


A new farm-size specific and crop-specific map covering 56 countries

Water, soil, crop, and farm size

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Abstract

This presentation participates in OSPP
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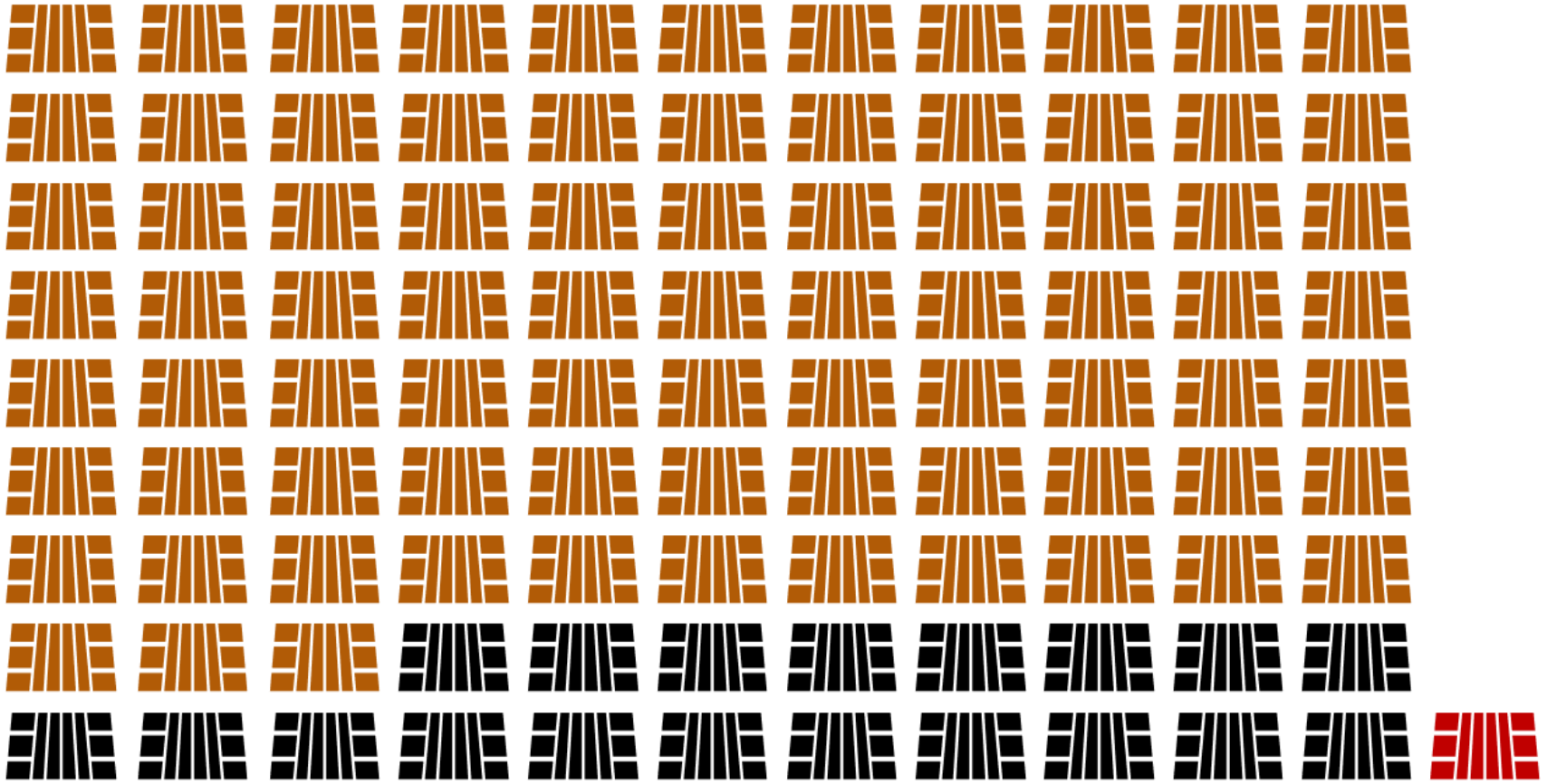
608 million farms around the world are significantly different

- 80% of farms < 2 hectares
- The largest 1% of farms utilize 70% of global farmland area*



* Farmland area include cropland, also any land used for agricultural activities

Goal: mapping the gridded farm sizes

Abstract

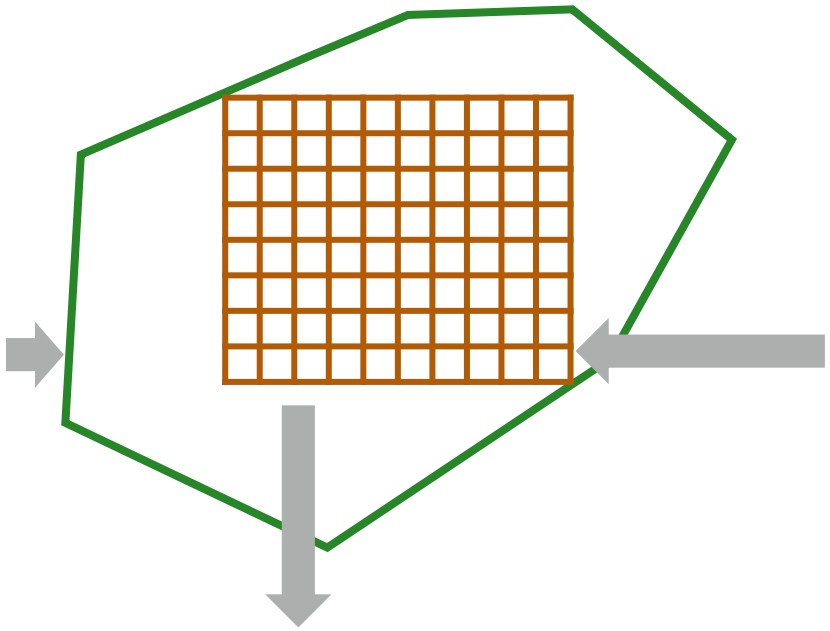
- Where are they?
- Which crops do they plant?
- How much land?
- What kind of farming systems?

Downscale direct measurements on crop and farm size at (sub)national level

Use the grid level data on crop location and dominant field size

Farm size structure

- Farm-size specific
- Crop specific
- Not gridded, only for administrative units



Crop map

- Not farm-size specific
- Crop specific
- Gridded
- With farming systems

Dominant field size map

- Not farm-size specific, but field-size specific
- Not crop specific
- Gridded

To maximize the consistencies with grid level to downscale the national level farm size specific data (see the online paper for details)

Map coverage and dimensions

Abstract

- Coverage

✓2010

✓56 countries (half global crop land)

✓5 arcmin (~10 km)

- Dimensions

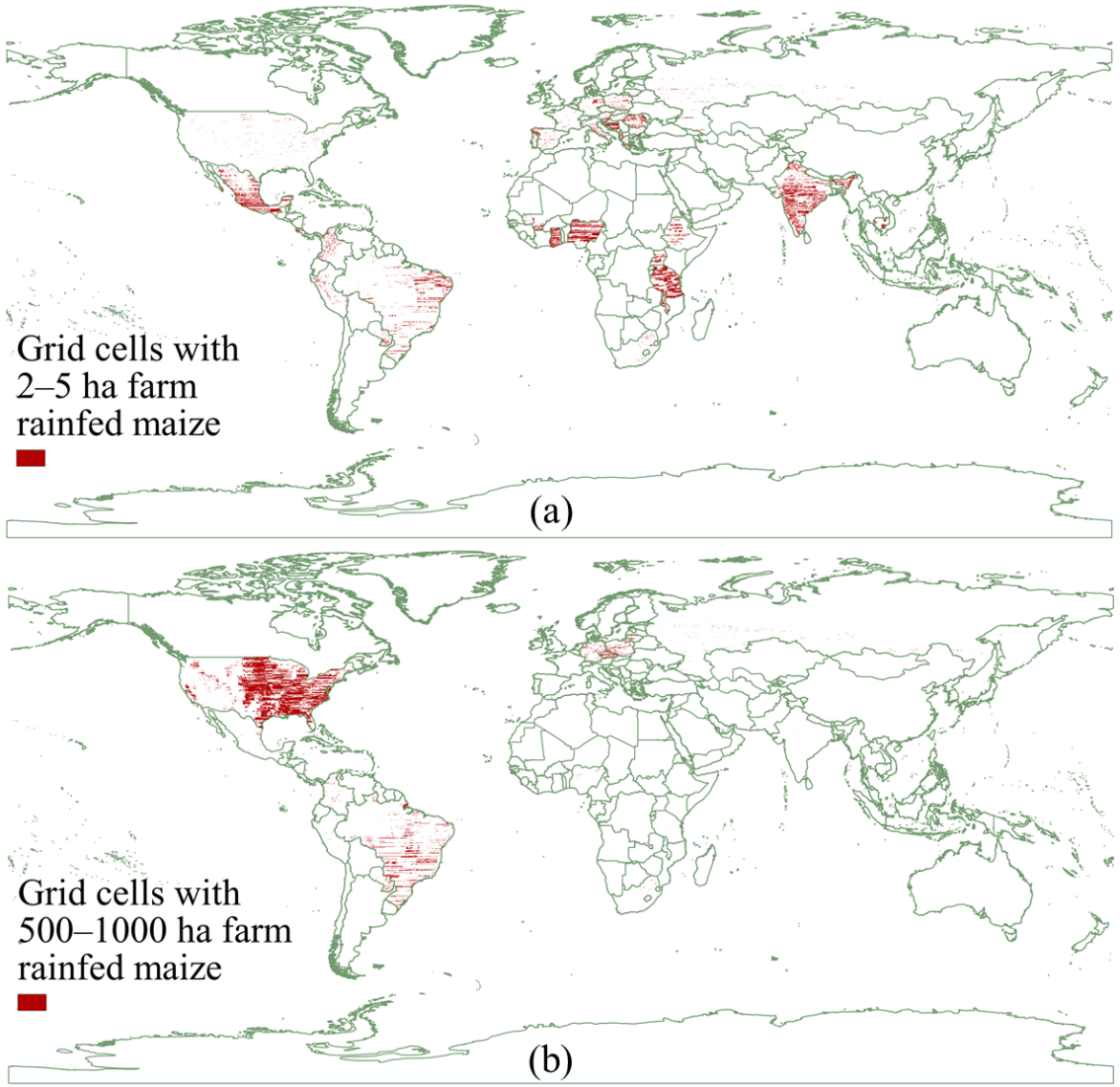
✓11 farm sizes

✓42 crops/27 crops

✓Irrigated/rainfed

✓Harvested area

Validated with empirical dataset



Planted crop and farm size

Abstract

- Large farms (>20 ha)

fodder crops

sugar crops

oilcrops

- Small farms (< 20 ha)

Vegetables

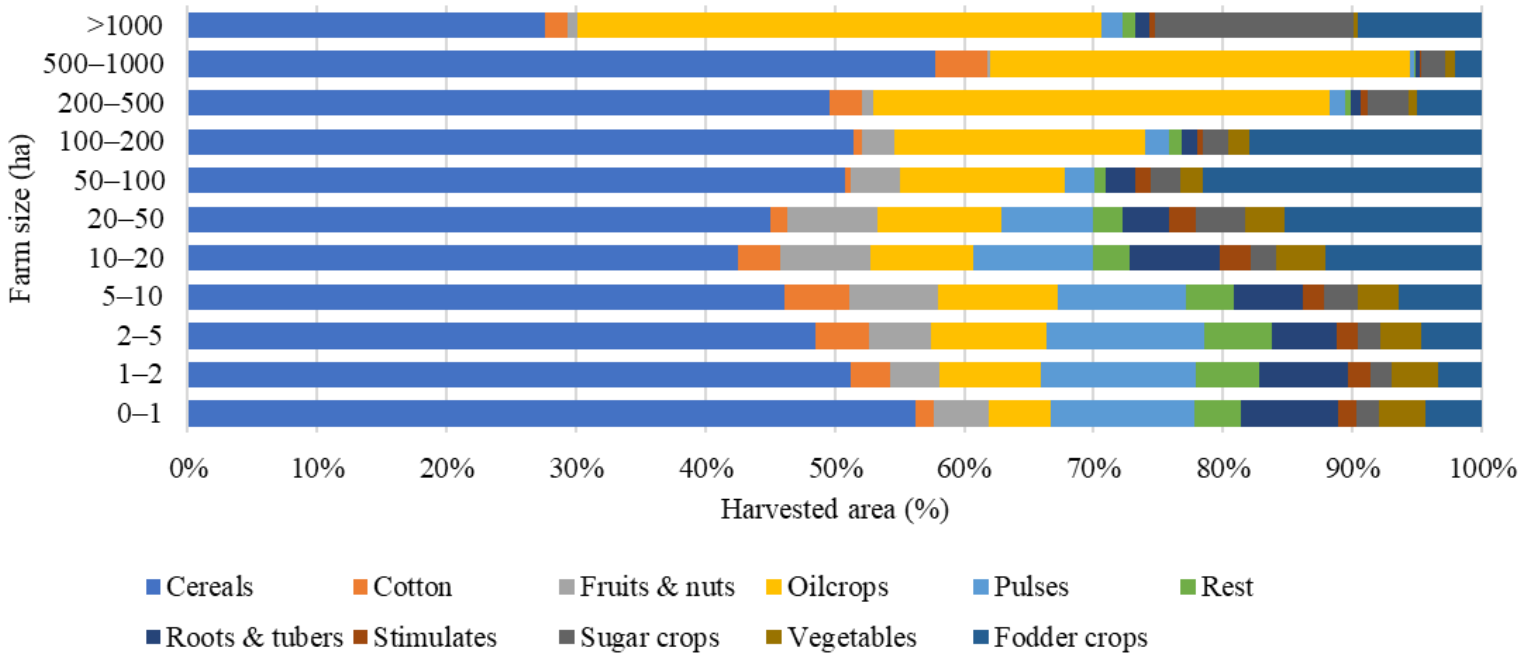
Stimulates

roots and tubers

Pulses

fruits and nuts

cotton



Cash crop VS labour intensive crops

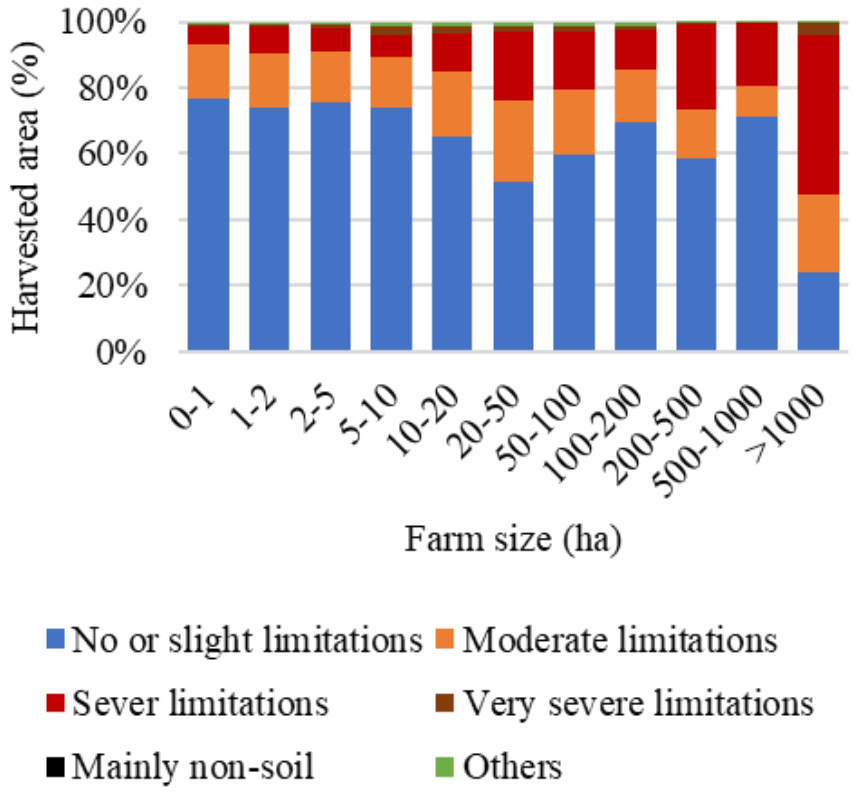
Support previous studies

Water, soil, and farm size

Abstract

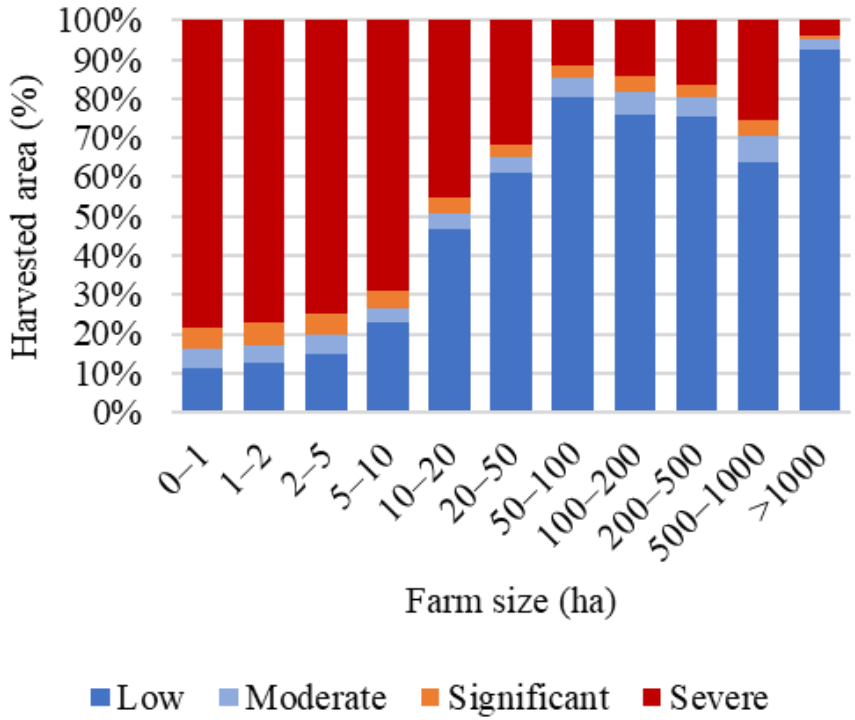
Large farms: soil nutrient limitation

Data source: Harmonized World Soil Database v 1.2



Small farms: water scarcity

Data source: Water scarcity: Mekonnen and Hoekstra



Farm size does matter!

Abstract

- Map dimensions: crop, farm size, harvested area, farming system
- Crop, soil nutrient availability, water scarcity and farm size

✓Collaboration to update the map, apply the map:

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Data description paper, freely available dataset, and code:
Su, H., Willaarts, B., Luna-Gonzalez, D., Krol, M. S., and Hogeboom, R. J.: Gridded 5-arcmin, simultaneously farm-size- and crop-specific harvested area for 56 countries, Earth Syst. Sci. Data Discuss. [preprint], https://doi.org/10.5194/essd-2022-72, in review, 2022.

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Validation and comparison

- Validated with

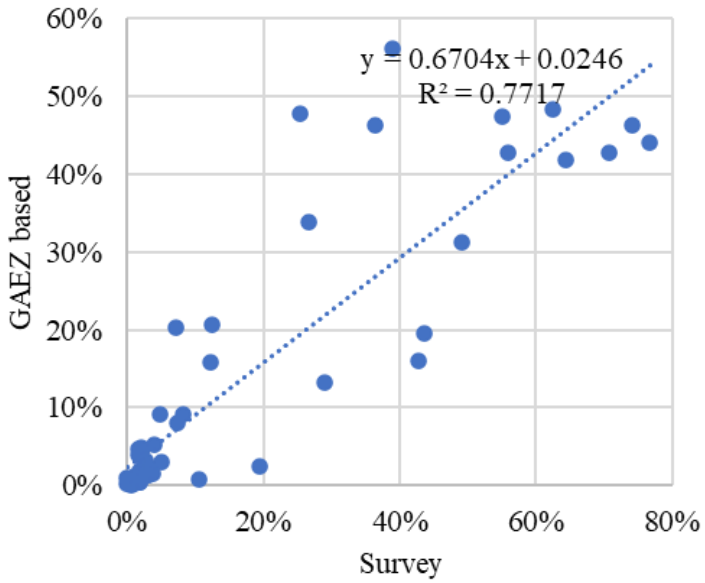
Small- and large-scale oil palm map from satellite images

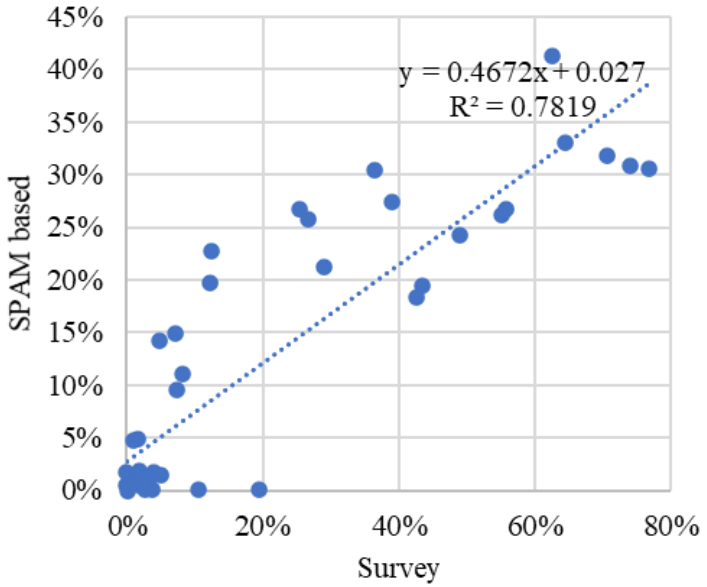
Farm-size specific irrigation from household survey

- Compared with

Dominated farm size from previous studies

Well consistencies at country level





Farm-size specific irrigation from household survey (FAO RuLIS)

Farming systems and farm size

- Large farms (>20 ha)

High-input rainfed

- Small farms (< 20 ha)

Subsistence rainfed

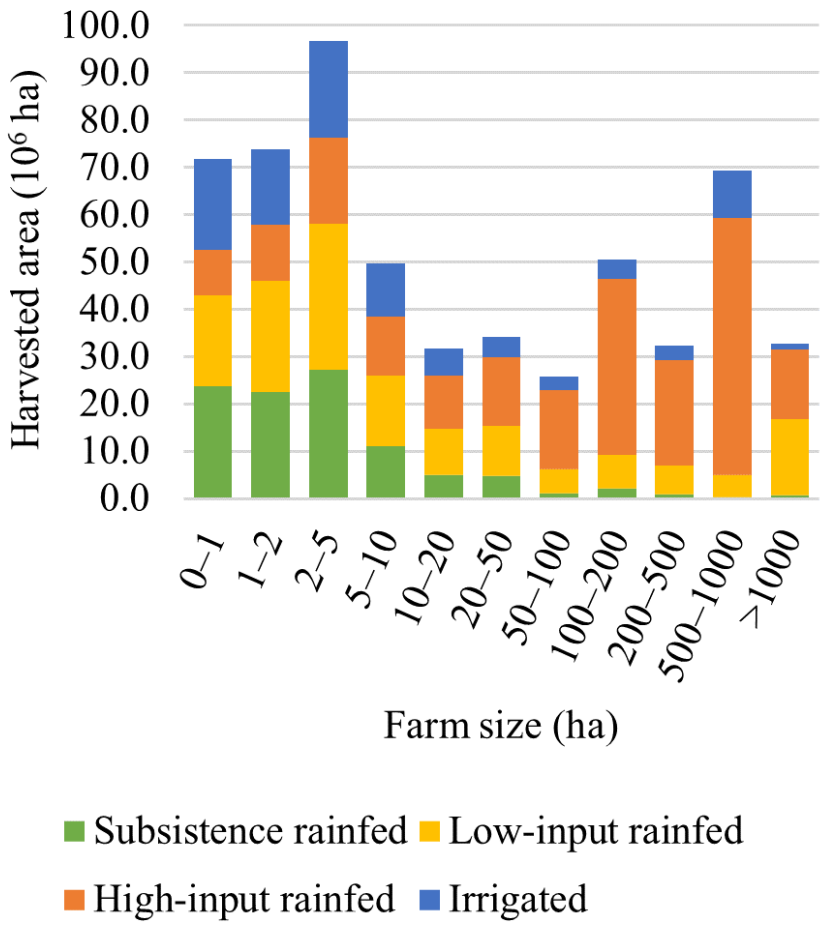
High, low rainfed

Irrigation

- Small farms irrigate to a larger extent than large farms

Asian irrigation tradition

Water scarcity



Farming systems and farm size

- Under water scarcity, overall, large farms irrigate more

Ability to adapt water scarcity

Support previous studies