Urban Agriculture and Nutrition. Empirical Evidence from a Sample of Developing Countries

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What is urban agriculture?

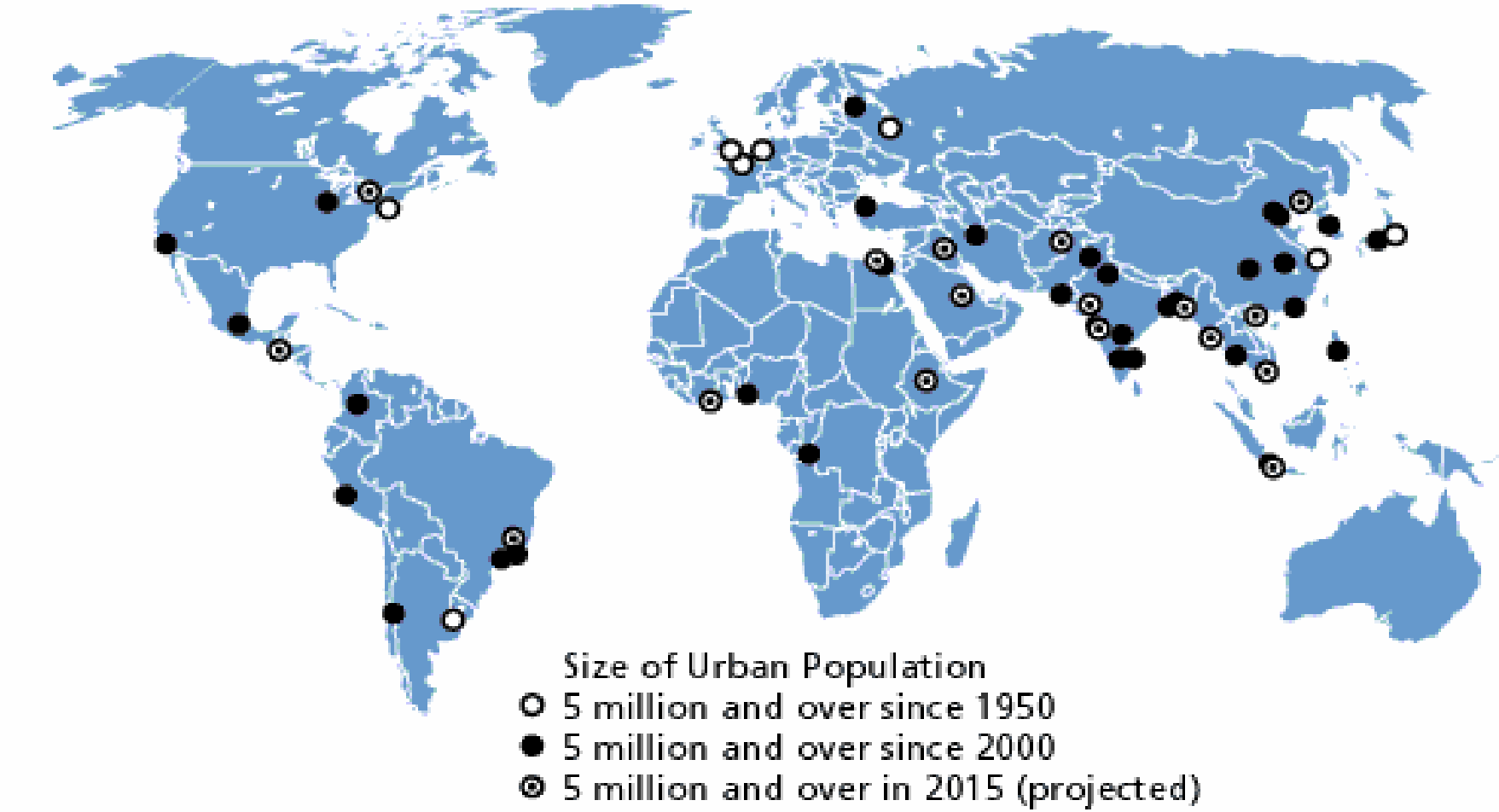
Urban agriculture is the production of agriculture commodities, both plant and animal, in urban areas.

Questions about urban agriculture

- Why is it important?
- Who consumes the output?
- Who is engaged in it?
- Where is it practiced?
- Is there is a relationship between **urban agriculture** and **nutrition**?

Satisfying the food needs of urban populations

By 2015, 53 cities in the world are expected to have a population of 5 million or more. To feed a city of this size, 6 000 tonnes of food must be imported every day.



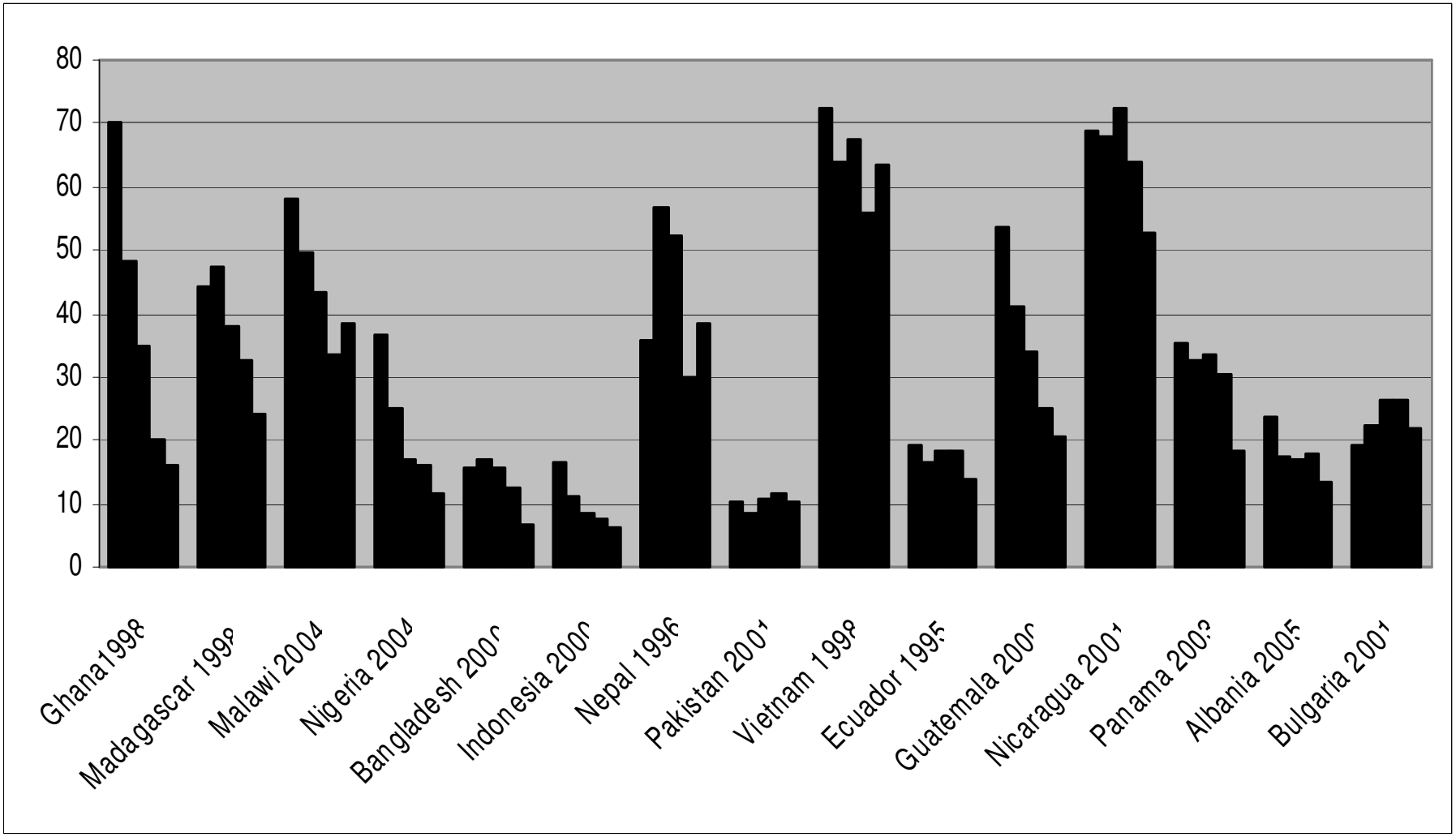
Source: UN, Urbanization prospects.

Why is urban agriculture important?

- There is a relationship between urban agriculture and nutrition.
- Direct access to cheaper/more diverse food if markets are inefficient.
- Source of additional income. 

Who are the urban farmers?

Percentage of urban households engaged in urban agriculture



Notes: different bars corresponds to different expenditure quintiles

Types of land used for urban agriculture

- Backyards.
- Community gardens.
- Unused public and private spaces.
- Roadsides.
- Streamsides and floodplains.
- Wetlands.
- Underdeveloped steep slopes.

Examples of land used for urban agriculture

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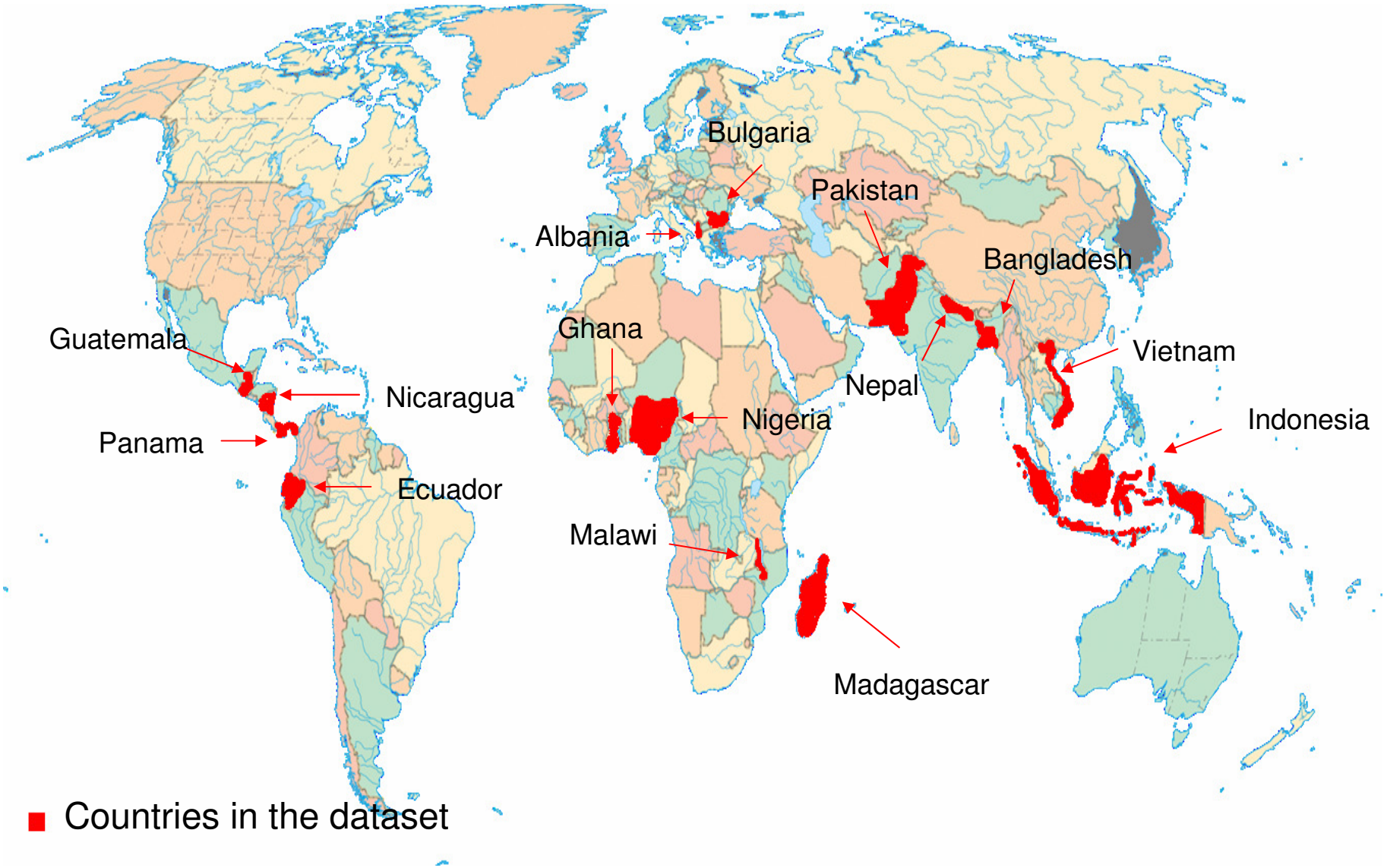
Examples of land used for urban agriculture

Existing literature on urban agriculture

- The amount of quantitative work on urban agriculture is **limited**.
- Studies based on survey data exist for several large cities, but most of the data is still qualitative.

Countries analyzed

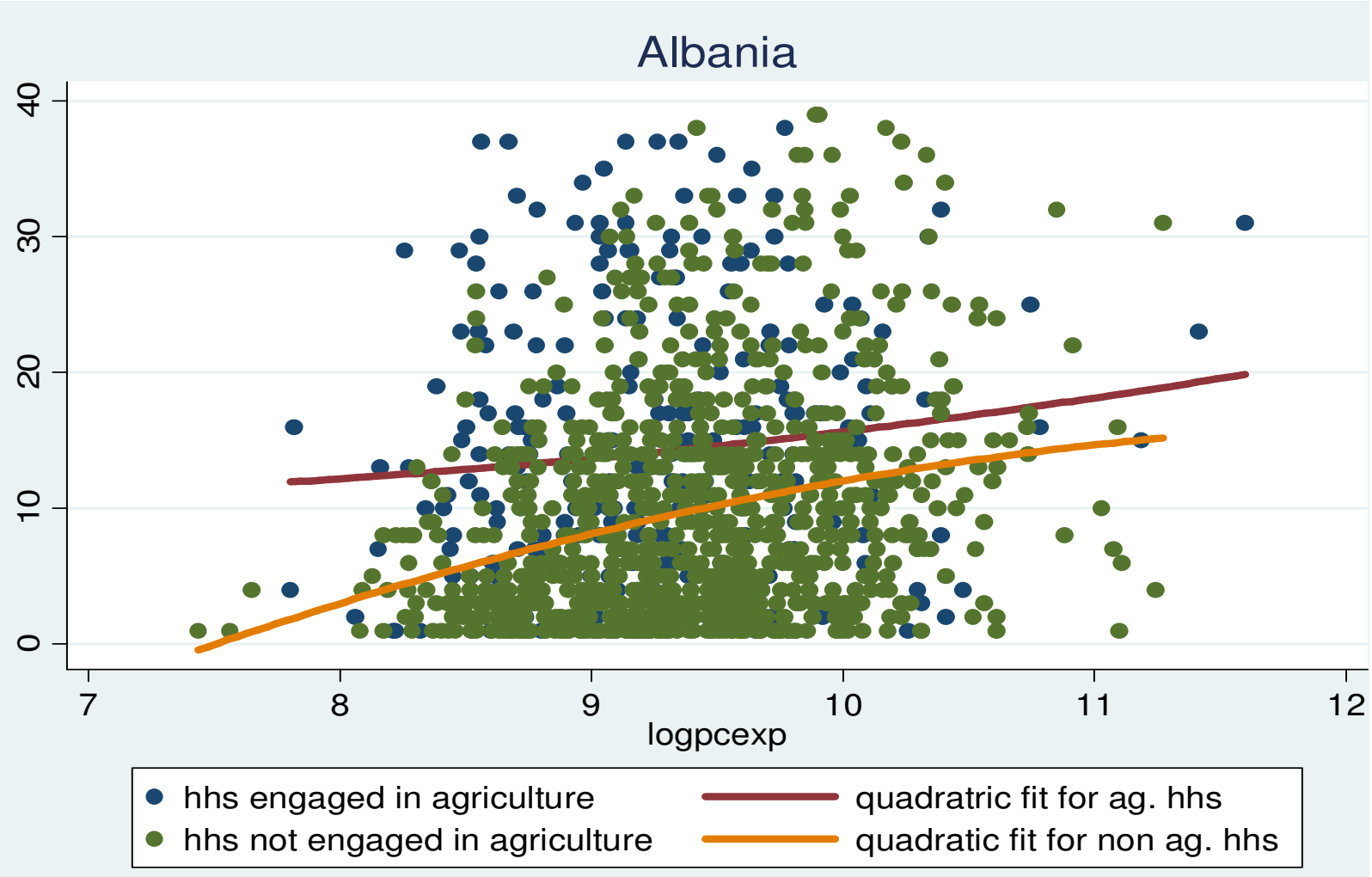


Urban agriculture and nutrition

We build two **measures of dietary diversity**:

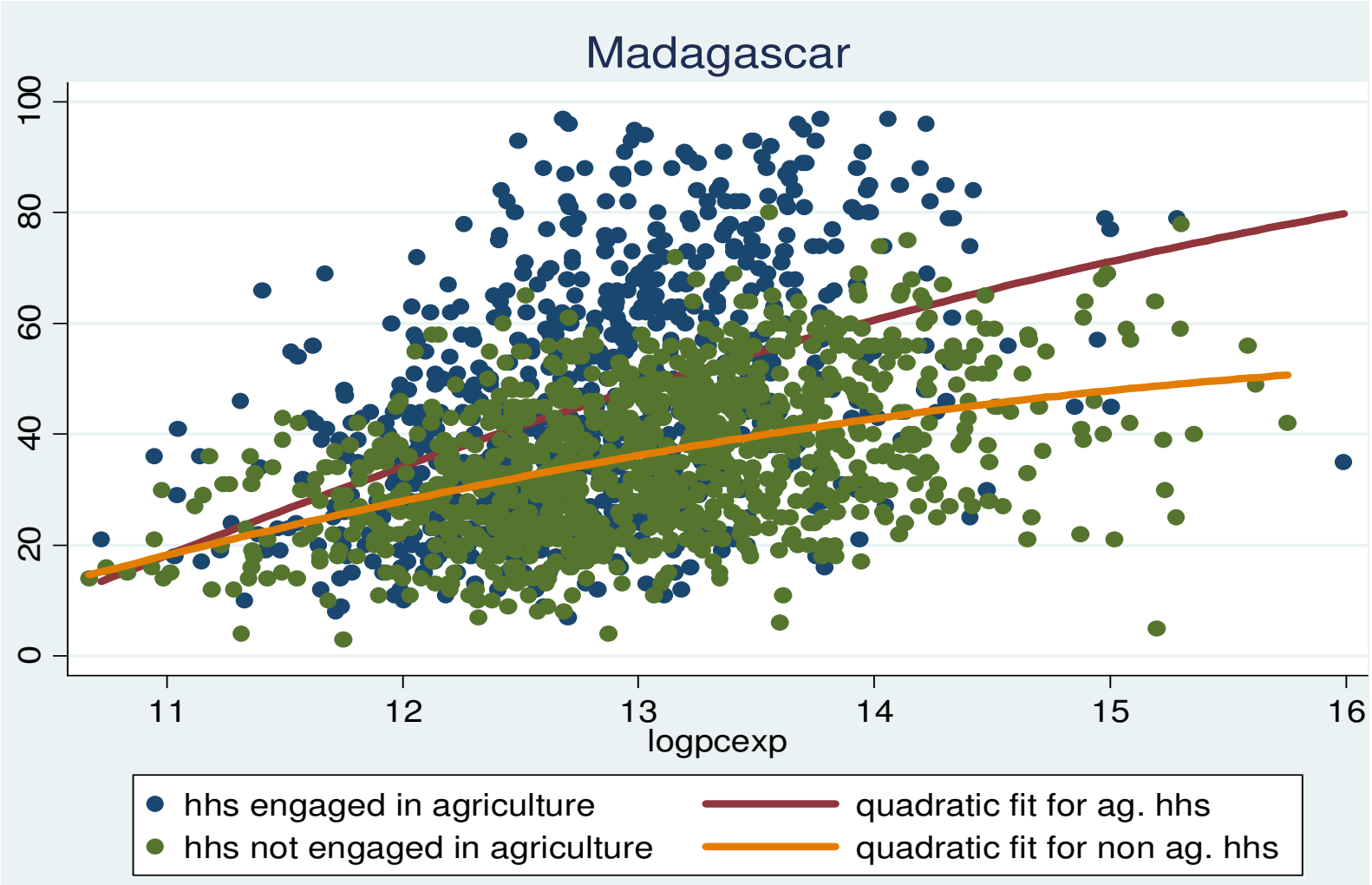
1) Food group index (from 1 to 13). ⟶
2) Food count index (how many types of foods are consumed by each household). ⟶

Urban agriculture and nutrition



Relationship between the food count index and the log of per capita expenditure

Urban agriculture and nutrition



Relationship between the food count index and the log of per capita expenditure

Urban agriculture and nutrition

- Statistical models

$$dietary\_diversity\_measure^{*} = \alpha_0 + \alpha_1 p\_agricultur e + \alpha_2 \log(percapita \exp) +$$
$$+ \alpha_3 landown + \alpha_4 household\_size + \alpha_5 head\_age + \alpha_6 head\_age\text{^}2 + \alpha_7 education +$$
$$+ \alpha_8 education\text{^}2 + \alpha_9 female\_labour\_share + \alpha_{10} geographic al\_dummy + \varepsilon$$

* 1. food group index (1st model);
2. food count index (2nd model).

Urban agriculture and nutrition

- The results of the regressions show that people involved in urban agriculture have **greater dietary diversity** (in 12 out of 15 countries)
- Urban agriculture **increases the number of food consumed** in each household, specifically by 6% in Guatemala, by 11% in Panama and by 36% in Albania.

Urban agriculture and calories consumption

- 3rd model

$$per\_capita\_daily\_calories = \alpha_0 + \alpha_1 p\_agriculture + \alpha_2 \log(percapita\exp) + \alpha_3 landown$$
$$+ \alpha_4 household\_size + \alpha_5 head\_age + \alpha_6 head\_age\text{^}2 + \alpha_7 education +$$
$$+ \alpha_8 education\text{^}2 + \alpha_9 female\_labour\_share + \alpha_{10} geographical\_dummy + \varepsilon$$

Urban agriculture and calories consumption

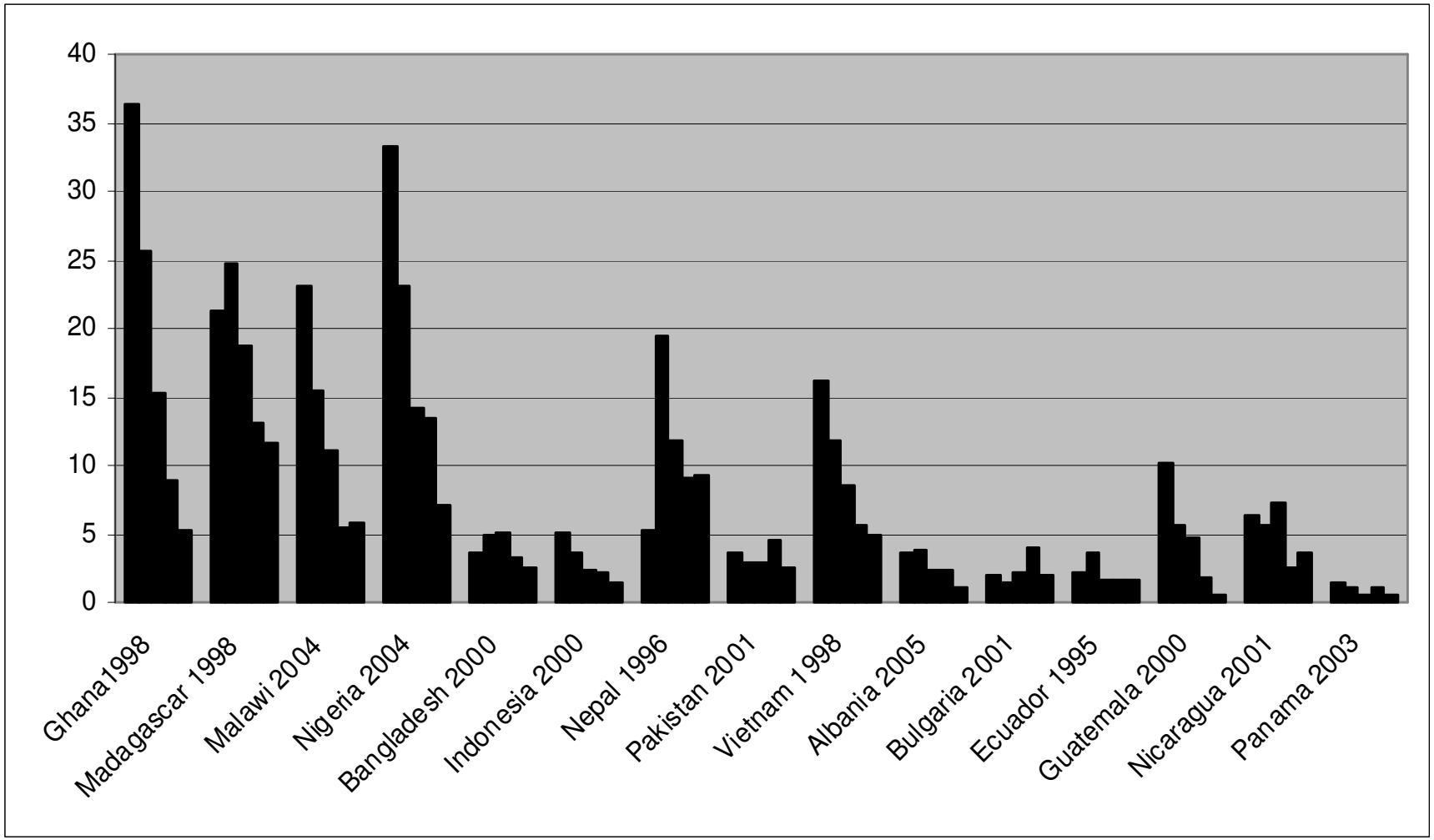
- Households involved in urban agriculture consume more calories.
- This **increased consumption of calories** is associated with a higher consumption of fruits, vegetables, dairy products and the local staple food.

Conclusions

Urban agriculture:

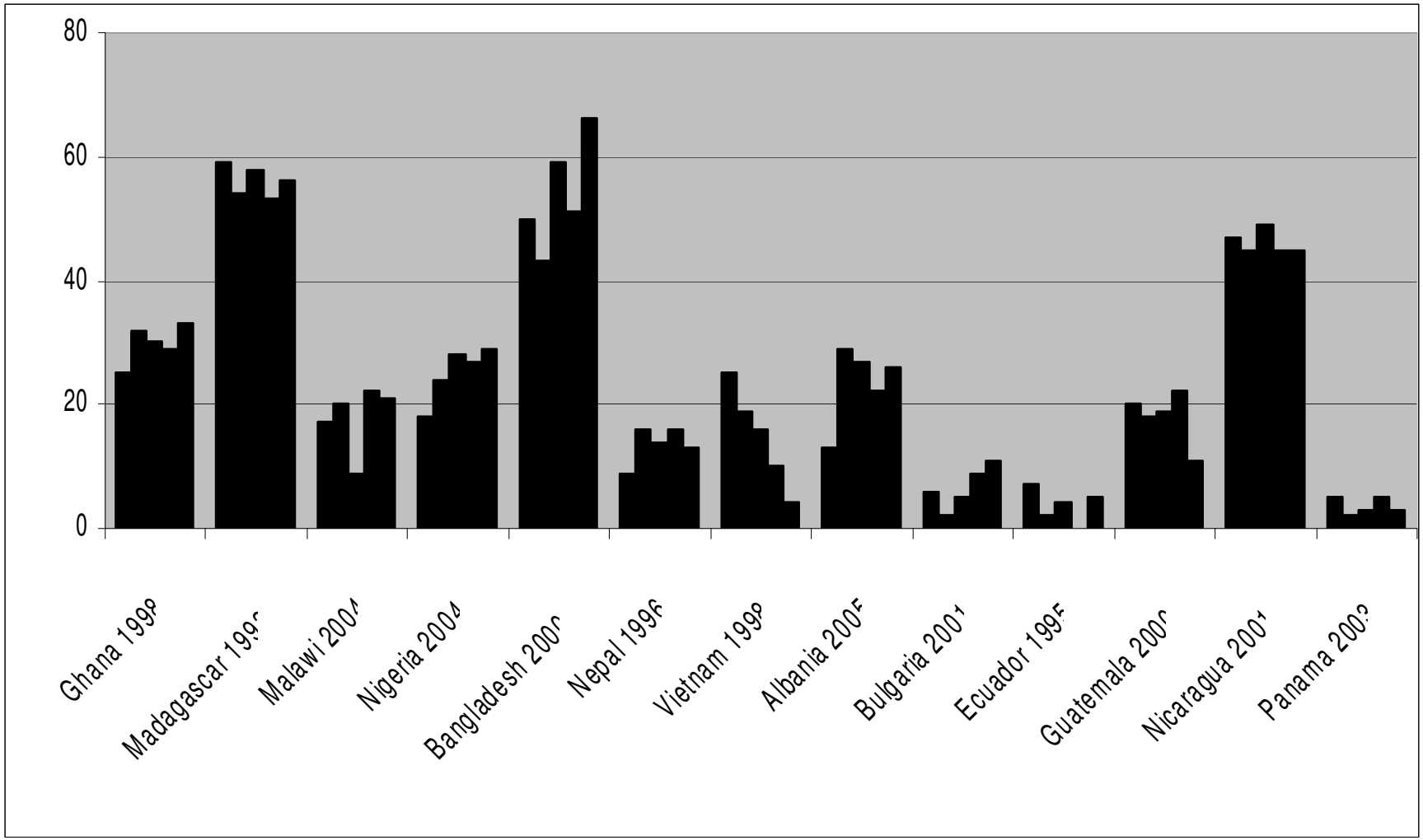
- involves between about 10% to 70% of urban households;
- is an activity in which the poor are disproportionately represented;
- is not a primary source of income, although...;
- **increases the dietary diversity**;
- **increases the number of per capita daily calories**.

Percentage of total household income coming from urban agriculture



Notes: different bars corresponds to different expenditure quintiles

Percentage of urban agricultural production sold

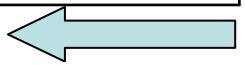


Notes: different bars corresponds to different expenditure quintiles

Food groups division

Food groups	**Food items**
Food group 1	Cereals and grain products
Food group 2	Starchy, roots, tubers and legumes
Food group 3	Nuts, seeds and legumes
Food group 4	Vegetables
Food group 5	Fruits
Food group 6	Sugar, syrup and sweets
Food group 7	Meat and Poultry
Food group 8	Fish and shellfish
Food group 9	Milk and milk products
Food group 10	Oil and fats
Food group 11	Beverages
Food group 12	Eggs
Food group 13	Miscellaneous

Country and year	Food group index	Food count index (max)
Africa		
Ghana 1998	10.5	26 (79)
Madagascar 1998	11	40 (116)
Malawi 2004	9.9	19 (53)
Nigeria 2004	8.9	21(122)
Asia		
Bangladesh 2000	10.5	27 (63)
Indonesia 2000	10.2	17 (37)
Nepal 1996	10.1	32 (54)
Pakistan 2001	10.4	42 (83)
Vietnam 1998	11.1	11 (20)
Eastern Europe		
Albania 2005	10.7	11 (74)
Bulgaria 2001	10	27 (56)
Latin America		
Ecuador 1995	9.8	40 (80)
Guatemala 2000	10.4	51 (88)
Nicaragua 2001	9.4	27 (61)
Panama 2003	10.8	47 (82)



Urban agriculture and dietary diversity

Country & year	**Coefficient of p_onfarm (1st model)**	**Coefficient of p_onfarm (2nd model)**
Ghana 1998	0.23***	-0.35
Madagascar 1993	-0.08	12.01***
Malawi 2004	-0.1	0.33
Nigeria 2004	0.24***	-2.39***
Bangladesh 2000	0.42***	1.64***
Indonesia 2000	0.16*	0.58**
Nepal 2000	0.20**	1.82***
Pakistan 2001	0.03	0.37*
Vietnam 1998	0.04	0.70***
Albania 2001	-0.05	4.05***
Bulgaria 2001	0.29***	0.85**
Ecuador 1995	0.37***	2.30***
Guatemala 2000	0.18***	2.98***
Nicaragua 2000	0.11**	1.21***
Panama 2003	0.59***	5.43***

Urban agriculture and calories consumption

Variable	Malawi 2004	Bangladesh 2000	Guatemala 2000	Nicaragua 2000
Calories	28	89***	212***	-137*
Cereals	-122	-9***	-22	-72***
Staple	712***	-37***	129***	40
Meat	-66**	2**	9***	-9*
Fruits & veg.	123***	7***	18***	-16*
Dairy & eggs	24	0	24***	10

Notes: effects of urban agriculture on calories consumption and on the consumption of food aggregates