The Impacts of Aquaculture in the Rural Economy

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Motivation: 3 observations & 3 questions

- Aquaculture is labor-intensive, input-intensive, high value-added, many SMEs in value-chain
  - ⇒ Q1: How can we evaluate the economy-wide impacts of aquaculture, beyond the fish farmers themselves?

- Much debate over land use, in particular conversion of cropland to ponds:
  - ⇒ Q2: Economic impact of aquaculture vs. agriculture?

- Policy has historically favored large fish farms over small:
  - ⇒ Q3: Differences between small vs. large fish farms?

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Outline

- Local Economy-wide Impact Evaluation (LEWIE):
  - What it is and why it can help us (Q1)
- Results from LEWIE modeling:
  - Impacts of aquaculture on the rural economy (Q2, Q3)
- Implications and the way forward

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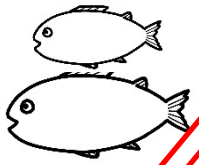
Part 1

LEWIE:
What it is and why it can help us

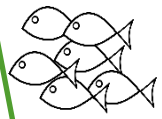


Fish Farmer Household

Non-farm

Market

Retailer



Nursery

Crop Farm

Aquaculture Cluster

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DIRECT IMPACT

Fish Farmer Household

INDIRECT IMPACT (Spillovers)

Non-farm

Market

Retailer

Nursery

Crop Farm

Aquaculture Cluster

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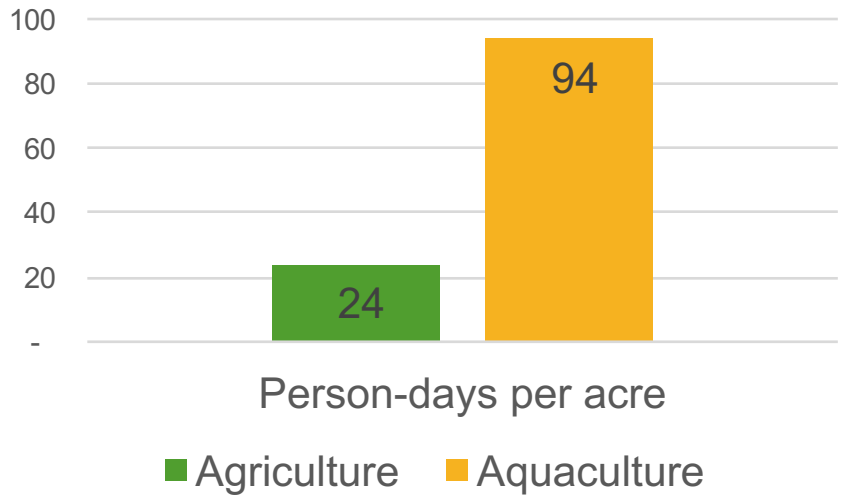
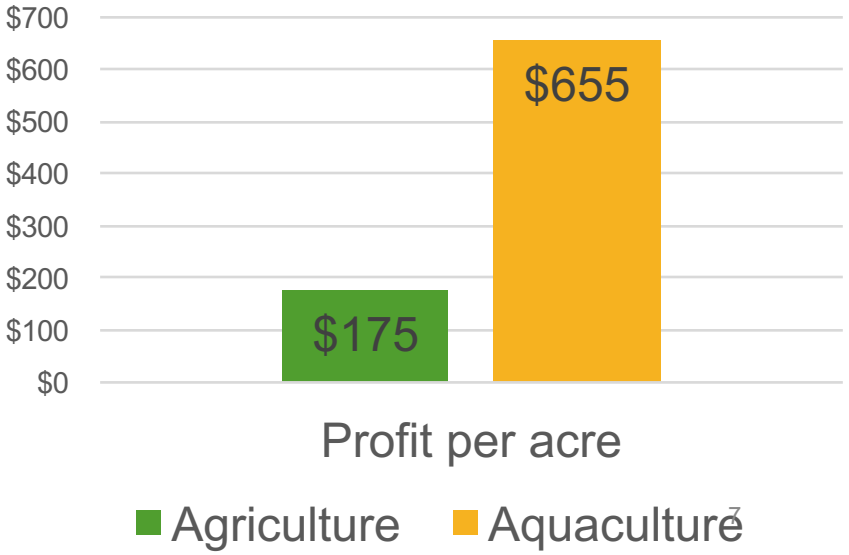
Indirect impacts can be large, particularly in aquaculture

- Aquaculture requires more labor, inputs, transport than crop farming
  => Backward and forward linkages may be large

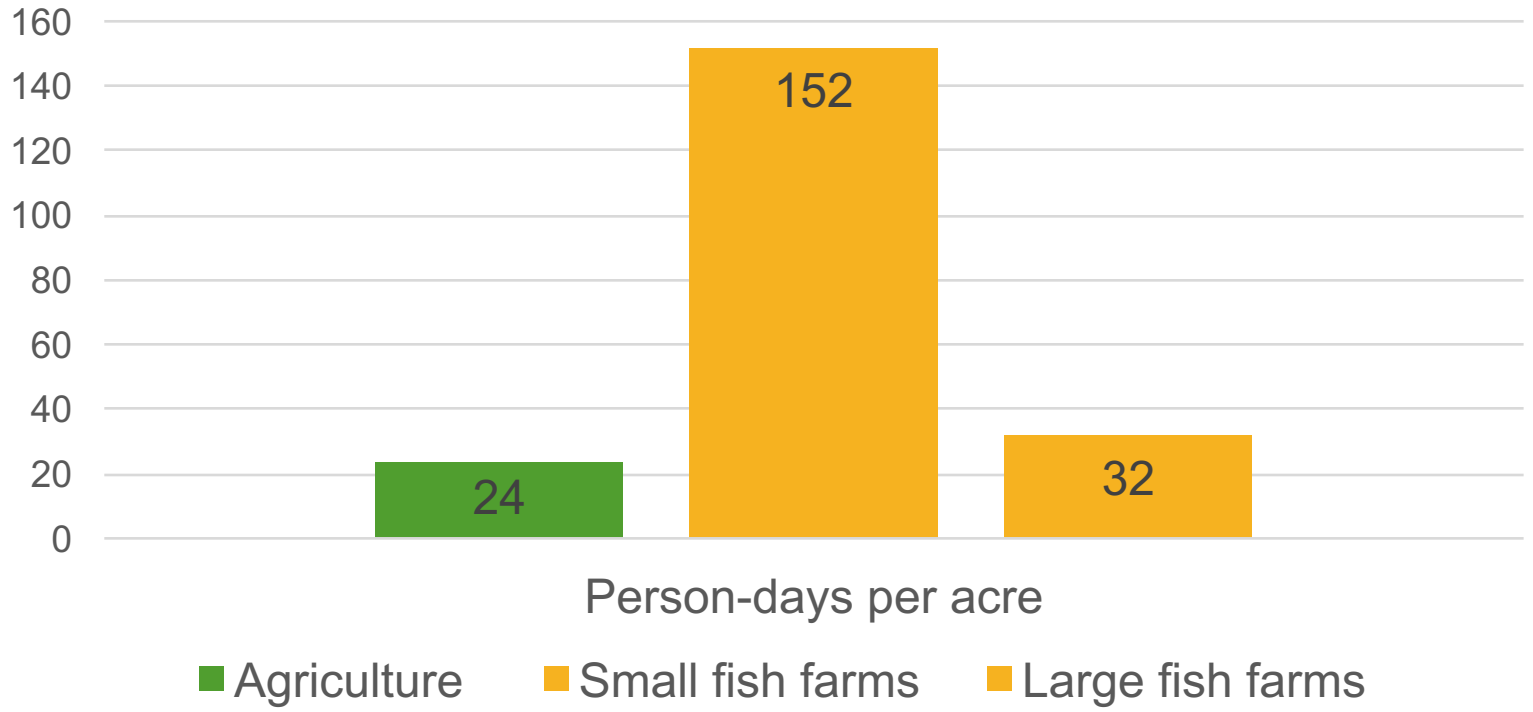


- Aquaculture generates higher incomes than crop farming
  => Spillovers through consumption may be large



Production technology matters

- Small fish farms are much more labor-intensive than large farms
- Large fish farms rely more on outside inputs and machinery



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LEWIE models the local economy

- Local Economy-wide Impact Evaluation
  - Understand linkages between actors in an economy
  - Quantify them using household data
  - Represent them with a set of equations (model)

- Use for simulations
  - Change one parameter, and see how the model reacts
  - Gives us insight into how that economy functions
  - Allows us to quantify the “full” impacts of an activity (Q1)
  - Allows us to make comparisons (Q2, Q3)

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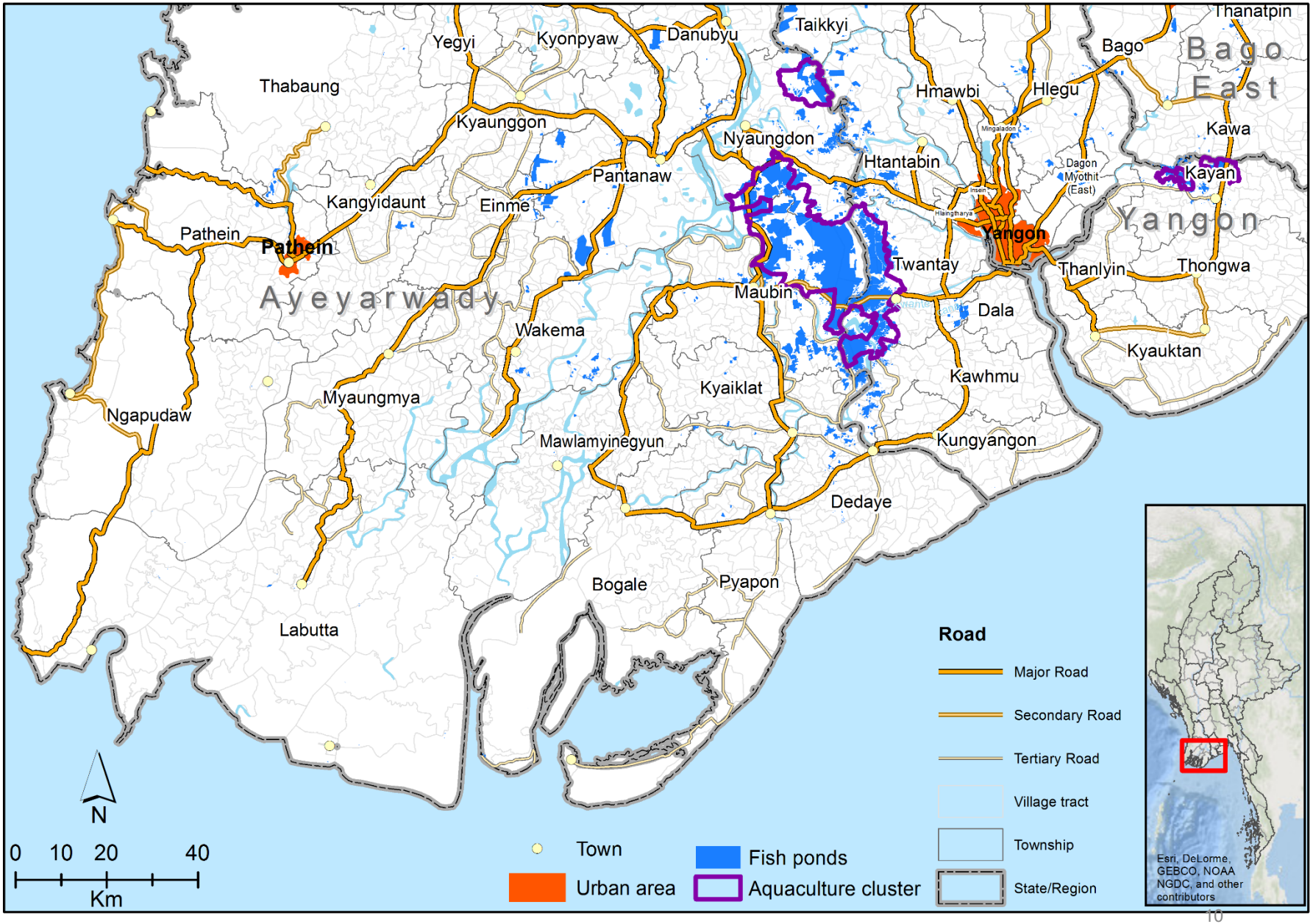
Modeled Cluster



Modelling the impacts of aquaculture on the rural economy

- Used data on all the economic activities of all households in aquaculture 'cluster'.
- Model comprised of 5 types of households: Small fish farm, Large fish farm; Fish nursery; Crop farm, Non-farm
- Households engage in fish production, fish seed production, crop production, other production, services, or trade and retail
- Activities require: land, labor, capital and inputs
- Households trade amongst themselves or outside the cluster

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Five simulations

- What type of activity creates the highest spillovers, on a per-acre basis?
- Simulations 1,2,3: Hypothetical unused acre ("new")
- Simulations 4,5: Convert one acre

sim1	sim2	sim3	sim4	sim5
Increase small fish farm area by 1 acre	Increase large fish farm area by 1 acre	Increase crop farmer area by 1 acre	Small fish farmer converts 1 own acre crop -> fish	Large fish farmer converts 1 own acre crop -> fish

- Assume that:
  - Farmers are able to purchase inputs they want
  - Production conditions same as in data (floods, market prices, etc.)

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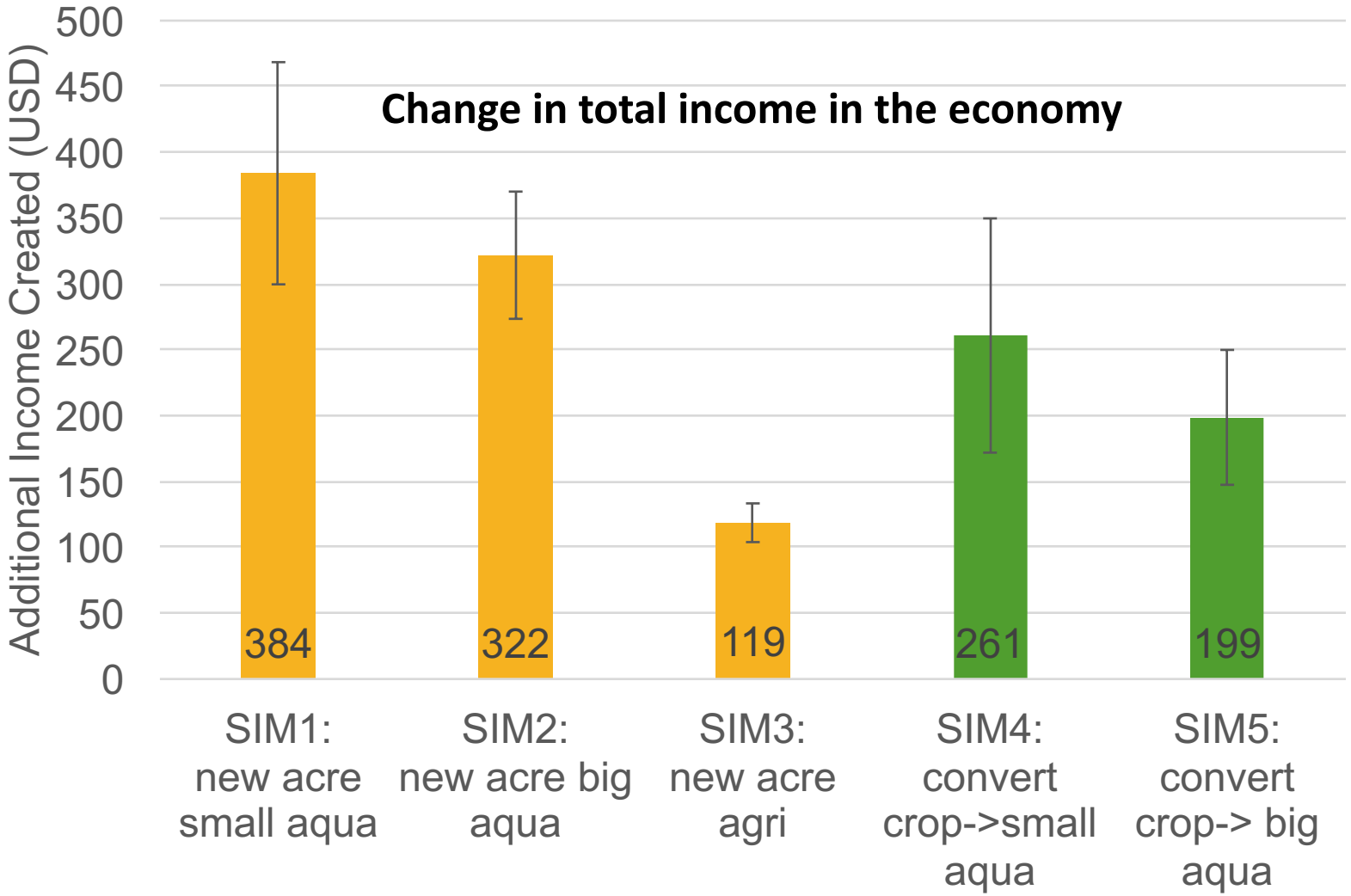
Part 2

LEWIE Modeling Results:
Impacts of aquaculture in the rural economy

Fish creates larger total income per acre



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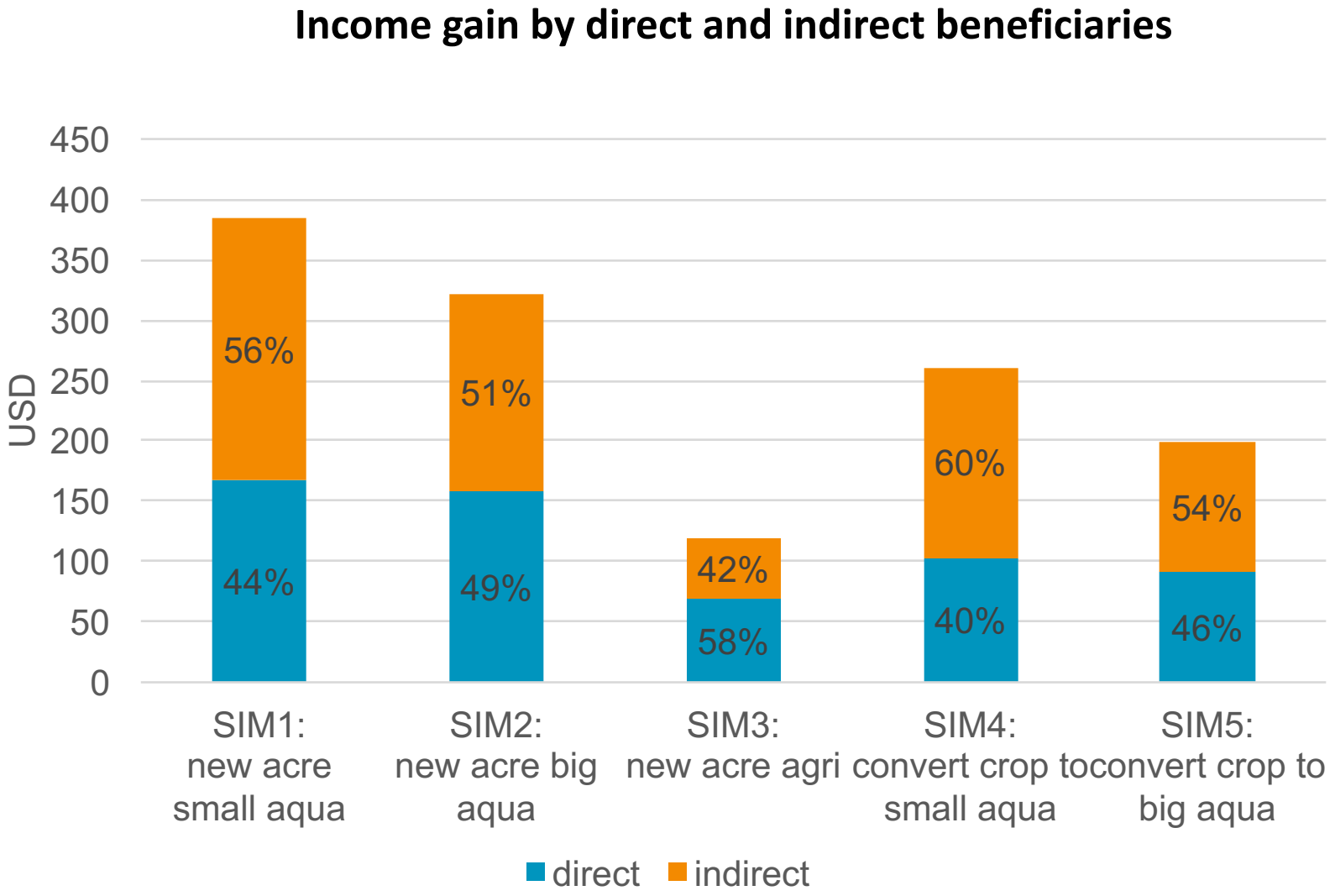
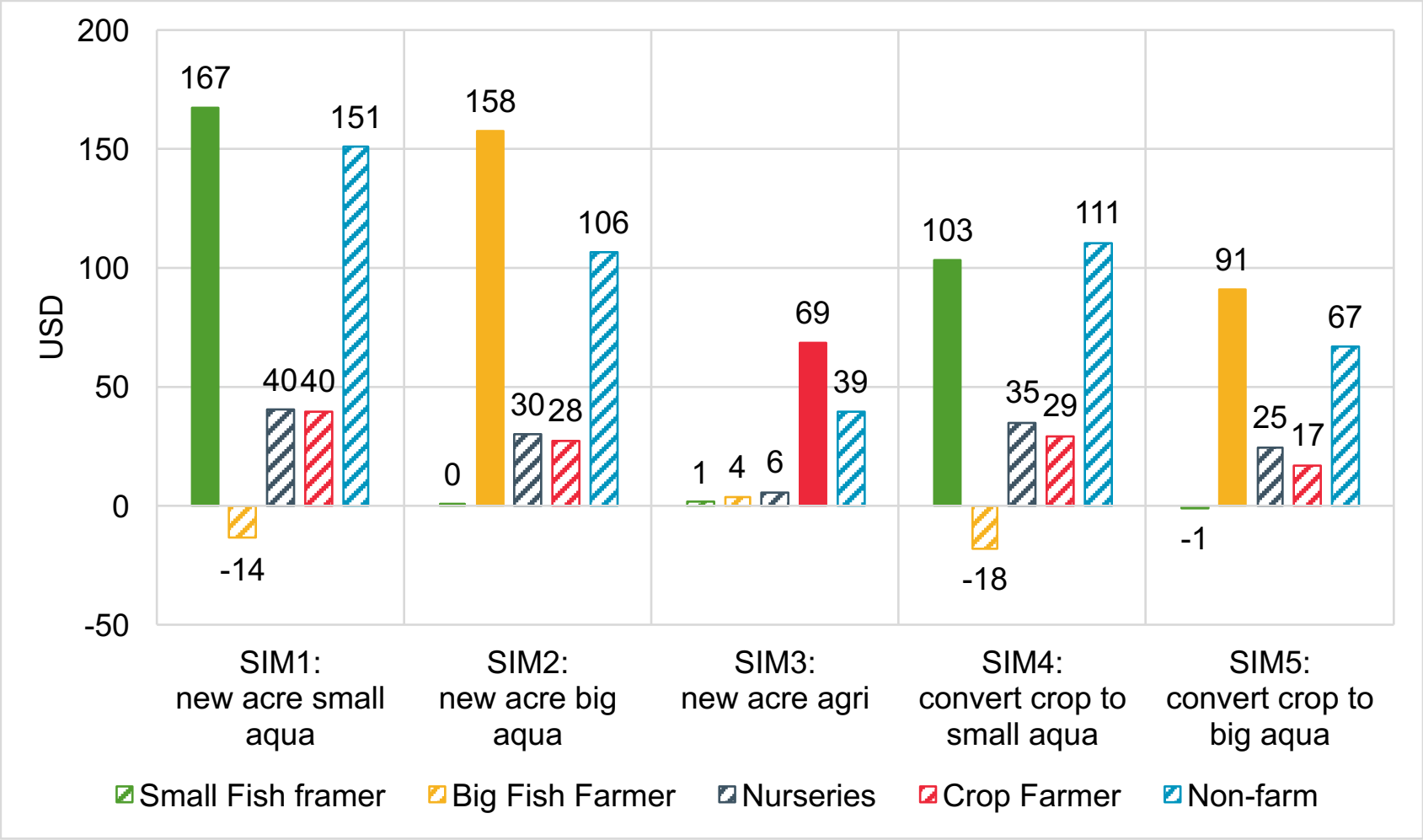
Fish farms create larger indirect income effects

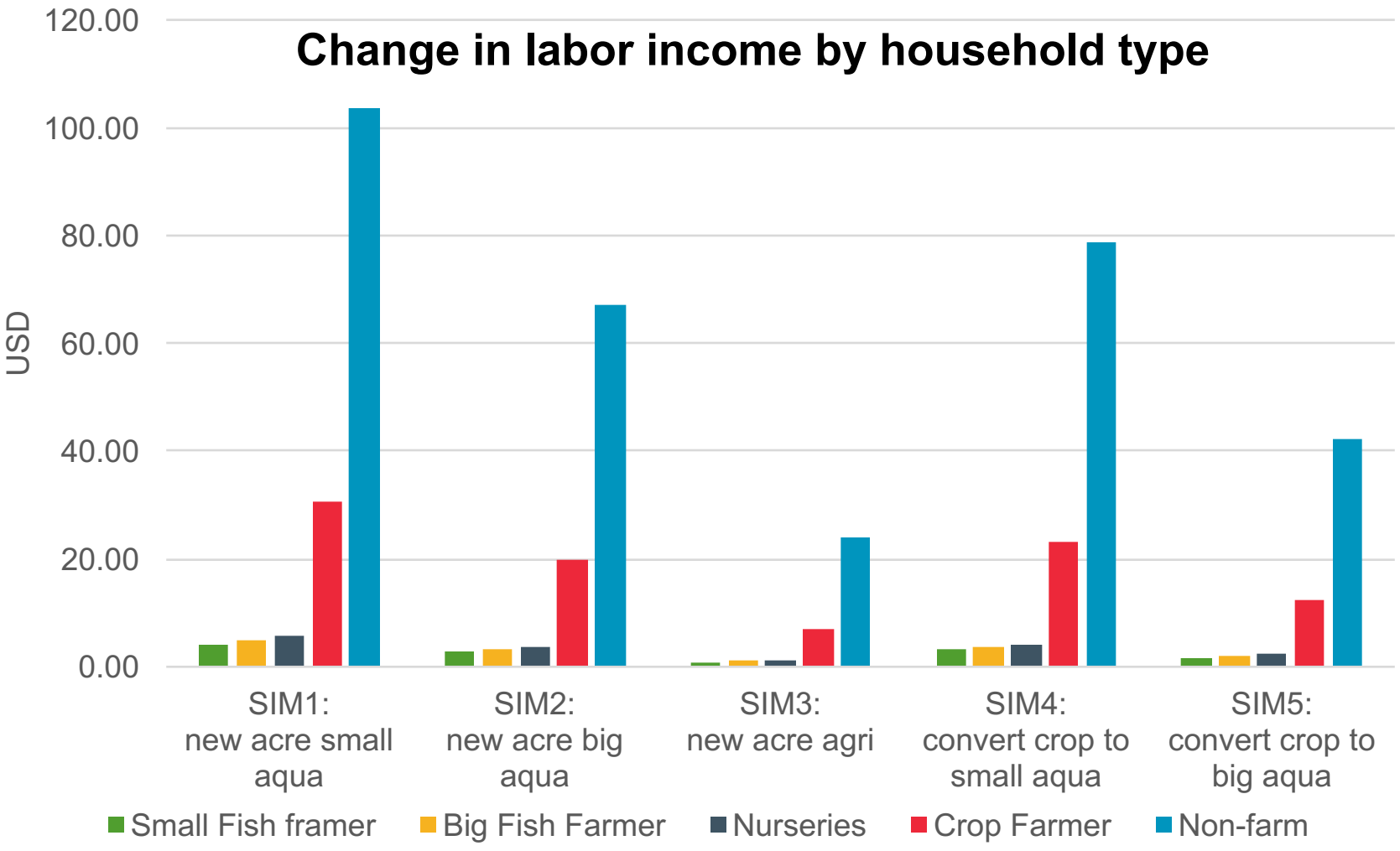


Distribution of income effects

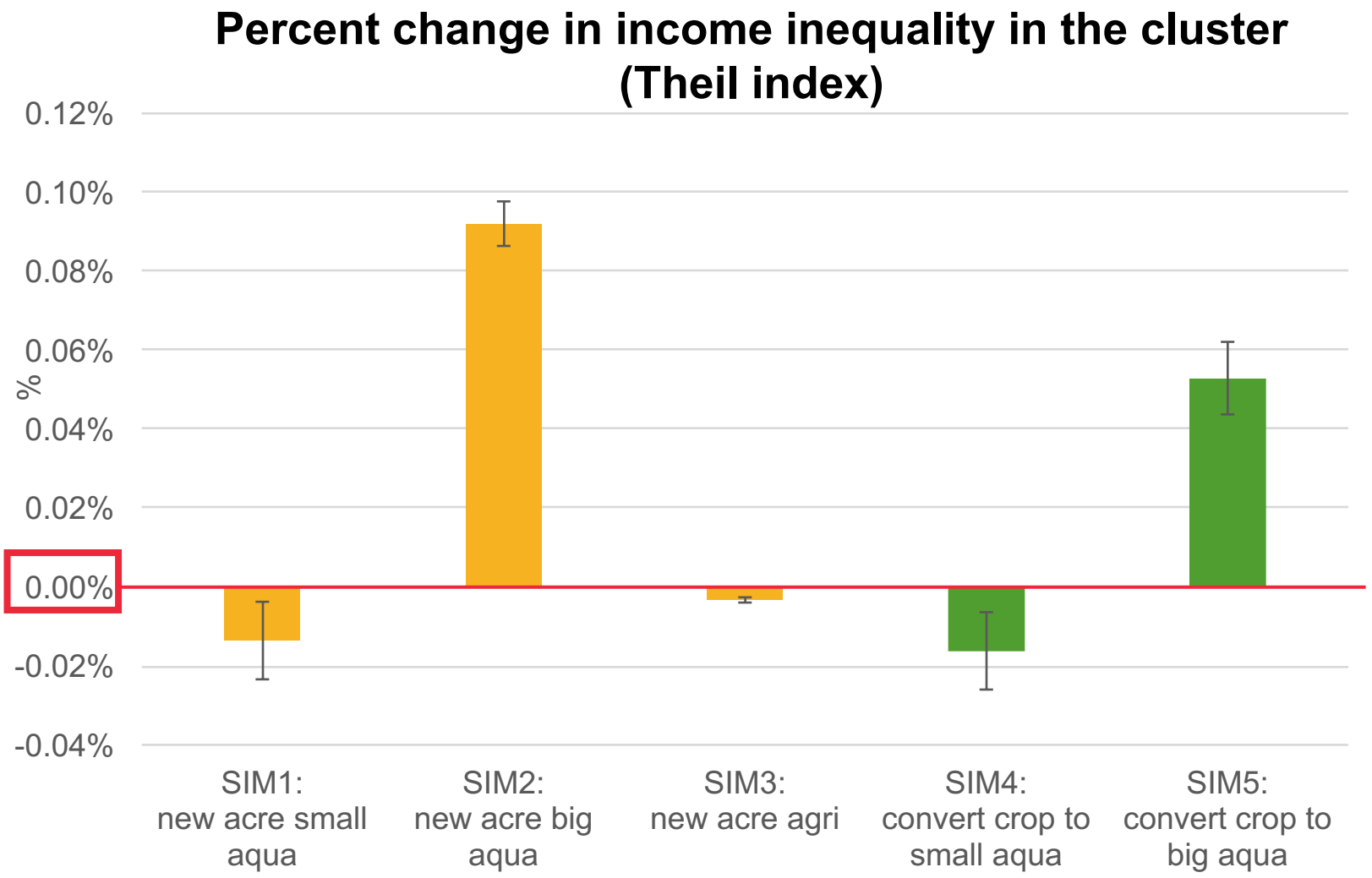


Income effects in simulations, by type of household

Labor spillovers mostly accrue to non-farm households



Simulations targeting small fish farms reduce inequality



Implications
and
The Way Forward

Take home points

- We can use LEWIE model to evaluate full impacts of aquaculture on the cluster economy (Q1)

- Aquaculture vs. Agriculture (Q2)
  - Fish farming creates higher profits per acre for farmer
  - Fish farming creates higher spillover incomes in the cluster (about half of value added goes to indirect beneficiaries)
  - This reflects backward and forward linkages

- Small fish farms vs Large fish farms (Q3):
  - Small farms create larger spillovers
  - Enabling small farms helps reduce income inequality

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The way forward

Future pathway options for Myanmar development

- Facilitate smallholder inclusion in aquaculture
  - Ease restrictions on agricultural land use
  - Facilitate access to credit
- What is the best use of reclaimed land?
- Beyond aquaculture, LEWIE tool applicable to other contexts where economy-wide lens is needed

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