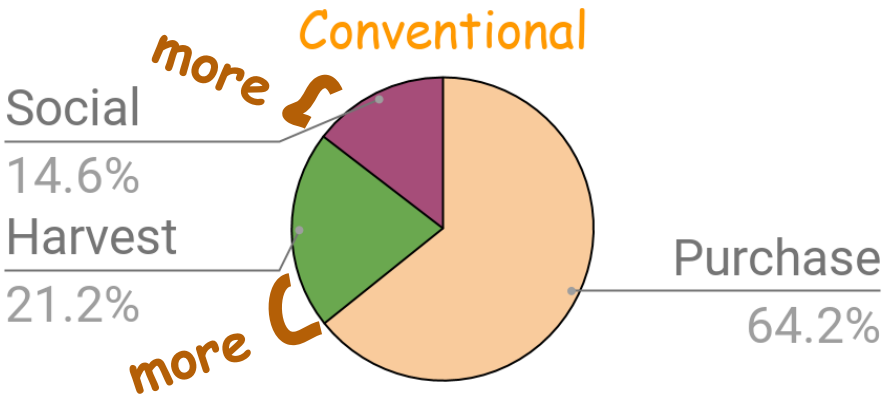
Micronutrients





Calories VS. Micronutrients





Consumption from own harvest is positively associated with higher fiber, calcium, iron, thiamin, and possibly zinc intakes.

Agroecological farmers have...

- ⊕ Production diversity
- ⊕ Dietary diversity, micronutrients
- ⊕ Food from own harvest
- ⊕ Food from the social economy

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- ⊕ Dietary diversity, micronutrients
- ⊕ Food from own harvest
- ⊕ Food from the social economy

Are agroecological farmers better off because of underlying socioeconomic reasons?

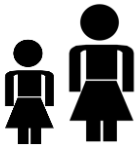
Socioeconomics: No differences between the two groups on any socioeconomic indicator

Education

Income

Market distance

Age



Household size

Are agroecological farmers better off because of underlying socioeconomic reasons?

So, do agroecological farmers have more diverse diets because they eat more from their own production?

?

So, do agroecological farmers have more diverse diets because they eat more from their own production?

A little bit.

But controlling for production factors, just being "agroecological" has the biggest impact on diet.

It appears that something else is also going on.

That "something else" relates to the social-educational environment surrounding agroecological markets.

And the direction of causality??

"Before agroecology, I grew maybe 4 or 5 products. Now I think I have more like 45."

-Paula

"I've changed [my diet].... with the agroecological market, I eat organic, I eat salads, vegetables, fruit. This is where I learned to eat healthy."

-María

Agroecology-based alternative food networks improve Ecuadorian farmers' diets while promoting food sovereignty and ecological regeneration

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For more info, read:

Deaconu, A., Mercille, G. and Batal, M., 2019.

The Agroecological Farmer's Pathways from Agriculture to Nutrition: A Practice-Based Case from Ecuador's Highlands.

Ecology of food and nutrition. Vol. 58(2): 142-165.

References:

Freire, W., Ramírez-Luzuriaga, M., & Belmont, P. (2014). Tomo I: Encuesta Nacional de Salud y Nutrición de la población ecuatoriana de cero a 59 años, ENSANUT-ECU 2012.

Frison, E. A., and IPES-Food. 2016. From uniformity to diversity: A paradigm shift from industrial agriculture to diversified agroecological systems.

Goodman, D., DuPuis, E. M., & Goodman, M. K. (2012). *Alternative food networks: Knowledge, practice, and politics*. Routledge.

Popkin, B. M., & Reardon, T. (2018). Obesity and the food system transformation in Latin America. *Obesity Reviews*, *19*(8), 1028-1064.

Sherwood, S. G. (2009). *Learning from Carchi: agricultural modernisation and the production of decline*.

Sherwood, S., Arce, A., Berti, P., Borja, R., Oyarzun, P., & Bekkering, E. (2013). Tackling the new materialities: Modern food and counter-movements in Ecuador. *Food Policy*, *41*, 1-10.

Sherwood, S. G., Arce, A., & Paredes, M. (2018). Affective Labor's ‘unruly edge’: The pagus of Carcelen's Solidarity & Agroecology Fair in Ecuador. *Journal of rural studies*, *61*, 302-313.

FAQ:

What Dietary Diversity Index did you use?
Minimum Dietary Diversity for Women (MDDW). Food groups are: (1) Grains, white roots and tubers, plantains. (2) Legumes. (3) Nuts and seeds. (4) Dairy. (5) Meats, including organ meat. (6) Eggs. (7) Green leafy vegetables. (8) Vitamin A rich fruits and vegetables. (9) Other veg. (10) Other fruit. We did not apply the cut-off provided by MDDW because women were not exclusively of reproductive age.

What food groups do agroecological farmers consume more of?
Dairy and fruit (at $P<0.05$). Potentially, they may also consume more legumes, leafy greens and "other vegetables", but the difference is not so pronounced as to produce statistically significant results in this sample size. (P-values are above 0.05, though fairly close).

How did you come up with the concept of social economy?
"Social and solidarity-based economy" is a popular concept among Ecuadorian farmers, Indigenous associations and other networks. It's in part a response to disconnected capitalist economy, and part a restoration of the traditional bartering practices that are still present in the Andes, although declining.

Did you also do nutrient analysis instead of just the dietary diversity index?
Yes. In nutrient analysis, agroecological farmers consistently appear to perform slightly better than conventional farmers, but we only get statistically significant results at $P<0.05$ for Riboflavin. Calcium and zinc come close to being significant.

Is there a positive relationship between higher consumption of own harvest and better nutrient adequacy/dietary diversity?
We tested for this. While the results would lean in this direction, the p-value is not significant. We do, however, get positive results for certain key nutrients.

FAQ continued:

Is it possible that the farmers that chose to adopt agroecology were already different (e.g. more production diversity, more dietary diversity)?
Yes, but we believe this is not the case. Farmers, NGOs and farmer association leadership consistently report a "before" and "after" story relating to agroecology. Specifically, they cite agroecology as having taught them to implement new products into their production as well as their diets.

Does it cost more to eat healthier?
In fact, it costs less. While both agroecological and conventional farmers have the same incomes, on average. Agroecological farmers use 1/4 of their income to buy food, whereas conventional farmers use 1/3.

What kind of social-educational processes are going on in agroecological farmers markets?
Market leadership regularly organize workshops to learn about nutrition, gastronomy, value-added products (e.g. how to make yogurt), household economics, and production strategy. Further, in farmers markets, there are conversations among farmers, and between farmers and their clients. In these conversations, knowledge is shared.