ADDRESSING UNDERNUTRITION IN THE CONTEXT OF URBANISATION IN LOW- AND MIDDLE-INCOME COUNTRIES

ANNEXES to MQSUN REPORT

November 2015

Contents

Annex 1 Methods and definitions

1.i Objectives of the review

The overarching goal of the proposed work is to provide DfID with a review of the evidence relating to urbanisation and undernutrition in low-income countries. The specific objectives are to:

- Summarise current and predicted trends to 2030 in urbanisation in countries where DfID operates, particularly in relation to the poorest groups/lowest income quintiles.
- Provide an overview of the relative burden of undernutrition in rural and urban contexts in these countries (both current and projected).
- Identify any approaches that are known to be effective for tackling undernutrition in the diversity of urban contexts and assess the strength of evidence for these approaches.
- Identify where there is insufficient evidence on effective interventions and where additional research is needed.

1.ii Analytical framework

The analytical framework is organised around the streams of work used to address undernutrition in young children, adolescent girls, and women of reproductive age (ultimate outcomes) in the urban context.

Streams of work:

- *Strengthening policy and planning*: These are actions that help create an enabling environment for urban nutrition improvement, taking into account the nuanced approaches required for urban versus rural settings.
- *Nutrition and health programming*: This includes the nutrition-specific clinic- and community-based programmes for which there is already good evidence of effectiveness, together with urban nutrition-sensitive activities related to agriculture and health.
- *Physical environment:* This includes both the planning and provision of quality infrastructure related to the urban existence such as housing, water and sanitation. Urban planning includes strategies to support land regularization and acquisition.
- *Equity and resilience:* This includes determinants of food security but is wider than this, and includes approaches to improve women's empowerment (e.g., girls' education, access to credit and markets).

Intermediate outcomes:

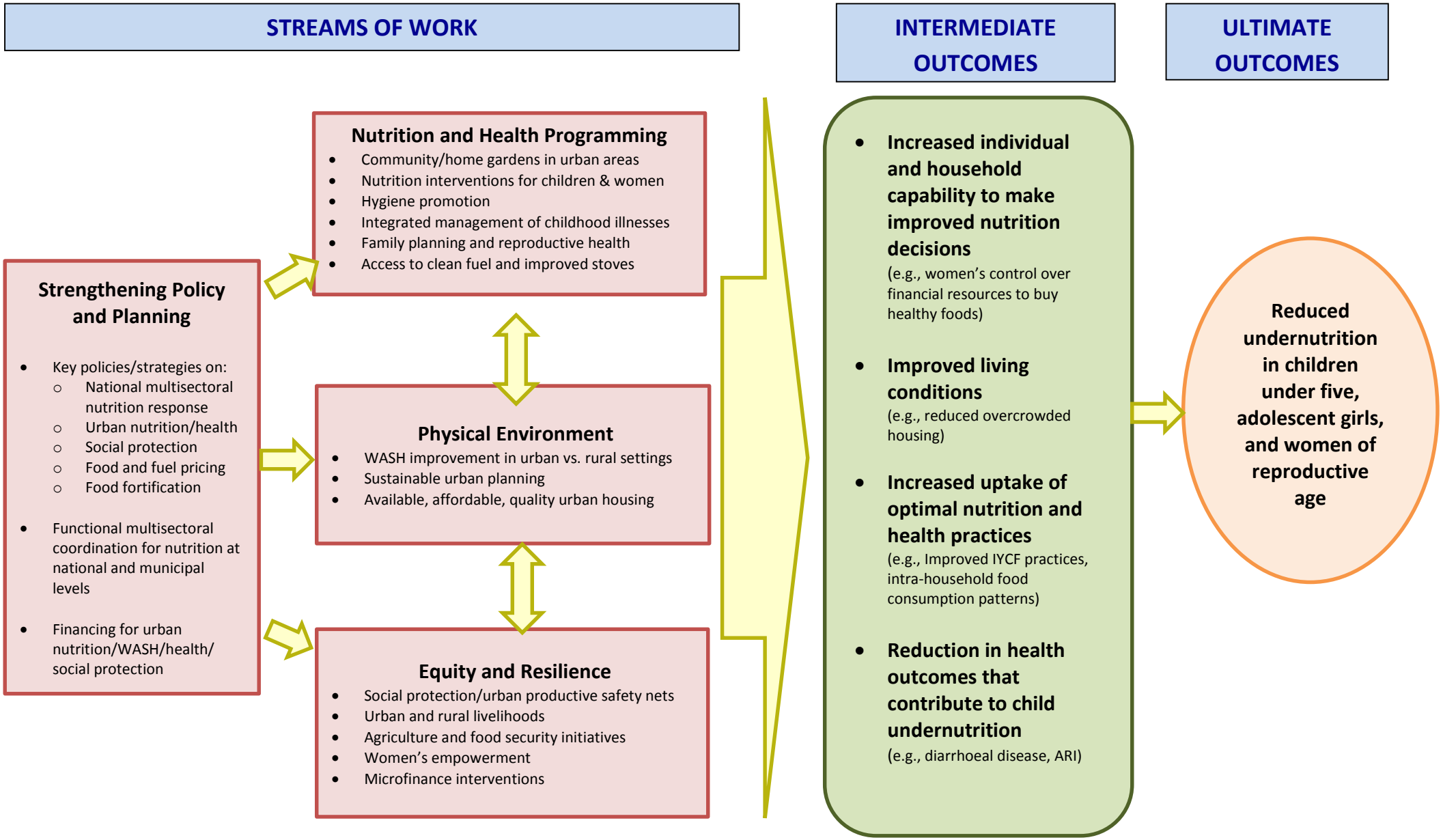
The following were identified as important precursors to the ultimate outcomes.

- *Increased individual and household capability to make improved nutrition decisions*: This category includes availability of financial resources to purchase healthy foods; women's access to/control over these resources; women's involvement in household decision-making; access of household members to health information; and household structure/family size.
- *Improved living conditions*: This category includes reduction in overcrowding; improved WASH infrastructure and reduced indoor air pollution.
- *Increased uptake of optimal nutrition and health practices:* This category includes improved infant and young child feeding practices; dietary diversity and patterns of intra-household food consumption; hand-washing with soap; hygienic disposal of stools; care-seeking for common childhood illnesses; and increased full immunisation coverage.

Reduction in health outcomes that contribute to undernutrition in young children, adolescent girls and women of reproductive age: This category includes communicable diseases such as diarrhoea, enteropathy, acute respiratory infections, malaria and intestinal helminths.

Figure i: Analytical Framework

Addressing undernutrition in the context of urbanisation in low- and middle-Income countries



1.iii Ranking of Strength of Evidence

There were two stages in the process of assessing the strength of evidence provided by individual studies.

First stage: Three criteria were used to classify each study:

i. Study design: R = Review, T = RCT, C = Cohort, O = Other controlled, N = Not controlled
The category "Other controlled" includes case-control studies; before/after comparisons of participants and non-participants, and cross-sectional comparisons of participants and non-participants[1].
The category "Not controlled" includes before/after comparisons of participants, and cross-sectional descriptive studies with no comparisons between groups.
ii. Internal validity: " - " was added to the above classification if there was a risk the results were due to chance or affected by bias or confounding e.g.

- for cohort or other controlled studies it could reflect lack of adjustment for confounding factors.
- for a review, it would reflect that the approach was not systematic, or based on secondary data analysis[2]
- for any study it could reflect small sample or poor sampling method.

iii. Consideration of ultimate outcome: The classification was included in square brackets to indicate when the study did not consider one or more of the ultimate outcomes in the conceptual framework.

Examples of classification of studies:

Study	Classification	Explanation
Pridmore, P., McCowan, T., Carr-Hill, R., Amuyunzu-Nyamongo, M., Lang'o, D., Charnes, G., et al. (2014). Nutritional Improvement for children in urban Chile and Kenya. London: Economic and Social Research Council.	Effective O-	Controlled before and after design, but control area was not well matched with intervention area. Considers anthropometric outcomes
Macauslan, I. & Phelps, L. (2012). Oxfam GB Emergency Food Security and Livelihoods Urban Programme Evaluation Final Report. Oxford: Oxford Policy Management	Effective [N-]	Uses secondary and qualitative data, no information on sampling, and does not address our ultimate outcomes

Second stage: A score from A to C was attributed to each study, to enable appraisal of the size and strength of the body of evidence for each category of workstream. The "evidence score" for each study was attributed using the criteria outlined for Stage 1 above as follows:

	iii. Considers at least one ultimate outcome			
	Yes		**No**	
	ii. Risk of bias		**ii. Risk of bias**	
i. Study design	**No**	**Yes**	**No**	**Yes**
R Review	A	B	C	C
T RCT	A	B	C	C
C Cohort	A	B	C	C
O Other controlled	B	C	C	C
N Not controlled	C	C	C	C

[1] Although cross-sectional analytic studies are not "controlled" in the strict sense of the word, they are included in this group because comparisons are made between groups in relation to relevant outcomes. Any such studies would in any case be graded as having a low evidence score for the purposes of this review, due to the high risk of confounding and bias associated with using a cross-sectional study design.
[2] Most such studies that we encountered used data from large scale nationally representative cross-sectional surveys, and therefore only provide weak evidence of causal relationships.

1.iv UN-Habitat definition of "slum"

A slum is a contiguous settlement where the inhabitants are characterized as having inadequate housing and basic services. A slum is often not recognised and addressed by the public authorities as an integral or equal part of the city.

Five components reflect conditions that characterize slums:

- Insecure residential status.
- Inadequate access to safe water.
- Inadequate access to sanitation and other infrastructure.
- Poor structural quality of housing.
- Overcrowding (more than three persons per room.

A slum household is a group of individuals living under the same roof that lack one or more of the conditions listed above. This can be locally adapted, for example, in cities like Rio de Janeiro where living area is insufficient for both the middle classes and the slum population alike, it could be formulated as two or more of the conditions.

Source: United Nations Human Settlements Programme (UN-Habitat) (2003) Guide to Monitoring Target 11: Improving the lives of 100 million slum dwellers. Nairobi: UN-Habitat

Annex 2 Urbanisation statistics and graphics

Table 1: Population of urban and rural Areas at Mid-Year 2014 (1000s) and % Urban, 2014, and average annual rate of change of the percentage urban, 2000–2030 (%), by major area, region and country

WUP index	Country	Most recent population estimates (2014)				Average annual rate of change of the % urban population (%)		
		Urban (000s)	Rural (000s)	Total (000s)	Percent urban	2000-05	2015-20	2030-35
1	**WORLD**	3,880,128	3,363,656	7,243,784	53.6	1.04	0.79	0.54
2	More developed regions	3,880,128	3,363,656	7,243,784	53.6	0.42	0.27	0.26
3	Less developed regions	980,403	275,828	1,256,231	78.0	1.47	1.05	0.67
4	Least developed countries	2,899,725	3,087,828	5,987,553	48.4	1.63	1.60	1.27
5	Less developed regions, excluding least developed countries	283,855	635,275	919,129	30.9	1.53	1.06	0.66
6	Less developed regions, excluding China	2,615,870	2,452,553	5,068,424	51.6	0.86	0.82	0.74
7	High-income countries	2,115,652	2,446,901	4,562,552	46.4	0.41	0.25	0.22
8	Middle-income countries	1,035,404	256,311	1,291,715	80.2	1.53	1.10	0.68
9	Upper-middle-income countries	2,555,840	2,484,859	5,040,699	50.7	1.98	1.21	0.52
10	Lower-middle-income countries	1,541,090	920,812	2,461,902	62.6	1.03	1.13	1.07
11	Low-income countries	1,014,751	1,564,047	2,578,798	39.3	1.42	1.50	1.26
12	Sub-Saharan Africa	268,441	616,562	885,003	30.3	1.36	1.29	1.02
13	**AFRICA**	455,345	682,885	1,138,229	40.0	1.02	1.06	0.91
77	**ASIA**	2,064,211	2,278,044	4,342,255	47.5	1.87	1.23	0.74
95	Afghanistan	8,221	23,059	31,281	26.3	1.46	1.61	1.54
96	Bangladesh	53,127	105,386	158,513	33.5	2.56	2.08	1.28
61	Burkina Faso	5,056	12,364	17,420	29.0	3.76	2.56	1.31
38	Central African Republic	1,872	2,837	4,709	39.8	0.23	0.81	1.12
39	Chad	2,951	10,260	13,211	22.3	0.15	0.79	1.69
18	Eritrea	1,451	5,086	6,536	22.2	1.46	1.98	1.78
19	Ethiopia	18,363	78,143	96,506	19.0	1.26	2.25	1.87
65	Ghana	14,118	12,324	26,442	53.4	1.48	1.12	0.71
98	India	410,204	857,198	1,267,402	32.4	1.10	1.21	1.28
20	Kenya	11,476	34,070	45,546	25.2	1.72	1.67	1.56
22	Malawi	2,710	14,119	16,829	16.1	0.60	1.23	2.00
69	Mali	6,172	9,596	15,768	39.1	2.46	1.79	1.04

70	Mauritania	2,361	1,623	3,984	59.3	1.52	0.90	0.56
25	Mozambique	8,454	18,019	26,473	31.9	0.61	0.98	1.34
110	Myanmar	18,023	35,696	53,719	33.6	1.40	1.58	1.36
101	Nepal	5,130	22,991	28,121	18.2	2.45	2.01	1.88
71	Niger	3,423	15,112	18,535	18.5	0.65	1.59	1.93
72	Nigeria	83,799	94,718	178,517	46.9	2.29	1.59	0.84
102	Pakistan	70,912	114,221	185,133	38.3	0.93	1.22	1.14
27	Rwanda	3,369	8,731	12,100	27.8	5.12	3.03	1.35
75	Sierra Leone	2,456	3,749	6,205	39.6	0.67	0.98	1.10
29	Somalia	4,223	6,583	10,806	39.1	1.12	1.21	1.10
30	South Sudan	2,182	9,556	11,739	18.6	0.77	1.29	1.88
50	Sudan	13,034	25,730	38,764	33.6	0.16	0.69	1.30
32	Tanzania	15,685	35,073	50,757	30.9	2.15	2.12	1.41
31	Uganda	6,124	32,721	38,845	15.8	1.51	2.11	2.00
134	Yemen	8,496	16,472	24,969	34.0	1.94	1.61	1.21
33	Zambia	6,079	8,942	15,021	40.5	1.01	1.11	1.03
34	Zimbabwe	4,745	9,854	14,599	32.5	0.21	-0.14	1.07

Source: World Urbanization Prospects (http://esa.un.org/unpd/wup/).

Table 2: Current and projected level of urbanisation and urban population by major area, region and country (DfID) 2000–2030, estimates from UN Department of Economic and Social Affairs (UN ESA)

WUP index	**Country**	**Level of urbanisation (% of total population in urban settlements)**			**Urban population (000s)**		
		2000	**2015**	**2030**	**2000**	**2015**	**2030**
1	**WORLD**	46.6	54.0	60.0	2,856,131	3,957,285	5,058,158
2	More developed regions	74.2	78.3	81.5	885,298	985,831	1,054,054
3	Less developed regions	39.9	49.0	56.2	1,970,833	2,971,454	4,004,104
4	Least developed countries	24.4	31.4	39.3	161,882	295,178	505,419
5	Less developed regions, excluding least developed countries	42.4	52.2	59.9	1,808,952	2,676,276	3,498,685
6	Less developed regions, excluding China	41.1	46.8	52.7	1,488,858	2,166,067	2,977,374
7	High-income countries	76.4	80.4	83.2	908,319	1,042,669	1,133,035
8	Middle-income countries	41.5	51.3	59.1	1,771,095	2,615,346	3,435,460
9	Upper-middle-income countries	48.8	63.5	73.2	1,066,288	1,574,772	1,958,119
10	Lower-middle-income countries	33.9	39.8	47.1	704,807	1,040,574	1,477,340
11	Low-income countries	24.6	30.8	38.2	159,418	278,657	467,382
12	Sub-Saharan Africa	30.8	37.9	45.4	196,869	359,534	621,375
13	**AFRICA**	**34.5**	**40.4**	**47.1**	**278,770**	**471,602**	**770,068**
77	**ASIA**	**37.5**	**48.2**	**56.3**	**1,392,740**	**2,113,137**	**2,752,457**
95	Afghanistan	21.3	26.7	34.0	4,383	8,547	14,788
96	Bangladesh	23.6	34.3	44.9	31,229	54,984	83,160
61	Burkina Faso	17.8	29.9	41.0	2,071	5,349	10,896
38	Central African Republic	37.6	40.0	46.3	1,369	1,923	2,925
39	Chad	21.6	22.5	26.6	1,796	3,057	5,547
18	Eritrea	17.6	22.6	30.2	693	1,523	2,954
19	Ethiopia	14.7	19.5	26.8	9,732	19,266	36,906
65	Ghana	43.9	54.0	62.6	8,270	14,583	22,064
98	India	27.7	32.7	39.5	288,363	419,944	583,036
20	Kenya	19.9	25.6	32.8	6,223	11,978	21,767
22	Malawi	14.6	16.3	20.4	1,654	2,816	5,305
69	Mali	28.4	39.9	50.3	2,909	6,490	13,089
70	Mauritania	49.2	59.9	66.9	1,334	2,442	3,774
25	Mozambique	29.1	32.2	38.1	5,318	8,737	14,825
110	Myanmar	27.0	34.1	42.8	13,067	18,469	25,094

101	Nepal	13.4	18.6	25.1	3,114	5,294	8,235
71	Niger	16.2	18.7	24.6	1,779	3,609	8,474
72	Nigeria	34.8	47.8	58.3	42,810	87,680	159,240
102	Pakistan	33.2	38.8	46.6	47,688	72,921	107,881
27	Rwanda	14.9	28.8	41.5	1,253	3,581	7,383
75	Sierra Leone	35.6	39.9	46.7	1,475	2,524	3,766
29	Somalia	33.2	39.6	47.3	2,455	4,399	7,977
30	South Sudan	16.5	18.8	23.6	1,098	2,285	4,083
50	Sudan	32.5	33.8	38.8	9,011	13,392	21,393
32	Tanzania	22.3	31.6	41.9	7,590	16,528	33,257
31	Uganda	12.1	16.1	22.0	2,933	6,463	13,952
134	Yemen	26.3	34.6	43.2	4,603	8,837	14,684
33	Zambia	34.8	40.9	48.2	3,515	6,351	12,036
34	Zimbabwe	33.8	32.4	33.8	4,221	4,871	6,851

Source: World Urbanization Prospects (http://esa.un.org/unpd/wup/).

Table 3: Current and projected level of urbanisation and urban population by DfID country 2000–2030, estimates from UN-Habitat, and % difference between UN ESA and UN-Habitat estimates

							% difference from WUP estimates					
	Level of urbanisation (% of total population in urban settlements)			**Urban population (000s)**			**Level of urbanisation**			**Urban population**		
	2000	**2015**	**2030**	**2000**	**2015**	**2030**	***2000***	***2015***	***2030***	***2000***	***2015***	***2030***
Afghanistan	21.3	27.0	36.2	4,413	9,631	19,294	*0*	*1*	*7*	*1*	*13*	*30*
Bangladesh	23.6	30.8	41.0	32,893	55,474	89,448	*0*	*-10*	*-9*	*5*	*1*	*8*
Burkina Faso	16.6	22.9	32.6	1,971	4,228	8,640	*-7*	*-23*	*-20*	*-5*	*-21*	*-21*
Cent. Afr. Rep.	No data	No data	No data	1,454	2,029	3,010				*6*	*6*	*3*
Chad	23.4	30.5	41.2	1,979	4,100	8,165	*8*	*36*	*55*	*10*	*34*	*47*
Eritrea	17.8	24.3	34.4	655	1,501	2,900	*1*	*8*	*14*	*-6*	*-1*	*-2*
Ethiopia	14.9	19.4	27.4	10,339	19,564	37,484	*1*	*-1*	*2*	*6*	*2*	*2*
Ghana	44.0	55.0	64.7	8,856	15,021	22,145	*0*	*2*	*3*	*7*	*3*	*0*
India	27.7	31.9	40.6	289,438	415,612	611,407	*0*	*-2*	*3*	*0*	*-1*	*5*
Kenya	19.7	24.1	33.0	6,167	11,126	20,739	*-1*	*-6*	*1*	*-1*	*-7*	*-5*
Malawi	15.2	22.5	32.4	1,764	3,828	7,634	*4*	*38*	*59*	*7*	*36*	*44*
Mali	27.9	36.5	47.4	2,787	5,716	11,022	*-2*	*-8*	*-6*	*-4*	*-12*	*-16*
Mauritania	40.0	43.1	51.7	1,026	1,620	2,557	*-19*	*-28*	*-23*	*-23*	*-34*	*-32*
Mozambique	30.7	42.4	53.7	5,584	10,466	16,708	*5*	*32*	*41*	*5*	*20*	*13*
Myanmar	No data	No data	No data	12,860	19,430	27,427				*-2*	*5*	*9*
Nepal	13.4	20.9	30.6	3,280	6,879	12,776	*0*	*13*	*22*	*5*	*30*	*55*
Niger	16.2	17.5	23.7	1,801	3,289	7,301	*0*	*-6*	*-4*	*1*	*-9*	*-14*
Nigeria	42.5	53.4	63.6	53,048	93,767	144,246	*22*	*12*	*9*	*24*	*7*	*-9*
Pakistan	33.2	39.7	49.8	47,884	75,598	119,652	*0*	*2*	*7*	*0*	*4*	*11*
Rwanda	13.8	20.5	28.3	1,126	2,494	4,703	*-8*	*-29*	*-32*	*-10*	*-30*	*-36*
Sierra Leone	35.5	40.4	49.0	1,605	2,799	4,702	*0*	*1*	*5*	*9*	*11*	*25*
Somalia	33.3	40.1	49.9	2,346	4,359	7,576	*0*	*1*	*5*	*-4*	*-1*	*-5*
South Sudan	No data	No data	No data	No data	No data	No data						
Sudan	36.1	49.4	60.7	12,034	22,513	35,468	*11*	*46*	*56*	*34*	*68*	*66*
Tanzania	22.3	28.9	38.7	7,551	14,161	25,330	*0*	*-9*	*-8*	*-1*	*-14*	*-24*
Uganda	12.1	14.4	20.6	2,983	5,756	12,653	*0*	*-11*	*-7*	*2*	*-11*	*-9*
Yemen	26.3	34.9	45.3	4,776	9,870	18,487	*0*	*1*	*5*	*4*	*12*	*26*
Zambia	34.8	37.0	44.7	3,637	5,122	7,990	*0*	*-10*	*-7*	*3*	*-19*	*-34*

Zimbabwe	33.8	40.9	50.7	4,273	5,939	8,432	*0*	*26*	*50*	*1*	*22*	*23*

Source of data in columns 2–7: UN-Habitat (http://urbandata.unhabitat.org/).
Values in columns 8 and 13 are from author's calculations. Shaded boxes indicate where estimates differ by > 30%.

Table 4: Urban poverty gap at national poverty line (%), and poverty headcount ratio (%) at national poverty line for DfID countries

Country	**Survey year**	**Urban poverty gap (%)[1]**	**Poverty headcount ratio (PHCR) %[2]**		**Difference (rural PHCR% – urban PHCR%)**	**Ratio (rural PHCR%/ urban PHCR%)**
			Urban	**Rural**		
Afghanistan	2011	5.6	27.6	38.3	10.7	1.39
Bangladesh	2010	4.3	21.3	35.2	13.9	1.65
Burkina Faso	2009	6.8	25.2	52.8	27.6	2.10
Cent. Afr. Rep.	2008	29.8	49.6	69.4	19.8	1.40
Chad	2011	6.6	20.9	52.5	31.6	2.51
Eritrea		No data	No data	No data		
Ethiopia	2010	6.9	25.7	30.4	4.7	1.18
Ghana	2012	2.5	10.6	37.9	27.3	3.58
India	2011	2.5	13.7	25.7	12.0	1.88
Kenya		No data	No data	No data		
Malawi	2010	4.8	17.3	56.6	39.3	3.27
Mali	2010	4.8	18.9	50.6	31.7	2.68
Mauritania	2008	4.9	20.8	59.4	38.6	2.86
Mozambique	2009	19.1	49.6	56.9	7.3	1.15
Myanmar		No data	No data	No data		
Nepal	2010	3.2	15.5	27.4	11.9	1.77
Niger	2011	11.3	18.6	55.2	36.6	2.97
Nigeria	2010	11.6	34.1	52.8	18.7	1.55
Pakistan		No data	No data	No data		
Rwanda	2011	No data	22.1	48.7	26.6	2.20
Sierra Leone	2011	7.7	31.2	66.1	34.9	2.12
Somalia		No data	No data	No data		
South Sudan	2009	8.8	24.4	55.4	31	2.27
Sudan	2009	7.1	26.5	57.6	31.1	2.17
Tanzania	2012	3.9	15.5	33.3	17.8	2.15
Uganda	2012	2.5	9.6	22.4	12.8	2.33
Yemen, Rep.		No data	No data	No data		
Zambia	2010	9.3	27.5	77.9	50.4	2.83
Zimbabwe	2011	15.5	46.5	84.3	37.8	1.81

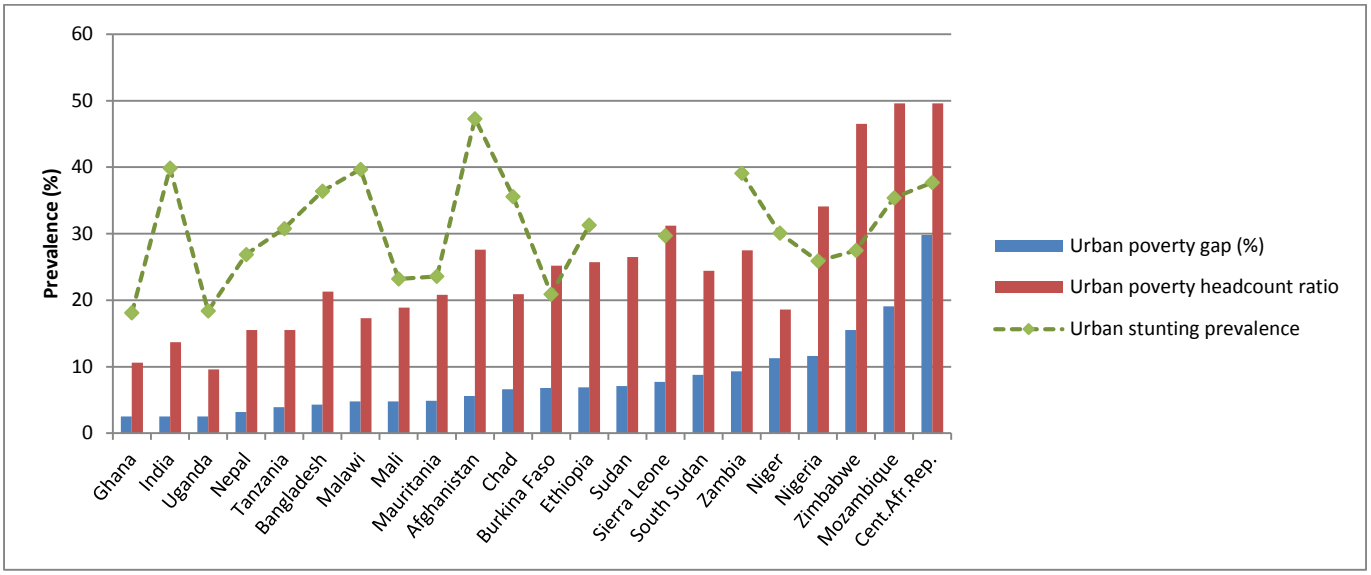
Source of data in columns 3–5: http://databank.worldbank.org/data/reports.aspx?source=poverty-and-equity-database.
Data in columns 6 and 7 are from authors' calculations.

Note: The poverty line is the cash income needed to avoid poverty. It is problematic to apply a single poverty line across rural and urban areas in a country as it may greatly underestimate urban poverty given that urban areas have significantly higher living costs and higher needs for cash income compared to rural areas of the same country. This analysis is therefore intended only to provide general impressions for comparing countries, as the absolute values may not be reliable.

[1] Urban poverty gap at national poverty line: The urban population's mean shortfall from the poverty line (counting the nonpoor as having zero shortfall) as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence.

[2] Urban poverty headcount ratio: The proportion of the urban population living below the national poverty lines.

Figure ii: Urban poverty gap (%); and urban poverty headcount ratio (%) at national poverty line, for DfID countries (line graph of urban stunting prevalence (%) superimposed)



*Sources: Poverty data World Bank (*http://databank.worldbank.org/data/reports.aspx?source=poverty-and-equity-database*);*
*Stunting data WHO (*http://www.who.int/nutgrowthdb/estimates/en/*).*

Annex 3 Undernutrition statistics and graphics

3.i Children under 5 years old

Table 5: Stunting prevalence in children aged < 5 years (%) by area of residence, DfID countries

Country	Year	Source	Rural stunting %	Urban stunting %
Afghanistan	2010	MICS	52.9 [49.8-56.0]	47.3 [44.5-50.2]
Bangladesh	2011	DHS	42.5 [40.6-44.5]	36.4 [33.4-39.5]
Burkina Faso	2010	DHS	37.2 [35.5-39.0]	20.9 [18.2-24.0]
Central African Republic	2010	MICS	42.4 [40.1-44.7]	37.7 [35.0-40.6]
Chad	2004	DHS	46.5 [43.6-49.4]	35.6 [31.5-39.8]
Ethiopia	2011	DHS	46.2 [44.2-48.2]	31.3 [26.3-36.9]
Ghana	2011	MICS	26.3 [24.3-28.5]	18.1 [15.7-20.8]
India	2005	DHS	50.7 [49.7-51.7]	39.9 [38.2-41.5]
Kenya	2008	DHS	37.1 [34.7-39.5]	26.5 [21.4-32.3]
Malawi	2010	DHS	48.4 [46.4-50.4]	39.7 [34.5-45.1]
Mali	2012	DHS	41.9 [39.5-44.4]	23.2 [20.2-26.4]
Mauritania	2007	MICS	31.8 [30.1-33.5]	23.6 [21.8-25.6]
Mozambique	2011	DHS	45.5 [43.5-47.6]	35.4 [31.6-39.4]
Nepal	2011	DHS	41.6 [38.4-44.8]	26.9 [22.4-32.0]
Niger	2012	DHS	45.2 [42.9-47.6]	30.1 [26.1-34.4]
Nigeria	2013	DHS	43.2 [41.1-45.2]	25.9 [23.8-28.1]
Pakistan	2012	DHS	47.8 [44.2-51.4]	36.9 [32.7-41.2]
Rwanda	2010	DHS	46.2 [44.1-48.2]	27.5 [22.1-33.6]
Sierra Leone	2013	DHS	40.4 [38.0-42.8]	29.7 [26.5-33.1]
Somalia	2006	MICS	47.5 [44.1-50.9]	32.1 [28.5-36.0]
Tanzania	2010	DHS	44.2 [42.2-46.2]	30.8 [26.7-35.2]
Uganda	2011	DHS	35.5 [32.6-38.5]	18.4 [13.0-25.5]
Zambia	2007	DHS	47.8 [45.5-50.2]	39.1 [35.2-43.0]
Zimbabwe	2010	DHS	32.4 [30.6-34.3]	27.5 [24.8-30.4]

Source: UNICEF/WHO/World Bank Joint child malnutrition estimates (http://www.who.int/nutgrowthdb/estimates/en/).
No data were available for Eritrea and Yemen.
Shaded cells indicate prevalence rates which are high or very high according to WHO cut-off values for public health significance (30% and 40%).

Table 6: Underweight prevalence in children aged < 5 years (%) by area of residence, DfID countries

Country	Year	Source	Rural underweight %	Urban underweight %
Afghanistan	2010	MICS	24.7 [22.6-27.1]	18.1 [16.0-20.3]
Bangladesh	2011	DHS	38.5 [36.5-40.6]	27.8 [25.2-30.7]
Burkina Faso	2010	DHS	27.1 [25.5-28.8]	18.4 [16.1-20.9]
Central African Republic	2010	MICS	23.6 [21.8-25.5]	23.2 [21.1-25.5]
Chad	2004	DHS	35.6 [31.8-39.7]	26.6 [24.2-29.3]
Ethiopia	2011	DHS	30.5 [28.6-32.6]	16.7 [12.2-22.5]
Ghana	2011	MICS	15.5 [14.0-17.2]	10.5 [8.9-12.3]
India	2005	DHS	45.7 [44.6-46.8]	32.8 [31.2-34.4]
Kenya	2008	DHS	17.1 [14.9-19.6]	10.3 [7.2-14.7]
Malawi	2010	DHS	13.1 [11.8-14.6]	10.5 [7.5-14.5]
Mali	2012	DHS	27.6 [25.4-29.9]	16.7 [14.4-19.4]
Mauritania	2007	MICS	28.0 [26.3-29.8]	16.0 [14.2-18.0]
Mozambique	2011	DHS	16.8 [15.5-18.2]	9.8 [8.2-11.8]
Nepal	2011	DHS	29.8 [27.0-32.7]	16.2 [12.7-20.4]
Niger	2012	DHS	38.1 [36.0-40.2]	23.3 [19.4-27.6]
Nigeria	2013	DHS	32.1 [30.1-34.2]	22.7 [19.9-25.7]
Pakistan	2012	DHS	32.0 [28.4-35.8]	23.6 [20.1-27.6]
Rwanda	2010	DHS	12.0 [10.9-13.3]	6.4 [4.5-9.0]
Sierra Leone	2013	DHS	17.8 [16.2-19.5]	12.0 [9.7-14.7]
Somalia	2006	MICS	39.0 [36.0-42.0]	21.2 [18.3-24.6]
Tanzania	2010	DHS	16.6 [15.1-18.3]	11.6 [9.3-14.3]
Uganda	2011	DHS	14.8 [12.8-17.0]	6.6 [4.2-10.3]
Zambia	2007	DHS	15.0 [13.6-16.5]	12.5 [10.4-14.8]
Zimbabwe	2010	DHS	9.8 [8.7-11.1]	8.2 [6.4-10.4]

Source: UNICEF/WHO/World Bank Joint child malnutrition estimates (http://www.who.int/nutgrowthdb/estimates/en/).

No data were available for Eritrea and Yemen.

Shaded cells indicate prevalence rates which are high or very high according to WHO cut-off values for public health significance (20% and 30%).

Table 7: Wasting prevalence in children aged < 5 years (%) by area of residence, DfID countries

Country	Year	Source	Rural wasting %	Urban wasting %
Afghanistan	2010	MICS	14.9 [13.3-16.7]	8.2 [6.7-9.9]
Bangladesh	2011	DHS	16.0 [14.7-17.3]	13.8 [12.1-15.8]
Burkina Faso	2010	DHS	16.0 [14.5-17.6]	14.7 [11.9-18.0]
Central African Republic	2010	MICS	6.7 [5.9-7.7]	8.5 [7.2-10.1]
Chad	2004	DHS	16.2 [14.1-18.5]	16.2 [13.8-19.0]
Ethiopia	2011	DHS	10.5 [9.4-11.6]	5.6 [4.1-7.6]
Ghana	2011	MICS	6.7 [5.8-7.7]	5.7 [4.6-7.1]
India	2005	DHS	20.8 [20.0-21.6]	16.8 [15.7-17.9]
Kenya	2008	DHS	6.8 [5.7-8.1]	5.1 [3.7-7.0]
Malawi	2010	DHS	4.4 [3.6-5.4]	2.5 [1.3-4.6]
Mali	2012	DHS	13.0 [11.2-15.0]	11.1 [8.7-14.1]
Mauritania	2007	MICS	15.9 [14.7-17.3]	10.0 [8.7-11.5]
Mozambique	2011	DHS	6.7 [5.9-7.6]	4.0 [3.1-5.0]
Nepal	2011	DHS	11.2 [9.6-13.1]	8.5 [5.7-12.3]
Niger	2012	DHS	18.6 [17.1-20.3]	14.4 [11.4-18.1]
Nigeria	2013	DHS	18.2 [16.9-19.6]	17.4 [15.1-20.0]
Pakistan	2012	DHS	11.1 [8.7-13.9]	9.8 [7.5-12.8]
Rwanda	2010	DHS	2.8 [2.2-3.4]	3.8 [2.4-6.0]
Sierra Leone	2013	DHS	9.4 [7.9-11.0]	9.1 [7.1-11.7]
Somalia	2006	MICS	16.1 [14.5-17.8]	8.6 [7.3-10.0]
Tanzania	2010	DHS	4.8 [4.1-5.6]	5.0 [3.7-6.9]

Uganda	2011	DHS	5.1 [4.0-6.4]	4.5 [2.6-7.8]
Zambia	2007	DHS	5.6 [4.8-6.5]	4.8 [3.7-6.2]
Zimbabwe	2010	DHS	3.4 [2.8-4.1]	2.4 [1.5-3.6]

Source: UNICEF/WHO/World Bank Joint child malnutrition estimates (http://www.who.int/nutgrowthdb/estimates/en/).

No data were available for Eritrea and Yemen.

Shaded cells indicate prevalence rates which are serious or critical according to WHO cut-off values for public health significance (10% and 15%).

Figure ii: Estimated prevalence rates of stunting in children aged < 5 years (%) living in urban areas of DfID countries in 2010 and projections to 2025

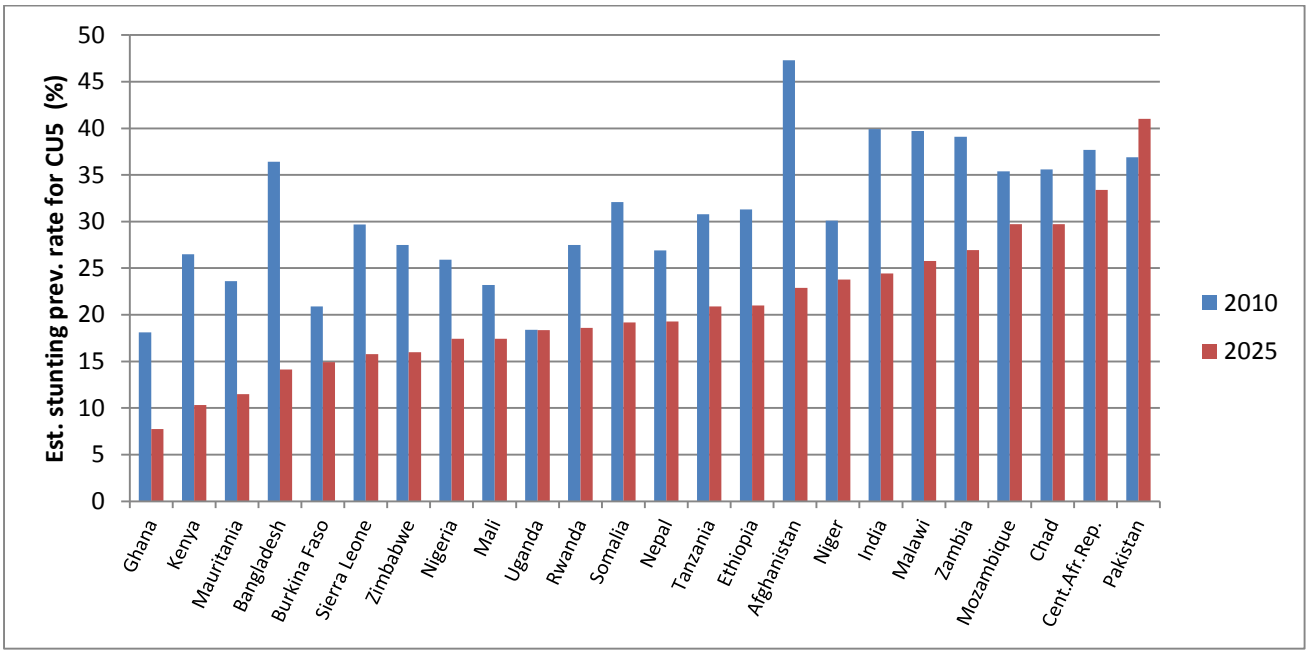
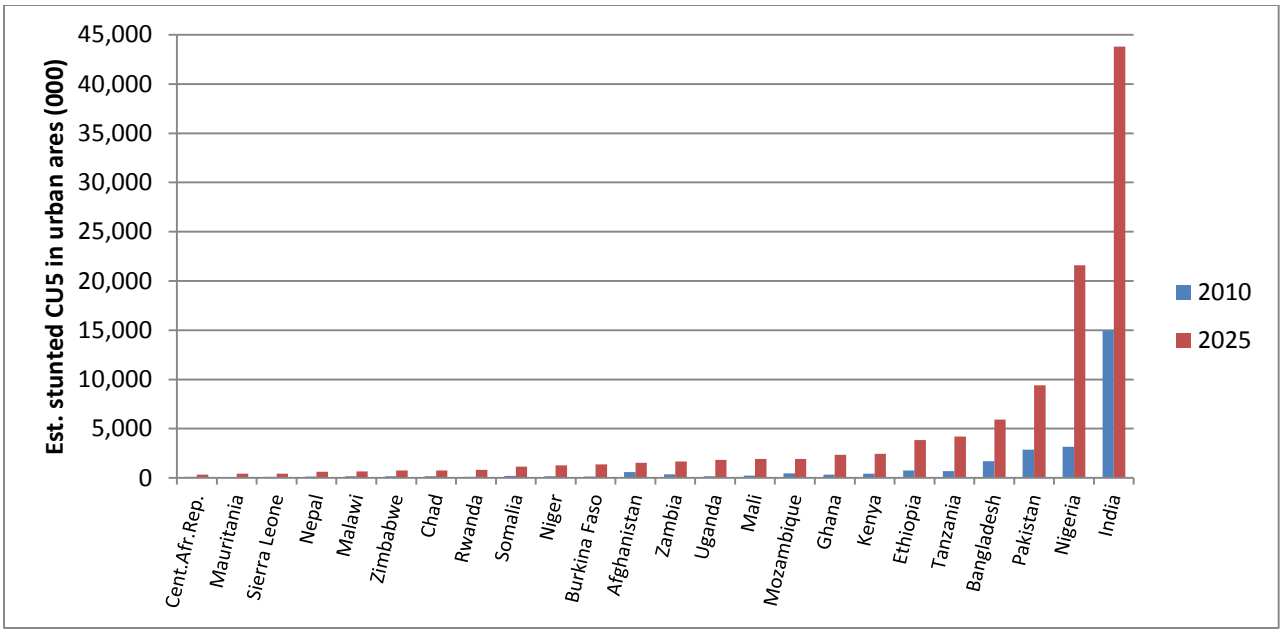


Figure iii: Estimated numbers of stunted children < 5 years (%) living in urban areas of DfID countries in 2010 and projections to 2025



Data used for projections in Figure 16 and Table 8:

- % urbanised in 2010 and 2025 from World Urbanisation Prospects (http://esa.un.org/unpd/wup/).
- World Bank estimates of numbers of children aged 0–4 years in 2025 (http://data.worldbank.org/data-catalog/population-projection-tables).

- Most recent urban and rural prevalence rates of stunting from DHS and MICS surveys (2005–2012) obtained from the Joint Malnutrition Estimates (UNICEF, WHO and the World Bank Group) dataset (http://www.who.int/nutrition/en/). *Note: All values are plotted as though surveys were in 2010.*
- Projected national stunting prevalence rate in 2025 from WHO tracking tool using current rate of reduction (http://www.who.int/nutrition/trackingtool/en/).

Assumptions used for the calculations:

- Proportional differences between urban and rural prevalence rates and national prevalence rate is the same in 2025 as 2010 (it is unknown if this would have led to over- or under-estimate of urban prevalence rates and numbers in 2025).
- Current rate of reduction in stunting prevalence rate stays constant (for most countries, this is likely to have led to overestimates of prevalence rates and numbers of stunted children in 2025).

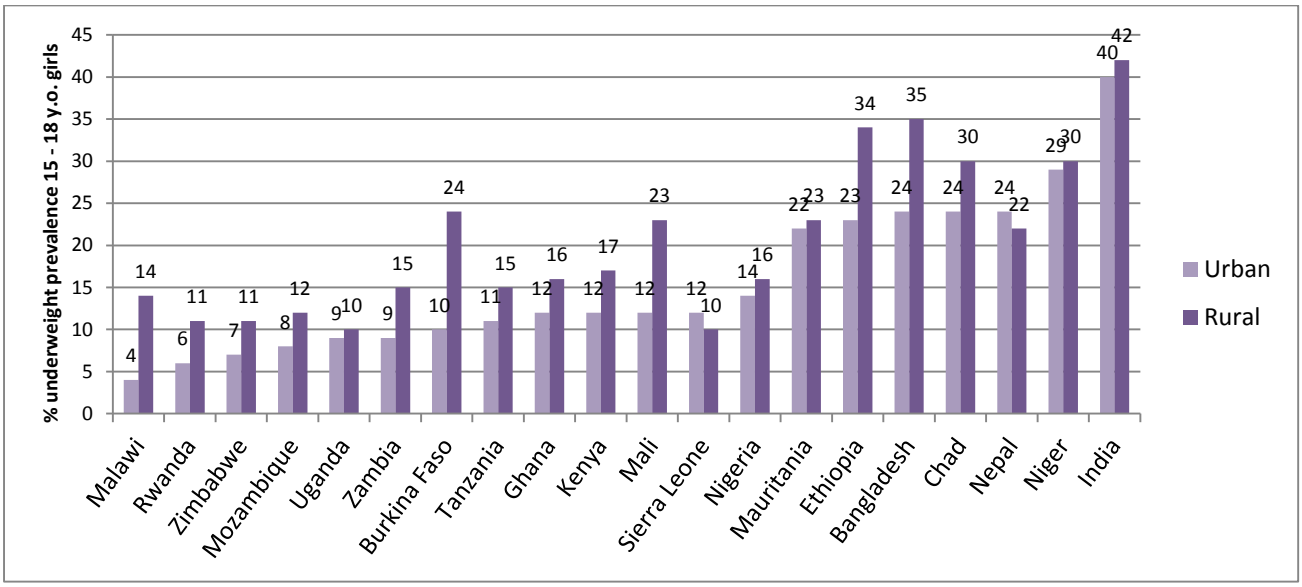
Table 8: Stunting prevalence rate and numbers stunted in children aged < 5 years (%) in urban areas of DfID countries, estimates for 2010 and projections for 2025

	Source of recent urban stunting data		Estimated urban stunting prevalence (%)		Estimated number of urban stunted children under 5 years (000s)	
	Year	Survey	2010	2025	2010	2025
Afghanistan	2010	MICS	47.3	22.9	587	1,524
Bangladesh	2011	DHS	36.4	14.1	1,698	5,911
Burkina Faso	2010	DHS	20.9	14.9	150	1,383
Cent.Afr.Rep.	2010	MICS	37.7	33.4	95	332
Chad	2004	DHS	35.6	29.7	179	772
Ethiopia	2011	DHS	31.3	21.0	750	3,859
Ghana	2011	MICS	18.1	7.8	324	2,341
India	2005	DHS	39.9	24.4	14,968	43,806
Kenya	2008	DHS	26.5	10.3	421	2,455
Malawi	2010	DHS	39.7	25.8	168	671
Mali	2012	DHS	23.2	17.4	223	1,927
Mauritania	2007	MICS	23.6	11.5	74	442
Mozambique	2011	DHS	35.4	29.7	465	1,939
Nepal	2011	DHS	26.9	19.3	144	624
Niger	2012	DHS	30.1	23.8	173	1,285
Nigeria	2013	DHS	25.9	17.4	3,154	21,582
Pakistan	2012	DHS	36.9	41.0	2,878	9,419
Rwanda	2010	DHS	27.5	18.6	118	818
Sierra Leone	2013	DHS	29.7	15.8	104	446
Somalia	2006	MICS	32.1	19.2	218	1,131
Tanzania	2010	DHS	30.8	20.9	697	4,207
Uganda	2011	DHS	18.4	18.4	175	1,841
Zambia	2007	DHS	39.1	26.9	366	1,683
Zimbabwe	2010	DHS	27.5	16.0	178	749

Shaded cells indicate prevalence rates which are high or very high according to WHO cut-off values for public health significance (30% and 40%).

3.ii Adolescents

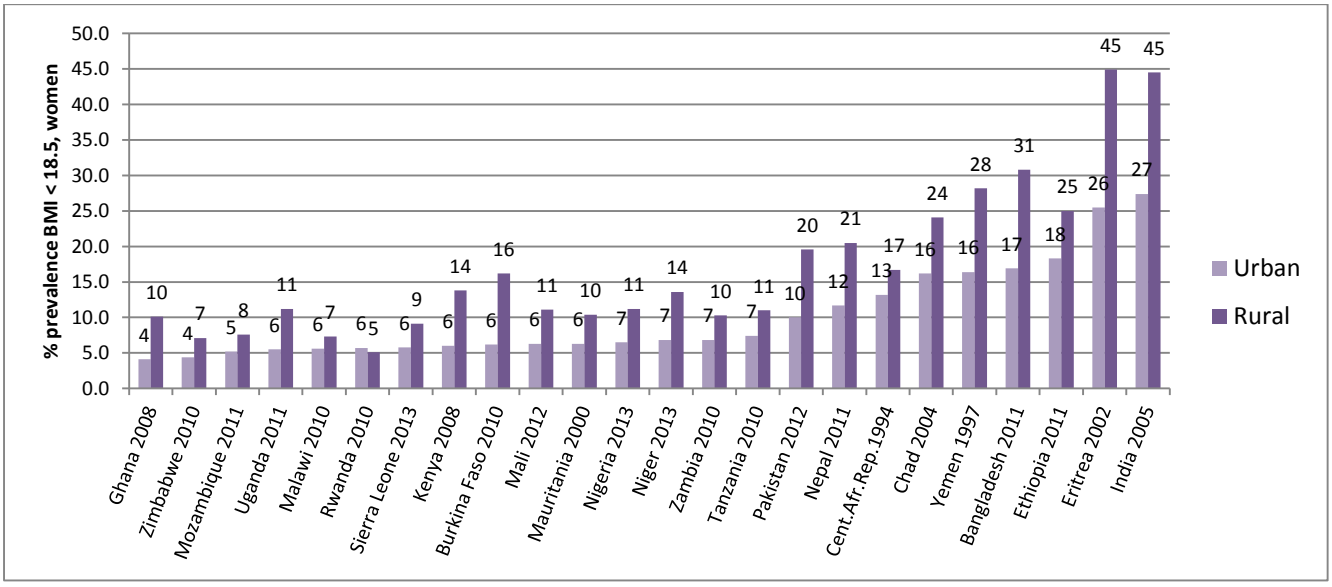
Figure iv: Underweight prevalence (%) in non-pregnant girls aged 15–18 years living in urban and rural areas of DfID countries, estimates from nationally representative surveys



Source: Jaacks et al., 2015. Underweight defined using the sex- and age-specific cut-off points for BMI recommended by the International Obesity Task Force.

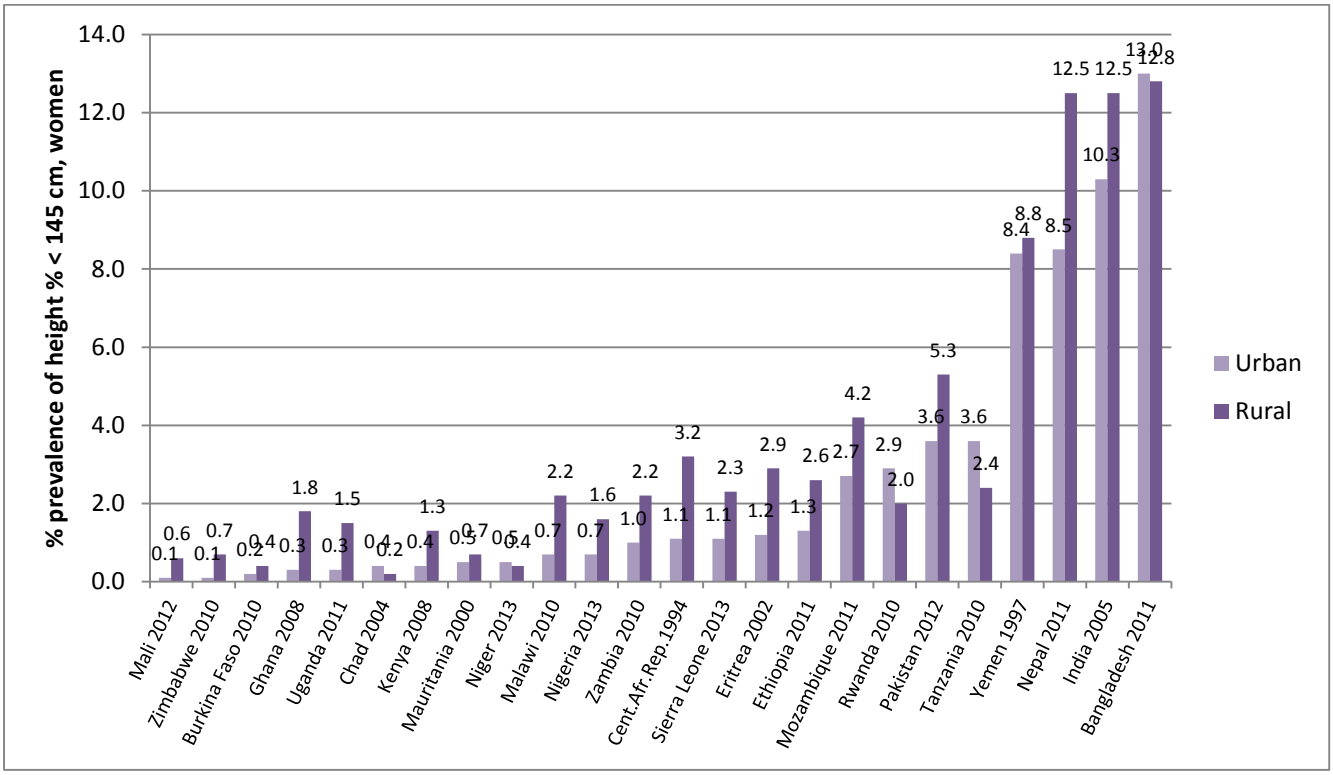
3.iii Women of reproductive age

Figure v: Percentage of women with BMI < 18.5 living in urban and rural areas of DfID countries, estimates from nationally representative surveys



Source: DHS surveys (http://www.statcompiler.com/). Includes women with births in last 3 years preceding the survey, and excludes pregnant women and those who are less than 3 months postpartum.

Figure vi: Percentage of women shorter than 145 centimetres living in urban and rural areas of DfID countries, estimates from nationally representative surveys



*Source: DHS surveys (*http://www.statcompiler.com/*); includes women with births in last 3 years preceding the survey.*

3.iv Socio-economic differentials in child stunting between urban and rural areas

Two different approaches have been used to analyse secondary data. The first approach ranks households relative to other households in the same residential stratum. So the comparison does not strictly compare the rural poor with the urban poor—it simply compares the size of the differentials between the first and the fifth quintiles within rural and urban areas. The second uses the same wealth index in both residential strata. This results in larger numbers of the urban population in the higher wealth quintiles and larger numbers of the rural population in the lower quintiles.

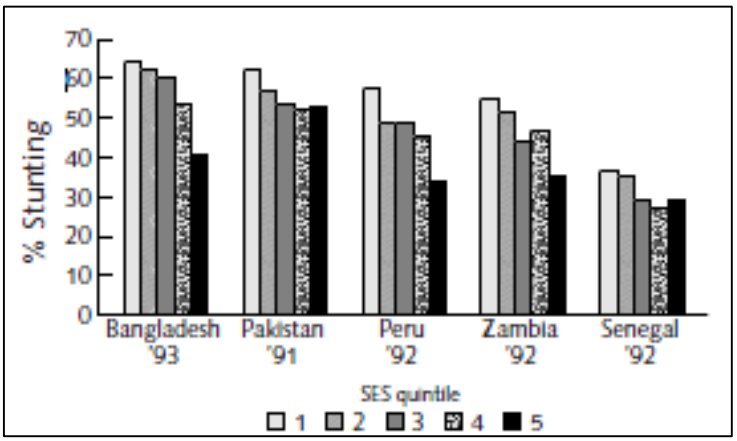
Approach 1) Menon and colleagues (2000)[3] used secondary data from the Demographic and Health Surveys for 11 countries and created a socioeconomic index for urban and rural areas separately in each country using household DHS data. Thus the population was divided into five equal-sized groups in both the rural and urban areas.

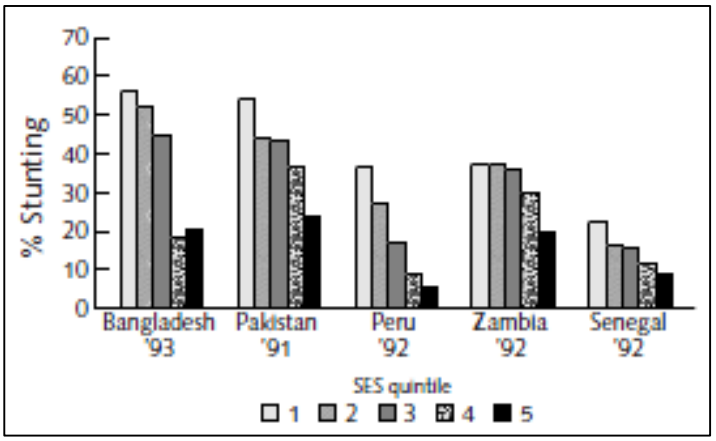
- Prevalence of stunting was lower in urban than in rural areas for all countries, but rural–urban odds ratios (OR) were relatively small (< 3.3).
- The gap between low and high socio-economic status (SES) was much larger in urban (median OR 4) than rural (median OR 1.8) areas.
- In most countries, stunting in the poorest urban quintile very similar as that among poor rural dwellers.

Figures vii and viii below show how the differences in the prevalence of stunting in the countries studied showed a dose-response relationship in both urban and rural areas. These figures also show how differences according to SES were more pronounced in urban areas (Figure vii) than rural (Figure viii).

[3] Menon P, Ruel MT, Morris SS. (2000) Socio-economic differentials in child stunting are consistently larger in urban than in rural areas. *Food & Nutrition Bulletin.* 21,282–289.

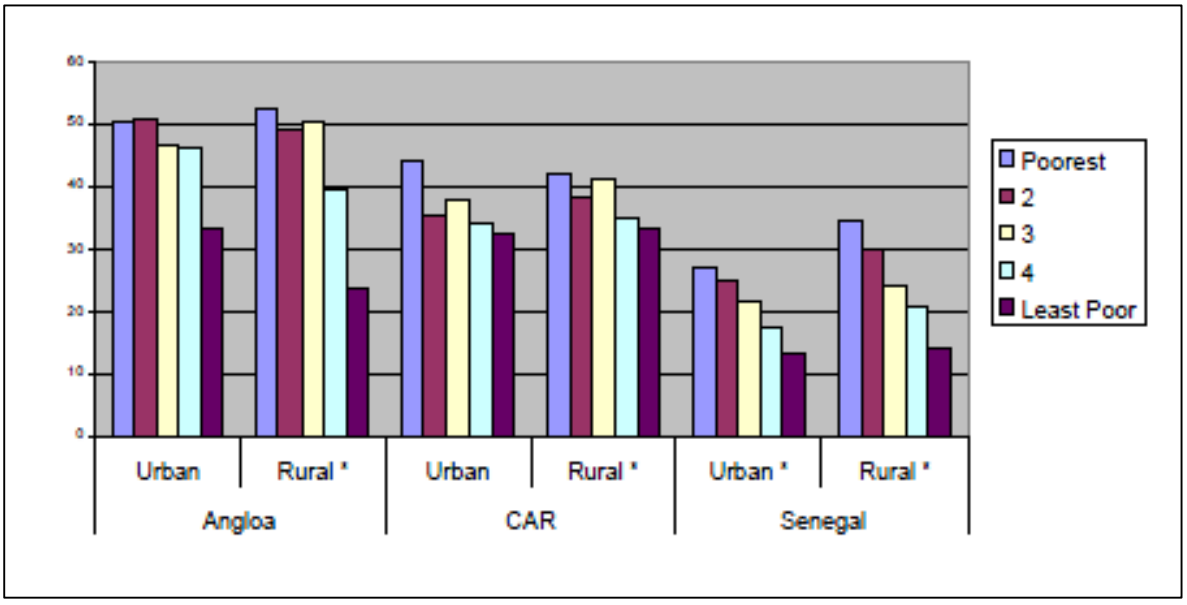
Figures vii and viii: Prevalence of stunting by quintile of socio-economic status, in rural and urban areas (Menon 2000)[4]





Approach 2) Kennedy (2003)[5] again used DHS data, choosing three countries with high-quality anthropometric data and adequate sample sizes in urban and rural areas (Angola, 2001; Central African Republic, 2000; and Senegal, 2000). For each country the children were allocation into quintiles using a wealth index derived from the DHS data based on the entire population sampled. Prevalence of stunting and underweight were the outcomes compared.

Figure ix: Prevalence of stunting by residence and wealth index quintile for Angola, Central African Republic, and Senegal (Kennedy 2003)[6]



** Indicates significant linear correlation between prevalence of stunting and wealth.*

- Overall prevalence of stunting was significantly greater in rural areas in all three countries when simple urban/rural comparisons are made.
- Stunting was significantly higher in lower economic groups compared to wealthier groups.
- When comparing within the same quintile, there were no statistically significant differences across urban and rural populations within the same in any of the three countries (however there was a trend for prevalence rates to be higher in rural areas compared to rural in the higher wealth quintiles (Figure ix).

[4] Ibid.
[5] Kennedy G. (2003) Analysis of disparities in nutritional status by wealth and residence: Examples from Angola, Central African Republic & Senegal. World Bank Urban Symposium, 15–17 December 2003.
[6] Ibid.

Annex 4 Literature summaries on evidence

4.i Strengthening policy and planning

Governance and policies: Evidence specific to nutrition but not to context		
Sources	**Relevant content**	**Points relevant for urban nutrition programming**
Acosta AM, Fanzo J. (2012) *Fighting maternal and child malnutrition: analysing the political and institutional determinants of delivering a national multisectoral response in six countries.* Brighton, IDS.	Examines stakeholders' motivations, and institutional organisational structures for delivering a national multisectoral response. Based on six country case studies	* Bodies to coordinate nutrition actions can play a critical role, but need to be given power to demand change * Local ownership of nutrition programmes and outcomes is best. Politicians are more likely to commit efforts to improve nutrition outcomes when directly accountable to citizens * Civil society groups can make problems visible * Regular collection of nutrition outcome data is needed to identify gaps and respond to crises
Gillespie S, Haddad L, Mannar V et al. (2013) The politics of reducing malnutrition: building commitment and accelerating progress. *The Lancet.* 382, 552-569.	Discusses environments and processes that underpin and shape political and policy processes relating to nutrition. Identifies three critical domains: i) knowledge and evidence, ii) politics and governance, and iii) capacity and resources.	Many countries in Asia and sub-Saharan Africa are moving to decentralised political, administrative, and financial systems, so commitment and capacity must be built at the levels at which decisions are made and resources allocated. The relevant research base is limited. In Vietnam, the role of provincial planning for nutrition was identified as a bottleneck to translation of national policy intent and frameworks into provincial-level plans and actions. It is critically important to strengthen subnational level capacity.
Haddad L, Nisbett M, Barnett I, Valli E. (2014) *Maharashtra's child stunting declines: What is driving them? Findings of a multidisciplinary analysis.* Brighton, IDS.	Using multidisciplinary analysis, this study examines the drivers behind the rapid decline in child stunting rate in Maharashtra state, India.	* The nutrition coordinating body in Maharashtra state is the "Rajmata Jijau Mother–Child Health and Nutrition Mission" which has a unique governance model (outside departmental structures, and supported by UNICEF by invitation from the state Government) giving independence and room to innovate. * There is also an active civil society, which helped raise awareness about child undernutrition, increased pressure and held government officials accountable.
Nisbett N, Gillespie S, Haddad L, Harris J. (2014) Why worry about the politics of childhood undernutrition? *World Development.* 64, 420-433.	Reviews literature on politics and processes of nutrition policy making and implementation.	* Political economy considerations affect the effectiveness of nutrition actions. Sectors which need to work in concert to achieve nutrition improvement have other prime interests. So alignment of interests around nutrition needs negotiation, contestation & settlement. * Key factors for good vertical integration between national and subnational government include local government capacity, earmarked financing, and support from local politicians.
Pelletier DL, Frongillo EA, Gervais S, et al. (2012) Nutrition agenda setting, policy formulation and implementation: lessons from the	Identifies challenges in the nutrition policy process and ways to overcome them. Based on studies from 2006 to 2009 in five countries which were part of the	* Mid-level actors from ministries and external partners had difficulty translating political windows of opportunity for nutrition into concrete operational plans, due to capacity constraints, differing professional views of undernutrition and disagreements over interventions, ownership, roles and responsibilities. * Weaknesses in human and organizational capacities from

Governance and policies: Evidence specific to nutrition but not to context		
Sources	**Relevant content**	**Points relevant for urban nutrition programming**
Mainstreaming Nutrition Initiative. *Health Policy and Planning.* 27: 19-31.	World Bank funded Mainstreaming Nutrition Initiative.	national to frontline levels severely constrained the pace and quality of implementation.
Rokx C. (2006) *Governance and Malnutrition – exploring the contribution of "good governance" to malnutrition reduction in developing countries.* PhD Thesis, University of Maastricht.	Uses country-level data from 82 developing countries. Found countries with higher scores on indices of governance have lower levels of child under-nutrition (indices were voice/demand and accountability; political stability; government effectiveness; and rule of law and control of corruption).	* The quantitative data provides evidence of a link between progress in governance at country-level and reduced child malnutrition. *The case-study of governance in Madagascar shows that 'voice' can be created through building local support and creating demand for improved nutrition. This voice led to lower levels of undernutrition, via increased government commitment, accountability and financing for nutrition. Shows that community participation has value as an instrument for building public accountability for nutrition.
Smith LC, Haddad L. (2015) Reducing child undernutrition: Past drivers and priorities for the post-MDG era. *World Development.* 68, 180-204.	Econometric analysis of country-level data (from 116 developing countries from 1970–2012) indicates clearly that improvements in the quality of governance reduces child stunting.	* Governance works through the underlying determinants of stunting. * The effects of governance seem to be strongest through improving access to safe water. * Improved governance takes a long time to work through to stunting reduction, suggesting that whatever nutrition interventions can do to improve micro-governance surrounding them will be useful.
Ved R, Menon P. (2012) *Analyzing intersectoral convergence to improve child undernutrition in India.* IFPRI Discussion Paper 01208. Washington, DC: International Food Policy Research Institute (IFPRI).	Examines the extent of "convergence" across sectors for action on nutrition in India.	Despite recognition of the importance of convergence to improving child undernutrition in India, the process has been limited and ineffectual. Poor convergence is due to: * Failure to include convergence in policy formulation. * Lack of attention to necessary institutional modifications. * Lack of monitoring to assess extent of convergence Implementers with experiential understanding have the view that convergent action is an almost insurmountable barrier.

Governance: Evidence specific to urban context but not to nutrition		
Publication	**Relevant content**	**Points relevant for urban nutrition programming**
Jones H, Clench B, Harris D. (2014) *The governance of urban service delivery in developing countries - literature review.* London: Overseas Development Institute (ODI).	Reviews literature on governance of urban service delivery in developing countries.	* Compared to rural settings, urban governance involves a large and diverse range of actors, and there is a strong theme of working with or through the private sector for service delivery. * Not much evidence exists that decentralisation of power to city level results in improved service delivery, but in any case. * Despite numerous efforts at decentralisation, typically only very limited control given to local government bodies in urban areas. * Externally-imposed solutions lead to disappointing results due to insufficient local ownership/no attempt to locally tailor them.
Kjellstrom T, Mercado S, Sattherthwaite D, Mccgranahan G, Friel S, Havemann K. (2007)	Synthesizes knowledge about social determinants of health in urban	Key features of healthy urban governance are: * Putting health and nutrition equity and human development at the centre of government policies and actions. * Building on and supporting community grassroots efforts of the

Governance: Evidence specific to urban context but not to nutrition		
Publication	**Relevant content**	**Points relevant for urban nutrition programming**
Our cities, our health, our future: Acting on social determinants for health equity in urban settings. Report to the WHO Commission on Social Determinants of Health from the Knowledge Network on Urban Settings. Kobe, Japan: World Health Organization Kobe Centre.	settings, and provides guidance and examples of interventions that have been effective in achieving health equity. Includes 13 case studies which address governance as part of the causal pathway for policy interventions related to "healthy urbanisation".	urban poor to gain control over their circumstances and the resources they need to develop better living environments and public service provision. * Developing mechanisms for bringing together private, public and civil society sectors. * Winning and wisely using resources (aid, investment, loans).
Satterthwaite D, Mitlin D, Patel S. (2011) *Engaging with the urban poor and their organizations for poverty reduction and urban governance.* New York: United Nations Development Programme (UNDP).	Reports on the many initiatives of organizations formed by the urban poor and the potential they have as partners for UNDP offices.	Organised groups exist of the urban poor, in many different contexts, organized around their livelihoods or around savings. Engaging with the informal sector via these groups in urban areas can strengthen local governance. International agencies that want to work with grassroots organisations must understand how these organisations work and negotiate.
Satterthwaite D, Mitlin D. (2013) *A future that low-income urban dwellers want, and can help secure.* Human Settlement Working Paper series Poverty Reduction in Urban Areas-38. London: International Institute for Environment and Development (IIED).	Looks forward at what international, national and local development agencies and governments can do to support urban poverty reduction. "Good governance" refers to the vital relationships between citizens and their local administrations.	Institutional constraints exist on international agencies and banks that limit their contribution to community-driven processes to reduce poverty. National and local governments have also offered only limited support. Principles behind good practice for initiatives (all included a strong focus on local initiatives on housing, land tenure and basic services): * Explicit provision for more voice for low-income groups and more voice at the city-scale, and for supporting their active engagement in developing solutions. * The need to change relationships between urban poor groups and local government, and other state agencies. This requires strong collective autonomous organizations.

Governance: Evidence specific to nutrition in the urban context		
Publication	**Relevant content**	**Points relevant for urban nutrition programming**
Food and Agriculture Organization of the United Nations (2011) *Food, agriculture and cities: The challenges of food and nutrition security, agriculture and ecosystem management in an*	Describes the challenges that continuing urbanization brings to food, agriculture, and the management of natural resources, with some case studies described. Argues that people-centred approaches to local, bottom-up efforts to address food security and sustainable diets call for new policy tools, and implementation of "multi-level food system governance" through new	Traditional and new institutional mechanisms for multisector urban-rural food and agriculture development already exist. Varied multistakeholder groups hold local governments accountable to their commitments, and generate debate and ideas about emerging issues related to food security.

Governance: Evidence specific to nutrition in the urban context		
Publication	**Relevant content**	**Points relevant for urban nutrition programming**
urbanizing world. FAO Food for the Cities multi-disciplinary initiative position paper. Rome: FAO. **Descriptive**	forms of participatory governance. Also discusses how the design and implementation of new institutional arrangements between urban and rural authorities, including producers and consumers, civil society and social movements, is a very culture- and site-specific process.	The report was prepared as an advocacy tool and to assist in developing operational strategies.
Food and Agriculture Organization (2015) *Food for the Cities Programme: Building sustainable and resilient city region food systems.* Rome, FAO. **Descriptive**	FAO's Food for the Cities Programme focuses on: * Strengthening capacity of local actors within a local food system to improve food and nutrition security. * Strengthening urban-rural linkages for more inclusive, efficient and resilient activities of small-scale agriculture within a local food system while ensuring sustainable use of natural resources. * Fostering participatory multistakeholder dialogue processes in order to build ownership by all actors. * Scaling up practices by evaluating/ monitoring/mapping city region food systems.	* The Food for Cities Programme, in collaboration with RUAF's City Tools Project (Resource Centre for Urban Agriculture & Forestry) is engaging with city regions to develop frameworks and action plans that underline priority areas of intervention to build sustainable and resilient city region food systems. * The process involves participatory multistakeholder dialogue; food system assessment; policy support/ participatory planning, and knowledge sharing/dissemination/training.
Justice J. Gopinath R. Raichowdhury S. Verma, R. Kantner, A. (2012) *USAID/India Health of the Urban Poor Project Mid-Term Evaluation Report.* New Delhi: United States Agency for International Development **Descriptive**	The Health of the Urban Poor (HUP) project was designed to work at state, municipal, and community levels to develop innovative policies and program strategies to better meet the health needs of the urban poor. The project's main focus is on maternal and child health, improvement of water and sanitation facilities, and nutrition. Evaluation took place after one year of project implementation, using indicators of primarily administrative process measures, reporting on activities being implemented by the project. *Note: the final evaluation is taking place between June-September 2015.*	There are highly variable policy environments for urban health across the states where HUP is deployed Project work plans do not emanate from an overall state urban health plan Practical constraints limited the range of activities which could be implemented as part of the Urban Health and Nutrition Days. These included limited physical space, non-availability of outreach health workers, and non-availability of IFA/deworming tablets and salter scales.
Pridmore P, McCowan T, Carr-Hill R, Amuyunzu-Nyamongo M, Lang'o D, Charnes G, et al. (2014) *Nutritional Improvement for children in urban Chile and Kenya.* Full Research Report. London: Economic and Social Research Council. **No evidence (rating C) of effectiveness**	Examines whether child malnutrition amongst families living in poverty in informal settlements in Mombasa and Valparaíso can be reduced through broadening community and stakeholder participation to change the social determinants of nutritional status. Multisectoral nutrition working groups were formed in each city with three bi-annual cycles of participatory action research. Findings: * In Kenya, nutritional status of around 500 children aged 24–59 months in each of the intervention and control areas was evaluated using baseline (Summer 2011) and follow-up (Summer 2013) anthropometric and	* Sensitively facilitated and supported action research process can enable municipal level multisectoral teams to plan and implement co-ordinated inter-sectoral actions. These actions can build community capacities to tackle social determinants of urban child nutrition. * It is difficult to show impact in such a complex environment. * Support is needed for members of the group as intersectoral collaborative approach is new. * Actions can emerge from the community itself by strengthening

Governance: Evidence specific to nutrition in the urban context		
Publication	**Relevant content**	**Points relevant for urban nutrition programming**
Evidence classification: O- *Controlled design, but the control area was not well matched with the intervention area. Sampling method and size fine. Anthropometric outcomes assessed.*	household surveys using a controlled before-and-after trial design. Rate of child stunting was reduced in the intervention area but in the control area the reduction was greater. This was attributed to greater negative changes in employment, food security, income and in- and out-migration in intervention area. * In Chile no follow-up survey data were collected. * Multisectoral working group members in both cities overcame the 'silo mentality' and developed capacity to work with other sectors; to build leadership and advocacy skills; and implement and evaluate small-scale, co-ordinated inter-sectoral actions[7]. * Kenya working group is still operational and study findings fed into policy development.	community action. * The policy environment must be supportive for multisectoral engagement. * Access to healthy food choices is key. * Capacity-building relates to empowerment, and transforming existing knowledge into new ways of understanding and working.
de Zeeuw H, Drechsel P. (2015) *Cities and agriculture: Developing resilient urban food systems.* London: Routledge. **Descriptive**	Presents experience and evidence-based explanations of the key dimensions of urban food challenges and types of intra- and peri-urban agriculture. Options discussed for the institutional responsibility for urban food strategies are: 1) Municipal department of food—but this option loses the opportunity to link varied policy domains and goals. 2) Interdepartmental body under responsibility of planning department—can bring a more holistic understanding of issues. 3) Separate food policy council—a steering group or network of actors from public, civil society, and private sectors.	The authors identify the third option as ideal, as involves stakeholders of different types working in partnership, and is less vulnerable to political change. They question to what extent it could work in cities/city-regions where institutional capacity is weak. The discussion mirrors the thinking which has taken place at national level in relation to where nutrition should sit within national government institutional structures.

National urban nutrition strategies and policies	
Country (city) and source	**Source**
Kenya Urban Nutrition Strategy (2013–2017)	Government of Kenya. (2012) Kenya Urban Nutrition Strategy 2012–2017, draft. Nairobi: Ministry of Public Health and Sanitation.
Delhi, India, state-specific urban nutrition policy is being drafted with help of Save the Children	Palo L. (2013) Urban Nutrition Strategy, Delhi. Presentation on behalf of Save the Children and the Coalition for Sustainable Food Security in India. Consultation on drafting the Delhi State Urban Policy, 26 September 2013.

[7] Training and actions focused on balcony farming; production and use of energy saving devices; other income generation activities (domestic waste processing and bead making using locally available recyclable materials); training on domestic violence prevention & mitigation, and psychosocial support training.

Urban food strategies and policies	
Country (city) and source[8]	**Governance mechanism**
Argentina (Rosario)	Unknown
Brazil (Belo Horizonte) since 1993 Described in: Rocha C, Lessa I. (2009) *Urban governance for food security: The alternative food system in Belo Horizonte, Brazil.* International Planning Studies. 14(4): 389-400.	An inter-departmental body, the SMAAB (Secretaria Municipal Adjunta de Abastecimento), has a separate administrative structure and budget. The programme is advised by a 20 member council, with representatives from government, labour unions, food producers and distributors and civil society organizations.
Madagascar (Antanananarivo)	Unknown
Peru (Lima)	Unknown
Sri Lanka (Kesbewa)	Unknown

Urban multisectoral programmes to address nutrition	
Country (city) and source	**Summary**
India. Described in: Ministry of Women and Child Development (MWCD). (2013) *Multi-sectoral programme to address the maternal and child malnutrition in selected 200 high-burden districts: An overview.* New Delhi: MWCD.	1) "Urban Models" would be piloted in select urban slums/vulnerable pockets of the four mega cities: Chennai, Delhi, Kolkata, and Mumbai. Innovative interventions of addressing maternal and child undernutrition would be supported. 2) Interventions may also be undertaken in the urban centres of the selected high burden districts by the District Councils.

4.ii Nutrition and health programming

Nutrition-specific programming

[8] Mentioned in de Zeeuw H, Drechsel P. (2015) Cities and agriculture: Developing resilient urban food systems. London: Routledge

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
SYSTEMATIC REVIEWS/CROSS-COUNTRY REVIEWS					
1. De-Regil LM, Suchdev PS, Vist GE, Walleser S, Peña-Rosas JP. Home fortification of foods with multiple micronutrient powders for health and nutrition in children under two years of age (Review). *Evidence Based Child Health.* 2013; 8(1):112-201. doi: 10.1002/ebch.1895.	GLOBAL purview Systematic review Included 8 "trials" (RCT & quasi-experimental) that were selected using rigorous criteria based on study design and risk of bias	**Evidence classification: R** Methodological details of each study included in the systematic review are not described in great detail. However, given the rigor of the inclusion criteria, it appears that the studies informing the systematic review meet the standard re: counterfactual evidence. Although most studies had experimental or quasi-experimental designs, there was tremendous variation in sample size, and a limited number of studies focused specifically on urban populations.	Primary population of interest: children aged 6-23 mos. The interventions entailed "point-of-use" fortification (at home or other places where meals are consumed [e.g., schools or refugee camps]) There were variations in fortification, e.g., use of micronutrient powders, syrups	Anaemia prevalence in infants and children; anthropometric measures (stunting/wasting) were secondary outcomes, as was diarrhoea	Composition of supplements deemed effective in improving nutrition status: 12.5 mg dose of elemental iron (ferrous fumarate) along with 5 mg of zinc and 300 µg of vitamin A A very small number of studies (from Mexico, Pakistan, South Africa) focused on urban populations. Inconclusive evidence on effectiveness of home fortification, particularly in urban areas
2. Fotso JC. (2006) Child health inequities in developing countries: differences across urban and rural areas. *International Journal for Equity in Health*.5(9):1-10.	EAST AND SOUTHERN AFRICA purview A DHS cross-country comparison, looking at stunting as the main dependent variable, and controlling for a number of other variables linked to nutritional status (e.g., maternal education)	**Evidence classification: R** Analysis of DHS data from surveys conducted since January 2005 in the following 15 countries: Burkina Faso, Cameroon, Chad, Côte d'Ivoire, Ghana, Nigeria, and Togo from Western and Central Africa, and Kenya, Madagascar, Malawi, Mozambique, Tanzania, Uganda, Zambia and Zimbabwe Multivariate logistic regression analysis served as a means of estimating risk while controlling for various factors.	Not applicable (yielded contextual evidence)	Stunting	The widest intra-urban gap in child malnutrition existed in Mozambique, Tanzania, Kenya, Nigeria and Uganda; the narrowest gaps exist in Chad, Ghana, Zambia, and Zimbabwe. For all countries, and regardless of urban or rural residence, children from the poorest households had the greatest risk of being malnourished, which is consistent with the broader literature.
3. Keino S, Plasqui G, Ettyang G, van den Borne B. (2014) Determinants of stunting and overweight among young children and adolescents in sub-	SUB-SAHARAN AFRICA purview Systematic review of 18 studies conducted between 1990 and 2012, with data on stunting, underweight, and/or	**Evidence classification: R** Inclusion criteria are not presented in the article, nor is it clear whether the 18 studies are based on methodologically rigorous approaches (e.g., DHS, MICS)	Not applicable (yielded contextual evidence)	Stunting, underweight, overweight	Boys are more likely to be stunted than girls. Rural-urban residence was identified as an environmental determinant of both stunting and overweight.

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
Saharan Africa. *Food and Nutrition Bulletin*. 35: 167-178.	overweight on children ages 0-18 years of age from sub-Saharan African countries	Sample sizes are presented for each study; however, there is wide variation, with one study based on a sample size as low as 46, whereas others have sample sizes in the thousands.			The review highlighted the coexistence of under- and over nutrition in the same households and individuals (particularly among under fives), something that is documented in other literature as an urban phenomenon. However, this review does not link this phenomenon specifically to urban areas.
4. Woldt M, Moy GG. (2015) *Literature review on effective food hygiene interventions for households in developing countries.* Washington, DC: FHI 360/Food and Nutrition Technical Assistance project (FANTA).	GLOBAL purview Systematic review	**Evidence classification: [R]** Very stringent inclusion criteria: Out of 1,403 journal articles covering food hygiene over the past two decades, 23 studies - 9 of which were intervention studies - met the inclusion criteria for the review. Seven of those nine studies focused on interventions for mothers of young children related to preparing complementary food and two focused on family food preparation. Many of the urban intervention studies were of a very short duration; however, the authors were transparent in noting this and other limitations of the literature they reviewed. Ultimate nutritional status outcomes were not a key focus of the studies reviewed.	The overwhelming majority of intervention studies focused on educating mothers on optimal practices related to food preparation and storage. Modalities adopted included both one-on-one and group-based formats. Length of interventions ranged from four weeks to two years.	Pathogens in food Hygiene practices Diarrhoea prevalence	Hygiene issues associated with foods prepared by street and market vendors (identified as an important source of complementary foods for young children in urban areas) warrants further investigation.

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
5. The World Bank Group (2010). *What Can We Learn From Nutrition Impact Evaluations? Lessons From A Review of Interventions to Reduce Child Malnutrition In Developing Countries.* Washington, DC: World Bank.	GLOBAL purview Systematic review of 46 nutrition impact evaluations that were published since 2000, 12 of which were World Bank supported programmes.	**Evidence classification: R** All the evaluations entailed some form of a comparison (either through statistical modelling, matching, or random assignment); about half of all the evaluations included in the systematic review used randomized assignment to create treatment and control groups	Intervention packages were quite varied; most entailed an integrated package of interventions such as nutrition education, deworming, CCT, and home gardens, not standalone interventions	Height, weight, wasting, and low birth weight	No clear pattern in terms of the impact of particular intervention approaches on outcomes of interest This review highlighted the paucity of quality evidence, particularly re: specific segments of the target population benefiting the most from nutrition interventions. Cost-effectiveness data are also scarce.
INDIVIDUAL INTERVENTION STUDIES					
6. Ahmed, AU. *Impact of Feeding Children In School: Evidence from Bangladesh.* Washington, DC: IFPRI; 2004.	BANGLADESH (highly food-insecure rural areas and four slums in Dhaka) An evaluation study that involved school, household and community surveys. Baseline and follow up assessments Econometric models were used to determine the impact of the school feeding alone, controlling for the effects of income and other factors. Entailed urban-rural comparison	**Evidence classification: O** Used regression modelling to control for the effects of other factors However no tests for interaction between effect of SFP and urban area were undertaken, so it is not possible to say whether the programme's effect differed between the urban and rural contexts. Sample sizes for anthropometric assessment are not clearly presented, although the school feeding programme covered 1.21 million primary school children in 6,126 schools in 366 upazilas (rural areas of 32 upazilas and urban slums in 4 upazilas in Dhaka City) in 2003 4,453 households (3,193 program and 1,260 control households) were surveyed in the village and urban	Entailed a mid-morning snack (8 fortified wheat biscuits) to primary school children Biscuitsd provide 300 kilocalories and 75% of RDA of vitamins and minerals	BMI was the main nutritional outcome assessed. Investigators noted sharing of biscuits. Participating students also appear to share SFP biscuits with younger siblings and other household members	The SFP raises school enrolment, and increases BMI and academic achievement. The biscuits are almost entirely additional to the child's normal diet. KEY FACTORS IN UNDERNUTRITION: child age, mother's BMI, mother's education, household size, number of female children under 5 years of age in the household, and residence in an urban slum (children in urban slums have significantly lower BMI than children in rural areas.) Both enrollment rates and attendance rates are much lower in urban slum communities than in rural, and dropout rates are higher

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
		slum-community census.			
7. Akter, S.M., Roy, S.K., Thakur, SK, Sultana, M, Khatun, W, et. al. Effects of third trimester counseling on pregnancy weight gain, birthweight, and breastfeeding among urban poor women in Bangladesh. *Food and Nutrition Bulletin.* 2012; 33(3):194-201.	BANGLADESH (urban—Dhaka) Sample size: N=115; 1 intervention, 1 comparison group	**Evidence classification:[O-]** Very small sample size (N=57 and 58 in intervention and comparison groups, respectively), even though women were randomly assigned to one of the two groups. Selection bias given the fact the recruitment was limited to ANC attendees at a local health institution (Maternal and Child Health Training Institute)	3-month IEC/BCC intervention, administered in group format (6-8 women per group) Women were weighed on a monthly basis.	Maternal weight gain in 3rd trimester Birthweight Immediate breastfeeding Exclusive breastfeeding at 1 month of age	* Intervention and comparison groups were comparable at baseline in terms of nutritional status and socioeconomic characteristics. * Statistically significant weight gain in third trimester amongst women in the intervention group. * 34% more women in the intervention group increased the frequency of their meals from three to five times a day.
8. Berger, S, de Pee, S, Bloem, M et al. Malnutrition and morbidity among children not reached by the national vitamin A capsule programme in urban slum areas of Indonesia. *Public Health*. 2008; 122:371–378.	INDONESIA (5 major urban slum areas: five major urban slum areas of Indonesia in the cities of Jakarta, Surabaya, Semarang, Makassar, Padang) Based on national nutrition surveillance data Large sample: 138,956 children, aged 12–59 months Only data from children aged 12-59 months at start of most recent Vitamin A capsule distribution round were used. The surveillance system used a stratified multistage cluster sampling of households in sub-districts of administrative divisions and in slum areas of large cities. A purposive sampling design was used to	**Evidence classification: O** Cross-sectional comparison of those children who received capsule and those who did not.	Oral vitamin A supplementation in the last 6 months = 60mg retinol equivalent to children aged 12-59 mos. and half that dose to children under 6 mos. of age Administered at sub-village health posts	Weight for age z-scores Height for age z-scores Iron-deficiency anaemia	Demonstrates the effectiveness of a vitamin A supplementation program in an urban setting & provides strong evidence of the role vit. A can play in reducing proximate determinants (e.g., illnesses such as fever or diarrhoea) and anaemia. Children who did not receive vitamin A supplementation were also significantly more likely to be anaemic and have diarrhoea or fever than children who received supplementation. Although deemed statistically significant due to the large sample size, stunting rates only differed by 2 percentage points between children who did and did not receive supplements. Underweight prevalence differed by approximately one percentage point. Wasting rates were virtually

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
	target poor households.				identical between the two groups
9. Bolam A, Manandhar Dharma S, Shrestha Purna, Matthew E, Costello AM. (1998) The effects of postnatal health education for mothers on infant care and family planning practices in Nepal: a randomised controlled trial. *BMJ.* 316: 805.	NEPAL (urban—central Kathmandu) RCT Sample size: N=540 mothers from a maternity hospital Mothers were randomly allocated to one of four groups: health education immediately after birth and three months later (group A), at birth only (group B), at three months only (group C), or none (group D).	**<u>Evidence classification: [T-]</u>** Multiple cohorts of women followed between November 1994 and May 1996 Selection bias associated with limiting the study to women who sought facility-based delivery care and postnatal care. Study did not assess impact on the ultimate outcomes of interest Fairly small sample size is a limitation, particularly given the multiple study arms.	IEC/BCC intervention: one-on-one 'health education' at the time of delivery and at three months post-delivery	Duration of exclusive breast feeding; appropriate immunisation of infant; knowledge of oral rehydration solution and need to continue breast feeding in diarrhoea; knowledge of infant signs suggesting pneumonia; uptake of postnatal family planning	The only statistically significant differences pertained to contraceptive use at 6 months postpartum (Mothers in groups A and B (received health education at birth) were slightly more likely than mothers in groups C and D (no health education at birth: (odds ratio 1.62, 95% confidence interval 1.06 to 2.5). No other significant differences documented between groups.
10. Deshmukh PR, Garg BS, Bharambe MS. (2008) Effectiveness of weekly supplementation of iron to control anaemia among adolescent girls of Nashik, Maharashtra, India. *Journal of Health, Population and Nutrition.* 26; 74-78.	INDIA (urban—Nashik [Maharastra state]) Sample selected from beneficiaries of Adolescent Nutritional Anaemia Project' for unmarried, non-pregnant, adolescent girls, aged 14-18 years N=342 in each stratum (urban, rural, tribal) Baseline and midline assessments; no control or comparison groups	**<u>Evidence classification: C-</u>** Randomly selected households from a nutritional surveillance system The investigators used multivariate analysis to control for potential confounders. Without a counterfactual, it is not possible to make definitive statements re: the impact of this intervention, although there was a baseline versus follow up comparison A relatively small sample size in each stratum is also a shortcoming.	Weekly micronutrient supplementation with iron folic acid tablets (100-mg iron and 0.5-mg folic acid); 3-day life-skills training sessions (3 hours per day)	Haemoglobin levels (rating of mild anaemia (100-119 g/L), moderate anaemia (70-99 g/L), and severe anaemia (<70 g/L; Two-month compliance with iron supplementation (expectation of 9 tablets over	Baseline anaemia prev= 65.3% (tribal girls (68.9%), urban slum girls (64.2%), rural girls (62.8%). Follow up: statistically significant decline in rural and tribal girls, <u>NOT in urban subjects</u> (only dropped to 62%). The authors attribute the poorer performance of the intervention in urban slum areas to the fact that a lower percentage (78.7%) of urban girls attended Life Skills Education sessions -AND- there was much lower compliance with iron suppl. (82% vs. over 92% in the other two groups). *Not proven to be a viable option in*

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
				2 months)	*urban areas; alternative models of ensuring compliance need to be explored*
11. Fernandes MBF, López RVM, de Albuquerque MP, Marchesano AC, Clemente APG, Martins VJB, Sawaya AL. (2012) A 15-year study on the treatment of undernourished children at a nutrition rehabilitation centre (CREN), Brazil. *Public Health Nutrition.*15: 1108-1116.	BRAZIL (URBAN—Sao Paolo) N=228 undernourished children from southern slums of Sao Paulo who received treatment at CREN between the years 1994 and 2009. Targeted children 0-71 months who were undernourished but could not be rehabilitated via either a home-visit approach or out-patient clinics. Equal numbers of boys and girls.	**Evidence classification: N-** No counterfactual evidence Orientation of the study was on factors that determined length of treatment, rather than the 'impact' of treatment on nutrition outcomes	Eligible children were accepted into a day-hospital programme, based either on their residence in impoverished communities (as assessed via anthropometric field censuses) or from public health units. Daily intervention: Five daily meals + recreational and educational activities (including hygiene practices) + nap time after lunch + periodic medical exams.	Weight-for-age, height-for-age and BMI-for-age Z-scores Neuro-psychomotor development	Boys were significantly more likely than girls to be severely undernourished. Moderately undernourished children had the lowest probability of remaining undernourished after five years of treatment. Children with developmental delays were more likely to remain undernourished.
12. Gartner A, Maire B, Kameli Y, Traissac P, Delpeuch F. (2006) Process evaluation of the Senegal-Community Nutrition Project: an adequacy assessment of a large scale urban project. *Tropical Medicine & International Health.* 11: 955-966.	SENEGAL (urban—Diourbel) Three cities (selected from the nationwide Community Nutrition Project, which focuses on urban areas of Senegal. Process evaluation included N=3864 children 6-36 mos. (from a grand total of 4084 children across four cohorts)	**Evidence classification: N** Solely a process evaluation; not designed to address the question of programme effectiveness vis-à-vis anthropometric outcomes Very large sample size Findings presented do not, however, speak to implementation/operational issues associated with the interventions assessed	Community nutrition centres (CNCs) were the point of intervention, offering child Growth Monitoring (monthly) and food supplementation (weekly), and educational sessions to caregivers.	Underweight (%) in young children (0-60 mos., not the conventional age group of 0-59 mos.); attendance at growth monitoring; food supplements distributed; nutritional	Low rate of nutritional recovery; targeting issues; caregiver attendance at educational sessions far lower than anticipated (target attendance: 80%). The investigators document some of the reasons behind the observed outcomes (e.g., conflicting scheduling of nutrition sessions with income-generating activities)

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
				recovery (ratio of children who were no longer underweight at end of follow-up to children who were underweight at recruitment)	
13. Huicho L, Dávila M, Campos L, Drasbek C, Bryce J, Victora CG. (2014) Scaling up Integrated Management of Childhood Illness to the national level: achievements and challenges in Peru. *Health Policy and Planning.* 20(1): 14–24.	PERU—national purview Covered all 34 districts of Peru Included primary data collection (survey) and retrospective records review Due to the phased scale-up approach, investigators were able to assess health worker performance vis-à-vis IMCI in IMCI and non-IMCI districts Limitation: data for several recommended indicators for IMCI monitoring were not available at district level	**Evidence classification: [N-]** Although the study covered both urban and rural areas, the specific sampling approach is poorly described. The study presents data on operational outcomes (e.g., related to health worker training and performance), but it did not establish a direct link between IMCI—whether it's discrete components or the overall approach—on either the proximate determinants or the ultimate nutrition outcomes of interest (e.g., anthropometric measures)	Standard IMCI package (Includes a global package of nutrition-specific and nutrition-sensitive interventions)	Focused on operational outcomes such as health worker adherence to IMCI protocols, operational issues related to community-IMCI	Only generic recommendations emerged from the evaluation re: factors such as ensuring sufficient budget for implementation and supervision, addressing gaps in routine health information systems. No insights are gleaned re: IMCI in the urban context, in particular.
14. Jahan K, Roy SK, Mihrshahi S, Sultana N, Khatoon S, Roy H, et al. (2014) Short-term nutrition education reduces low birthweight and improves pregnancy outcomes among urban poor women in Bangladesh. *Food and Nutrition Bulletin.* 35:	BANGLADESH (Urban—Dhaka) RCT N=300 pregnant women attending antenatal care at 2 ANC clinics in Dhaka	**Evidence classification: [T-]** Small sample size despite being an RCT Selection bias based on the fact that the intervention study is limited to ANC attendees; consequently, findings should not be extrapolated to all urban pregnant women Data generated on proximate determinants, not anthropometric	Nutrition education, with a focus on promoting consumption of khichuri during the third trimester of pregnancy Very short follow up	IN WOMEN: maternal weight gain in 3rd trimester; IN CHILDREN: birthweight; immediate breastfeeding; EBF @ 1 month	Nutrition education significantly reduced the rate of low birthweight and increased maternal weight gain. There were statistically significant differences between intervention and control group in (a) maternal weight gain in the third trimester [60% higher (8.60 vs. 5.38 kg, p = .011); (b) mean birth weight [20% higher (2.98 vs. 2.49 kg, p < .001); (c) rate

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
414-421.		indices such as stunting, wasting, underweight in women and/or children			of low birth weight [94% lower (2.7% vs. 44.7%; p < .001)]; (d) rate of initiation of breastfeeding within 1 hour after birth [52% higher (86.0% vs. 56.7%, p < .001)
15. Khanum S, Ashworth A, Huttly S. (1998) Growth, morbidity, and mortality of children in Dhaka after treatment for severe malnutrition: a prospective study. *The American journal of clinical nutrition*. 67(5):940-945.	BANGLADESH (focused on slum settlements in Dhaka) Initially targeted N = 437 children treated for severe malnutrition when 12–59 m.o. These children had been included in an earlier controlled trial of three approaches to SAM treatment The analysis was based on 335 (77% of the original sample) who completed at least 18 morbidity visits Prospective study with fortnightly follow up over 12 months. Families recorded their children's morbidity daily and completed a survey fortnightly	**Evidence classification: N-** Cohort study of three groups of children discharged from different types of SAM treatment. The aim was to determine whether the initial success in treatment at the Nutrition Unit was sustained when children returned home. Sample size is sufficient, although attrition issues compromise quality Although this study lacks counterfactual evidence, it does follow a cohort over the span of 12 months, documenting changes in the outcomes of interest. This study pertains to a very specific profile of urban child and thus has limited generalizability.	Three different types of treatment for SAM (inpatient care, daycare, and domiciliary care preceded by 7 d of daycare). Site of intervention: Children's Nutrition Unit in Dhaka. Children had been admitted between Dec. 1990 and Nov. 1991, and discharged using the criterion is 80% of NCHS (U.S. National Center for Health Statistics) weight-for-height.	Weight-for-age z score, height-for-age z-score, weight-for-height z-score Relapse, morbidity, and mortality.	* Difficulties in tracing children after discharge due to residential mobility of families in slum settlements * Losses and intermittent follow-up were more common in children who had been inpatients, resulting in a significantly lower completion rate compared with the other two groups. * WFH gains were sustained for all three groups, and did not differ between groups. * Morbidity was high, with an average of 7 diarrhoeal disease episodes per child * Weight gain but not height gain was lower in children who experienced more diarrhoea. * Fever and cough were not associated with either weight or height gain, and were reported less frequently in children who had been treated in domiciliary care group.
16. Lanerolle P, Atukorala S, de Silva G, Samarasinghe S, Dharmawardena L. (2000) Evaluation of nutrition education for improving iron status in	SRI LANKA (urban areas (Colombo) and rural areas) N=915 adolescent girls (ages 13-19 years) of low socio-economic status attending schools in urban and rural	**Evidence classification: T-** Schools were selected randomly but the authors do not describe the selection process for girls' inclusion in the study, other than stating that those who had experienced menarche and had no history of any major illness	Nutrition education (using flip charts and other visual aids, and conducted in a group format by trained facilitators who were young adults, not	Nutrition knowledge; iron status	* There was good compliance. * The educational intervention resulted in significant increases in knowledge of nutrition and in iron status among girls in both the rural and urban areas. * Iron status was more improved in

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combination with daily iron supplementation. *Food and Nutrition Bulletin.* 21: 259-269.	areas. Intervention vs. control schools. Girls in the control schools received placebos. Intervention girls were assigned to one of two groups matched for initial haemoglobin. Intervention group 1 (N = 237 urban, 97 rural) Education + iron Intervention group 2 (N= 239 urban, 111 rural) Education + placebo tablet Control group (N = 100 urban, 131 rural) No education + placebo tablet Girls were not told whether the tablets contained iron or a placebo.	were included. Limited evidence on nutrition outcomes of interest. Short-term follow up assessment of iron status.	teachers) + unsupervised daily iron supplementation on iron status. Iron supplementation (ferrous sulphate tablets containing 60 mg elemental iron per tablet). Each girl received 70 tablets and was instructed to take one tablet with water every night for 10 weeks before going to sleep. Assessment was conducted 10 weeks after the intervention was introduced.		the groups receiving iron supplementation than in the group receiving education only. * The study indicates the effectiveness of unsupervised supplementation when combined with education. * Follow-up was more difficult in the urban area than in the rural area, because some subjects did not attend school regularly or changed schools. * Short-term sustainability (12 weeks) was higher in rural areas than in Colombo. Thus in urban areas reinforcement of educational messages is needed. * For urban girls, poor living conditions, lack of land for home gardens, and the social pressures of community living may have contributed to declining enthusiasm to modify their diet. The rural girls could diversify their diets more easily, as many had home gardens even before the study.
17. Muthayya S, Thankachan P, Zimmermann MB, et al. (2007) Low anemia prevalence in school-aged children in Bangalore, South India: possible effect of school health initiatives. *European Journal of Clinical Nutrition*	INDIA, Bangalore region in Karnataka state N = 2030 school children aged 5–15 years, with mean age 9.6 years Three urban schools and six	**<u>Evidence classification: N-</u>** Cross-sectional study. Compares prevalence rates with those reported from previous surveys. No control group. Sampling method is not described Limitations of the study are lack of	School-based, twice yearly intervention of deworming (albendazole 400 mg, single oral dose) and Vitamin A supplementation (200 000 IU, single oral dose)	Anaemia based on measure of blood haemoglobin (Hb	* Mean Hb 12.7 g/dl (range 5.6–16.7); anaemia prevalence 13.6%. * Anaemia prevalence was lower in boys than girls (12.0%; N=1037 vs 15.3%; n=993, P<0.05). * No significant difference in anaemia prevalence between female children in urban (15.6%) and rural (14.9%) locations. For boys anaemia prevalence was significantly higher in urban areas

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61(7):865-869.	rural schools	baseline data from the school children in the study areas for prevalence of anemia, helminthic infections, Fe deficiency and vitamin A deficiency.			(13.6%) than rural (9.9%). * For urban children the prevalence of anemia was comparable between genders but rural girls had a significantly higher anemia prevalence than rural boys. * These findings contrast with data showing 3–4 times higher anaemia prevalence in school age children from other parts of India. * Based on the study findings, the authors attribute the lower rates in Bangalore to integrated school health programmes which have been operating for 3 years and include deworming, Vitamin A and a free daily lunch.
18. Nabugoomu J, Namutebi A, Kaaya AN, Nasinyama G. (2015) Nutrition education influences vitamin A-related knowledge, attitudes, and practices of child caregivers towards the production of orange-fleshed sweet potato in Uganda. *Journal of Food and Nutrition Sciences*. 3(2): 38-46.	UGANDA (urban—Kampala) N=457 households in urban and peri-urban farming communities. Targeted households with children aged 2 - 6 years. Children with mental or physical disabilities were excluded. Cohort intervention but cross-sectional assessment, spanning four divisions, one of which was the control division	**<u>Evidence classification: [O-]</u>** The control division provided counterfactual evidence. Limited evidence on proximate determinants of nutritional status or on nutritional status outcomes Purposive selection of beneficiaries/study subjects	Broader intervention entailed farming of orange-fleshed sweet potato (OFSP) and However, the main intervention component assessed was nutrition education component on vitamin-A-rich foods.	Production of orange-fleshed sweet potato (OFSP); Vitamin A related knowledge, attitudes and practices of child caregivers.	Respondents who had received nutrition education had better knowledge than other respondents related to vitamin A, OFSP as a source of vitamin A and attitudes towards health and child health practices ($p<0.05$). Results from a seven (7) day recall: significantly higher consumption of foods that are rich in Vitamin A by respondents from divisions that received nutrition education ($p<0.05$).

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
19. Neervoort F, von Rosenstiel I, Bongers K, Demetriades M, Shacola M, Wolffers I. (2013) Effect of a school feeding programme on nutritional status and anaemia in an urban slum: a preliminary evaluation in Kenya. *Journal of tropical pediatrics*. 59(3):165-174.	KENYA Nairobi slums (Kibera) N = 67 children aged 2 – 9 years attending the St. George primary school Data were collected during a medical health check.	**<u>Evidence classification: O-</u>** Controlled cross-sectional study There may have been reporting bias because the precise age of children was not always known. Convenience sample Very small sample size .	School feeding programme consisted of daily lunch, health education and, when clinically indicated, vitamin or iron supplements for a 3 month period. The control group included children of same age at same school not participating in feeding programme or receiving health education, vitamin or iron, but with anti-worm treatment	Underweight, stunting, wasting and anaemia.	Prevalence of stunting and wasting was significantly lower in children participating in the school feeding programme (12% and 0%) compared to children in the control group (22% and 11%). The rate of anaemia was significantly lower in programme children (19%) compared to control children (42%). Having no father and living in small families overruled the effect of the feeding programme. Also, the higher the mother's education, the more wasting was seen despite participation in the programme. The latter finding was described as "erratic", difficult to explain and requiring further investigation. These findings indicate that school-based interventions can be effective but the benefit derived from them will differ between children with varied home circumstances

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
20. Oelofse, A. Micronutrient deficiencies in South African infants and the effect of a micronutrient-fortified complementary food on their nutritional status, growth and development. *Central African Journal of Medicine.* 1999; .doi: 10.4314/cajm.v45i1.8444 The publication, which is a doctoral thesis, describes four studies, one of which is an intervention study. That last study is summarised in this matrix.	SOUTH AFRICA (micronutrient intervention focused solely of poor, urban, Black South African infants in Kayamandi, Western Cape) Experimental study design N=46 children aged approximately 6 months were randomly selected from mother-baby pairs attending a local clinic (25 assigned to experimental, 21 assigned to control group at 6 months) The infants in the study were followed up for six months (i.e., until age 12 months). Mothers were instructed to make three follow up visits to the clinic (two visits approximately two weeks apart when the child was 6 mos., and once when the child was approximately 12 mos.	**Evidence classification: T-** Mother-baby pairs were selected randomly and were randomly assigned to experimental vs. control group; no information provided on whether this was done blindly Extremely small sample size	Micro-nutrient-fortified complementary food (a porridge) provided to infants by their mothers, who received dry cereal and instructed in its preparation. Experimental group participants were visited by the research team on a weekly basis to receive their supply of cereal (complementary food) Infants in the control group received no complementary food (or placebo)	Prevalence of micronutrient deficiency	Consumption of a micronutrient-fortified complementary food was associated with a slower decline in both serum retinol and iron concentrations in the experimental group compared to the comparison group. However the fortified food had no effect on serum zinc concentration, linear growth, or psychomotor development.

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21. Osendarp SJ, Santosham M, Black RE, Wahed M, van Raaij JM, Fuchs GJ. (2002) Effect of zinc supplementation between 1 and 6 mo of life on growth and morbidity of Bangladeshi infants in urban slums. The *American journal of clinical nutrition.* 76(6):1401-1408.	BANGLADESH, Dhaka slums N = 301 children enrolled at 4 weeks of age	**Evidence classification: T-** Placebo-controlled trial. Children were identified through an established household-surveillance system (no further details were provided) Details are not provided of sampling Anthropometric outcomes assessed.	Infants were randomly assigned to receive 5 mg elemental Zn/day (n = 152) or placebo (n = 149) until 24 weeks of age.	Compliance and morbidity; Anthropometric measurements (weight and length and arm, head, and chest circumference) were performed monthly until the infants were aged 6 months. Serum zinc was assessed at baseline and at 24 weeks of age.	* Beneficial effects were observed after zinc supplementation only for infants with low serum zinc concentrations at baseline. * At 24 weeks of age, serum zinc concentrations were significantly higher in the zinc than in the placebo group (13.3 and 10.7 µmol/L). Significantly greater weight gains were observed in the zinc than in the placebo group for 43 infants who were zinc deficient (< 9.18 µmol/L) at baseline (3.2 and 2.7 kg). In the other infants, no significant differences were observed in mean weight and length gains during the study period. * Zinc-deficient infants showed a reduced risk of incidence of acute lower respiratory infection after zinc supplementation (relative risk: 0.30; 95% CI: 0.10, 0.92). Among the non-zinc-deficient infants there were no significant differences between treatment groups.
22. Osendarp SJ, van Raaij JM, Arifeen SE, Wahed M, Baqui AH, Fuchs GJ. (2000) A randomized, placebo-controlled trial of the effect of zinc supplementation during pregnancy on pregnancy outcome in Bangladeshi urban poor. The *American journal of clinical nutrition.*	BANGLADESH, Dhaka slums N = 559 pregnant women of 12 - 16 weeks gestation. 446 remained in the study.	**Evidence classification: T-** Randomised placebo-controlled trial. Women were identified between 12 and 16 weeks gestation through an established pregnancy identification system (no further details are provided.) Details are not provided of sampling	Women were randomly assigned to receive 30 mg elemental Zn/day (n = 269) or placebo (n = 290). Supplementation continued until	Serum zinc was assessed at baseline and at 7 month gestation. Dietary intake was assessed at baseline. Anthropometric measurements of women were made monthly.	* Zinc supplementation during the last 2 trimesters of pregnancy did not improve birth outcomes. * At 7 months of gestation, serum zinc concentrations were higher in the zinc-supplemented group than in the placebo group (15.9 v. 15.2 mmol/L, not significant). * No significant effects of treatment were observed on infant birth weight, gestational age, infant length, or head, chest, or

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271(1):114-119.		High drop-out rate	delivery	Weight, length, circumferences and gestational ages of 410 singleton newborns were measured within 72 hours of birth.	mid-upper arm circumference * No significant effects of treatment were observed on The incidence rate of low birth weight, prematurity, and smallness for gestational age * These findings were unexpected because the study population was very malnourished, with low dietary zinc intake and bioavailability. Perhaps the findings were due to the concurrent existence of other nutrient deficiencies that reduced zinc bioavailability or limited foetal growth. * At around 20% the dropout rate was very high, attributed to the high mobility of the urban population
23. Pahwa S, Kumar GT, Toteja GS. (2010) Performance of a community-based health and nutrition-education intervention in the management of diarrhoea in a slum of Delhi, India. *Journal of Health, Population, and Nutrition.* 28(6): 553–559.	INDIA, Urban slums in Delhi N=370 mothers of children ages 12-71 mos. Control and intervention groups, but not done via random assignment. Mothers from extreme opposite locations within the slum were assigned to control or intervention group to minimise interaction.	**<u>Evidence classification:[N-]</u>** Purposive allocation to control vs. intervention group compromises the rigor of the evaluation There was little emphasis on key proximate determinants; no assessment of nutritional status outcomes, although diarrhoea management was a focus.	Community-based health and nutrition-education intervention Targeted mothers identified by a door-to-door survey Intervention: health and nutrition education through fortnightly contacts (via 'personal discussion sessions' and 'lane approach')	Knowledge, attitudes, and practices on diarrhoea-related issues, such as oral rehydration therapy (ORT), oral rehydration salt (ORS), and continuation of breastfeeding during diarrhoea	Statistically significant (p=0.000) improvements in knowledge of ORS/ORT preparation, preparation of home-made sugar-salt solution (10–74%); prevention of dehydration; continuation of breastfeeding during diarrhoeal episodes The reported usage of ORS packets and sugar-salt solution improved significantly from 12% to 65% (p=0.000) and 12% to 75% (p=0.005) in this urban slum sample. The study corroborates other literature on the effectiveness of

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
					one-on-one interaction vs. group-based interaction in an urban setting.
24. Palwala M, Sharma S, Udipi SA, Ghugre PS, Kothari G, Sawardekar P. (2009) Nutritional quality of diets fed to young children in urban slums can be improved by intensive nutrition education. *Food and Nutrition Bulletin.* 30: 317-326.	INDIA, 5 urban slums in Mumbai N=414 mothers/caregivers of children under age 3 years	**Evidence classification: [N-]** There was no counterfactual Sufficient sample size Evidence produced on a proximate determinant of nutritional status in children (IYCF)	Three-month-long IEC/BCC intervention that started with groups of 8-10 mothers/caregivers, followed by weekly monitoring and reinforcement of messages. Demonstrations were part of the educational approach.	Complementary feeding practices for children under the age of three years	There was a statistically significant association between exposure to the intervention and knowledge of optimal complementary feeding practices.
25. Penny ME, Creed-Kanashiro HM, Robert RC, Narro MR, Caulfield LE, Black RE. (2005) Effectiveness of an educational intervention delivered through the health services to improve nutrition in young children: a cluster-randomised controlled trial. *The Lancet.* 365(9474):1863-1872.	PERU, poor peri-urban area (shanty town) of Trujillo, 400 km north of Lima. Birth cohort n = 187 infants from the catchment areas of intervention centres n = 190 from control areas	**Evidence classification: T-** Cluster-randomised trial. Analysis by intention to treat. There were socio-economic differences between control and intervention groups. The study could not be blinded, which could have led to bias introduced by data collectors' interpretation of responses or the recording of dietary-recall data (but this is unlikely to have affected weight or height measurements.)	Educational intervention that aimed to enhance the quality and coverage of existing nutrition education, and to introduce an accreditation system in six government health facilities. Six intervention health facilities were matched based on socioeconomic conditions in catchment populations with six control facilities before randomisation.	The primary outcome measure was growth, measured by weight, length, and Z scores for WFA and LFA at age 18 months. Main secondary outcomes were % of children receiving recommended feeding practices and the 24-h dietary intake of energy, iron, and zinc from	The study shows that a child-nutrition educational intervention implemented through health services can decrease the prevalence of stunted child growth in areas where access to food is not a limiting factor. * The proportion of caregivers who reported receiving nutrition advice from the health service in intervention areas was significantly higher than in control (52% vs 24%). * At 6 months a significantly higher proportion of babies in intervention areas were fed nutrient-dense thick foods at lunch (a recommended complementary feeding practice) than of controls (31% vs 20%).

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			The authors were careful to limit the intervention to sustainable enhancement of existing services. No new personnel were added, and donations of material benefits were kept to a minimum, mainly in the form of educational materials. The programme aimed to improve services rather than train individuals who may move on and be replaced.	complementary food at ages 6, 9, 12, and 18 months.	* A significantly lower proportion of children in intervention areas failed to meet dietary energy requirements than controls. * Children in control areas were significantly more likely to have stunted growth at 18 months than children in intervention groups (16% vs 5%). Adjusted mean changes in weight gain, length gain, and Z scores were all significantly better in the intervention area v. control area. * The authors suggested that interventions that are heavily dependent on community-based strategies often have limited sustainability because it depends on political expediency or continued presence of NGOs. In countries where government health services provide wide coverage and are easily accessible, these services offer a more sustainable channel for educational interventions.
26. Puett C, Salpéteur C, Lacroix E, et al. Protecting child health and nutrition status with ready-to-use food in addition to food assistance in urban Chad: a cost-effectiveness analysis. *Cost Effectiveness and Resource Allocation.* 2013;11:27.	CHAD, Urban—Abeche (Eastern Chad) One of a few studies that actually assessed cost issues associated with implementing in an urban setting The corresponding programme evaluation is also described in the article.	**<u>Evidence classification: T</u>** Counterfactual via two-arm, cluster RCT Assessed both proximate determinants and nutritional status outcomes Adequate sample size	5-month general distribution of monthly staple rations (FA) vs. staple rations plus a ready-to-use supplementary food (RUSF) Inclusion criteria for the study: non-wasted child, lack of bilateral pitting (oedema),	Wasting rates (6-36 mos.) Mid-upper arm circumference (MUAC) Child morbidity (diarrhoea, fever, ARI) Haemoglobin	The programme evaluation documented that the addition of RUSF to a staple ration did not result in significant reduction in wasting rates. However, it was associated with a small but significant improvement in height, as well as a reduction in the occurrence of diarrhoea and fever. The FA+RUSF package was deemed less cost-effective than

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
27. Huybregts L, Houngbé F, Salpéteur C, et al. The Effect of Adding Ready-to-Use Supplementary Food to a General Food Distribution on Child Nutritional Status and Morbidity: A Cluster-Randomized Controlled Trial. *PLoS Med*. 2012; 9:e1001313.	Citation information for that evaluation (Huybregts et al., 2012) appears in the citation column. RCT design (tested effectiveness of a) monthly food assistance alone: (FA); FA + ready-to-use supplementary food (RUSF) N=458 children (and their households) received FA alone; N= 613 children received FA + RUSF		member of a ''vulnerable'' household (targeted for food assistance) 18 children from the FA group and 15 children from the FA+RUSF group were lost-to-follow up	concentration *Primary outcomes of interest for the cost-effectiveness analysis: cost per case of anaemia averted; cost per episode of diarrhoea averted	conventional interventions to minimise anaemia and diarrhoeal episodes.
28. Saleem AF, Mahmud S, Baig-Ansari N, Zaidi AKM. (2014) Impact of maternal education about complementary feeding on their infants' nutritional outcomes in low- and middle-income households: A community-based randomized interventional study in Karachi, Pakistan. *Journal of Health, Population and Nutrition.* 32: 623-633.	PAKISTAN (Urban/peri-urban Karachi) RCT N=148 (74 in each group)	**<u>Evidence classification: T-</u>** Although the nutritional status data were collected, there is a fairly weak linear relationship established between nutrition education and high-level outcomes However, the study design does produce counterfactual evidence re: the educational intervention Sample size was small but deemed sufficient for detecting statistically significant differences	30-week educational intervention (delivered by trained community health workers in one-on-one format at home) targeting mothers. Topics (including IYCF, hand washing and general hygiene, promotion of protein- and nutrient-based foods) were covered. INTERVENTION MOTHERS: Three education modules and 2 modules 10 weeks apart + anthropometric assessment of children CONTROL MOTHERS: breastfeeding advice	Weight, length, and mid-upper arm-circumference (MUAC), stunting, wasting, and underweight at baseline, 10, 20, and 30 weeks	* The educational interventions about appropriate CF to mothers had a direct positive impact on linear growth of their infants. * The authors note the target was food-secure households, and suggest that for food-insecure populations, food supplementation, along with CF education, may have an impact. * Infants in the intervention group had significantly higher mean weight, length, and MUAC compared to the controls * Notably, however, there were some statistically significant baseline differences between the intervention and control children on background characteristics such as immunisation status, though no

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
			according to national guidelines; no special home visits, only routine anthropometric assessment		baseline differences in anthropometric measures, with the exception of MUAC.
29. Savadogo L, Zoetaba I, Donnen P, Hennart P, Sondo BK, Dramaix M. (2007) Management of severe acute malnutrition in an urban nutritional rehabilitation center in Burkina Faso. *Rev Epidemiol Sante Publique.* 55(4): 265-274.	BURKINA FASO (Urban setting) N=1322 children who were hospitalised at a nutrition rehabilitation centre Data from 1999-2003	**<u>Evidence classification:[N-]</u>** There was sufficient sample size However, there was no counterfactual evidence Relevant outcome data were produced by this study	There was a SAM intervention that entailed provision of RUTF; however, this study does not provide evaluation evidence; just contextual evidence	Mortality Standard anthropometric indices (e.g., MUAC, height-for-age, weight-for age)	Does not elucidate the reader on programme effectiveness per se; tracked mortality and adverse outcomes in severely malnourished children admitted to an urban health facility for treatment. The authors do, however, make an argument for the existence of community-based therapeutic care approaches to provide continued management of children who are still malnourished at discharge.
30. Semba RD, Moench-Pfanner R, Sun K, et al. Consumption of micronutrient-fortified milk and noodles is associated with lower risk of stunting in preschool-aged children in Indonesia. *Food and Nutrition Bulletin*. 2011; 32(4): 347-353.	INDONESIA (included rural and urban areas) The study used national nutrition surveillance data collected between January 1999 and September 2003. Data from children 6 to 59 months of age were used	**<u>Evidence classification: O</u>** Cross-sectional comparison of those children who consumed the foods and those who did not. Regression modelling was used to control for the effects of other factors on the outcome of interest Extremely large sample size	Fortified powdered milk (with vitamin A, vitamin C, vitamin D, vitamin E, vitamin K, vitamin B12, thiamin, riboflavin) and noodles (with vitamin A, vitamin B6, vitamin B12, thiamin, niacin, folate, and iron) purchased by the	Stunting	* Stunting prevalence rates were not vastly different between rural children and children from urban slums (51.8% and 48.8%, respectively) Children > 6 months old who were still breastfeeding were at higher risk for stunting than those not breastfeeding

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
	N = 222,250 rural families and N = 79,940 families living in urban slum areas For families with more than one child aged 6 to 59 months during the study period, the investigators limited the analysis to the youngest child The surveillance system used stratified multistage cluster sampling of households in sub-districts of administrative divisions of the country in rural areas and slum areas of large cities.		family; extensive data were collected on the types/brands of foods purchased by the families and given to the children to ascertain whether or not they were fortified		* Children from both urban and rural areas samples were less likely to be stunted if they consumed fortified milk or fortified noodles * There was a graded relationship between per capita expenditure on fortified milk and the prevalence of stunting * Protective factors against stunting included mother's education, vitamin A supplementation within the previous 6 months, presence of an improved latrine, and use of adequately iodized salt
31. Shah U. (2011) Impact assessment of nutritional supplement program in urban settings: a study of under nutrition in slum community of Mumbai. *Journal of Social and Development Sciences.* 1: 24-35.	INDIA (urban, Mumbai) Sample size: N=51 children ages 2-6 years	**Evidence classification:[N-]** Assessed nutritional status outcomes Extremely small sample size Very short duration of follow up (3 months) Authors noted that N=51 was the resultant sample size; there a number of dropouts. However, neither the extent of or reasons for attrition appear in the article	Intended food supplement = 1 nutri-cookie (prepared from cheap, locally available ingredients) per day. However, the authors noted that there was variation in both the quantity and frequency of consumption within the sample. Targeted children aged 2-6 years who were enrolled in a Supplementary Nutrition Program	mean improvement in a) height, b) weight	The authors concluded that there is a direct, positive correlation between consumption of the nutri-cookie and increase in weight and height. However, given the lack of uniformity in how the 'intervention' was administered, it is difficult to make definitive statements re: programme effectiveness. Also, although the study took place in an urban setting, it did not provide insight on programming in urban settings, or how intervention effectiveness might differ between urban and rural settings.

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
32. Solidarités International. (2011) Stakeholder Forum: The Future of Urban Agriculture in Kenya (Workshop Proceeding, Nairobi, 3-4 August 2011). The publication is based on a workshop in which various programme approaches in urban Kenya were reviewed.	KENYA	**Evidence classification: [N-]** The publication merely highlighted promising practices in urban settings; it did not provided detailed information that sufficiently backed up claims re: programme effectiveness.	SACK GARDENS can be implemented in the corridors of slum areas (requires very little physical space) and are associated with limited water requirements to maintain A CASH TRANSFER approach entailed €100 for 1000 household direct transfer into bank accounts • 2 instalments to cover immediate needs and longer term livelihood recovery • 54% saved average of €24 (2,412 KSh) per household • Approx. €12,000 € of €100,000 totally saved • Cost efficiency - Cost/BNF €145.43 = 68.76% (€100) cash itself and 31.24% support costs	Report notes that in addition to serving as a means of meeting dietary requirements and fostering greater dietary diversity, SACK GARDENS ('Garden in a Sac') have been a form of income generation for some poor urban households. No data were presented in impact on nutritional status of women or children	Approaches cited as showing promise: (a) Sack gardens—require very little water (5 litres a day); some forms of domestic waste water can be used to water the gardens (b) Cash and voucher transfers
33. Yunusa I, Muhammed A, Adegbus S. (2012) School feeding program in Nigeria: A vehicle for nourishment of pupils. *The African Symposium.* 12(2).	NIGERIA Multi-state intervention	**Evidence classification: [N-]** Ranks very poorly in terms of quality. The publication provided very little detail on the (a) the actual intervention and (b) any specifics re: evaluation of its effectiveness No nutrition-related outcome data are	Home Grown School Feeding and Health Program (HGSFHP). Entailed the provision of one 'nutritionally adequate meal' per school day.	Authors noted primary school enrolment as a major outcome but provided no corroborating evidence.	Poor sustainability. Piloted in 12 states; only 1 (Osun) was still implementing the programme at the time of the assessment

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
		presented in the publication	Launched in September 2005, as a collaborative effort between the Federal Ministries of Health and Education		

Health-related nutrition-sensitive programming

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
SYSTEMATIC REVIEWS/CROSS-COUNTRY REVIEWS					
1. Food and Nutrition Technical Assistance Project III (FANTA)/USAID. (2015) *Desk review of programs integrating family planning with food security and nutrition.* Washington, DC: FANTA.	GLOBAL purview Systematic review of 102 (primarily USAID-funded) programmes implemented between 2003 and 2013 Combination of health and nutrition outcomes; a great variation in outcomes were assessed across countries	**Evidence classification: R** Included very clear and rigorous inclusion criteria (e.g., operational definitions of 'integration'). Only 17 out of 14,000 identified publications met inclusion criteria and thus were included in the review. The systematic review was particularly challenging to conduct given the poor availability of rigorously designed evaluations of microfinance initiatives.	Food security/ nutrition and family planning (FP) interventions delivered: (a) at same contact/ entry point -OR- (b) by the same provider Very broad definition of "FP intervention:" Included any FP-related component (education, counselling, contraceptive/ commodity provision, referral)	* Nutrition outcomes: stunting, underweight, wasting, early breastfeeding, exclusive breastfeeding, introduction of complementary feeding, composite IYCF indicator, vitamin A supplementation for women and/or children * Food security outcomes: household dietary diversity score, months of adequate food provisioning, and	Insights were not specific to urban areas, although integration (in particular, building on existing platforms [health and non-health related]) is a critical success factor identified by the review. The first 1,000 days, which is consistent with a broader life-cycle approach (in this case, pregnancy through the first two years of life), reduces missed opportunities—both from nutrition and FP perspectives.

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
				use of sustainable practices/ improved technologies * FP outcomes: use of modern family planning methods, birth spacing, and met need for family planning	
2. Naik R, Smith R. (2015) *Impacts of family planning on nutrition.* Washington, DC: Futures Group, Health Policy Project.	GLOBAL purview Systematic review	**<u>Evidence classification: R-</u>** Very poor description of inclusion criteria, or the total number of studies included in the analysis. However, the body of the report references meta-analyses and large cross-country comparisons based ON DHS and other methodologically rigorous data sources	Not applicable Primary focus is on research that provides contextual evidence (e.g., secondary analyses of DHS data)	Outcomes ranged from low birth weight, wasting, stunting, and underweight to rates of exclusive breastfeeding and complementary feeding	The review as a whole makes a strong argument for the direct link between FP and IYCF. Very weak in the insights provided on urban nutrition programming. There is reference to one qualitative study from South Africa that documented poor IYCF practices for teen mothers.
3. Smith E, Smith R. (2015) *Impacts of family planning on food security.* Washington, DC: Futures Group, Health Policy Project.	GLOBAL purview Systematic review	**<u>Evidence classification:[R-]</u>** Authors describe the methods used to cull evidence from published literature (e.g., *PubMed* and *Medline* searches); however, they do not provide summary information on the total number of publications reviewed, or on strength of evidence.	Not applicable (yielded contextual evidence)	Outcomes assessed do not extend food security as a proximate determinant of nutritional status.	The investigators identified FP's pathway of influence on food security through four pillars: food availability, access, utilisation/ consumption, and stability. In urban areas, high fertility compromises food access. It also contributes to poor food utilisation and/or consumption. The findings also shed light on the role of FP in creating greater resilience for women.
INDIVIDUAL STUDIES					

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
4. Austrian K, Muthengi E, Riley T, Mumah J, Kabiru C, Abuya B. (2015) *Adolescent Girls Initiative-Kenya baseline report.* Nairobi: Population Council.	KENYA (Urban—Kibera slums of Nairobi, in addition to a rural site—Wajir [northeastern Kenya]) The intervention being evaluated is multisectoral, and multi-site focused on over 5,000 girls ages 11–14 in two marginalized areas of Kenya: 1) Kibera slums in Nairobi and (N=2394 in Nairobi) 2) Wajir County in Northeastern Kenya. The investigators have adopted an RCT design to compare the effect of different intervention packages. This publication just pertains to baseline findings.	**Evidence classification: [N]** Large sample size Counterfactual has been established through the baseline (pre-intervention) assessment There is the potential to produce nutrition-related indicators under the auspices of this intervention, although none of those data are presented in the baseline report.	The intervention is implemented by Plan International in Kibera and Save the Children in Wajir. The intervention packages to be compared are as follows: 1) Violence Prevention 2) Violence Prevention + Educ 3) Violence Prevention + Educ. + Health 4) Violence Prevention + Educ. + Health + Wealth Creation	This is not a nutrition-specific initiative No nutrition-related data are presented, although the ensuing intervention will include modules on nutrition and hygiene	Not applicable; however, the ensuing initiative will shed light on the effectiveness of a holistic package of interventions. Given the multifaceted nature, it might be difficult to ascertain "what works."
5. Burnham G. (1997) *Evaluation of integrated management of childhood illness (IMCI) performance in urban health centers.* Prepared for USAID. BASICS Technical Directive: 019 ZA 01 024, 10-23 August 1997, Lusaka, Zambia.	ZAMBIA Project evaluation study consisted of health facility surveys (baseline, 3-month, and 9-month surveys), direct observation in clinics, exit interviews with mothers of children attending health facilities,	**Evidence classification: [N-]** More process-oriented, focusing on dimensions such as health worker compliance with IMCI protocols rather than actual outcomes	Standard facility IMCI protocol	Training in IMCI Various measures reflecting compliance with IMCI protocols Maternal knowledge of key IMCI-related practices.	Whilst there was some improvement health worker performance (vis-à-vis IMCI) over baseline, performance was still below standards of acceptability.

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
	assessment of clinic resources and management				
6. Jibo AM, Iliyasu Z, Abubakar IS, Umar LM, Hassan AM. (2014) Community-integrated management of childhood Illnesses (C-IMCI) and key household practices in Kano, Northwest Nigeria. *Sub-Saharan Afr J Med*. 1: 70-76	NIGERIA (Urban local government areas in Kano State) Cross-sectional urban study based on multi-stage cluster sampling; N=400 caregivers of children aged 0-59 mos. and their index children Compared key household and community practices in IMCI implementing and non-implementing communities in two local government areas (LGAs) of Kano State, Nigeria Conducted Feb. 2009 through Jan. 2010	**Evidence classification: [N]** Given the cross-sectional nature of the study, attribution of outcomes is not possible. The investigators did document similar demographic characteristics between IMCI and non-IMCI areas; however, children from the IMCI households were considerably older than those in the non-IMCI households Good documentation of outcomes of interest Existence of counterfactual evidence 100% response rate	Standard IMCI approach, with a focus on the household and community components of that approach	Exclusive breastfeeding rate; Rates of other IYCF practices; Possession of growth monitoring cards; Immunization; ITN use; Hand washing; Diarrhoea prevalence; Care seeking for common childhood illnesses; MNCH coverage rates (e.g., for antenatal care)	Fewer children from the IMCI communities than their counterparts from non-IMCI communities experienced some common childhood illnesses, and their caregivers were much more likely to practices optimal IMCI behaviours. Documented MNCH coverage rates that were much higher than the national average were attributed to the fact that the study was urban based. The investigators drew no other conclusions re: the implications for programming in urban settings.
7. Khatun M, Stenlund H, Hornell A. BRAC initiative towards promoting gender and social equity in health: a longitudinal study of child growth in Matlab, Bangladesh. Public Health Nutrition. 2004;7(8):1071–1079	BANGLADESH (rural only) Longitudinal design N=576 Children were stratified into 3 groups based on mother's socioeconomic status & BRAC membership status: (1) poor and BRAC member, (2) poor non-member,	**Evidence classification: C-** * A rural sample * Inclusion of counterfactual * Time-series/longitudinal nature of the data is a strength * However, the authors noted that a large proportion of the children were excluded from the analysis due to missing anthropometric measurements in the second and/or third rounds of assessment, although they claim that this attrition did not influence	Assessment targeted children aged 6-72 months However, BRAC's initiatives is strongly oriented toward poverty alleviation through empowerment of poor women (e.g., via micro credit, female education,	STUNTING was the primary outcome measure of interest	Yields no insight regarding urban settings; however, it provides data on the South Asian context (albeit rural Asian) Stunting was highest among poor non-members In the first round of assessment, girls had a significantly higher stunting prevalence than did boys. However, boys were less likely than girls to recover from stunting

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
	(3) non- poor non-member Three rounds of assessment over the course of a year, conducted in four-month intervals	results because the rate of attrition was similar across study groups.	increased access to health care)		over time. By the third round of assessment, girls had comparable nutritional status to boys
8. Mukunya D, Kizito S, Orach T, et al. (2014) Knowledge of integrated management of childhood illnesses community and family practices (C-IMCI) and association with child undernutrition in Northern Uganda: a cross-sectional study. *BMC Public Health.* 14: 976. http://doi.org/10.1186/1471-2458-14-976	UGANDA (1 urban setting in Northern Ugandan [Pece] and 1 rural setting [Bobi]). Cross-sectional study N=442 child-caretaker pairs (predominantly urban [n=302]) Included logistic regression analysis	**Evidence classification: O-** Primarily urban sample Absence of counterfactual evidence Emphasis on knowledge outcomes with a large conceptual leap to impact on anthropometric measures	Standard C-IMCI approach	C-IMCI related knowledge and practices according to 4 themes: breastfeeding, immunisation, micronutrient supplementation and complementary feeding. Anthropometric measures: Wasting and stunting of children (6–60 months)	Caretakers' lack of C-IMCI knowledge associated with both wasting (OR 24.5, 95% CI 4.2-143.3) and stunting (OR 4.0, 95% CI 1.3-12.4) Rural residence was also associated with both wasting (OR = 3.1, 95% CI 1.5-6.5) and stunting (OR = 1.7, 95% CI 1.0-2.7). Children younger < 25 mos. more likely to be wasted (OR = 3.3, 95% CI 1.7-10.0). The study yields no specific insights re: urban dynamics vis-à-vis the above, or key issues re: urban IMCI programming.
9. Singh P. (2011) *Performance pay and information: reducing child malnutrition in urban slums.* MPRA Paper No. 29403 Munich Personal RePEc Archive	INDIA, Chandigarh, urban slums N = 145 child day-care centers and 4101 children aged 3-6 years Data collection took place three months after baseline.	**Evidence classification: O-** Before – after controlled study with factorial design. Risk of bias - Selection of anganwadis ensured that geographical areas were matched on level of malnutrition. However there might have been some spillover of intervention effect between them.	Two interventions: 1) change in compensation for childcare workers from wages to performance pay 2) provision of information to mothers (including book listing ten	Weight, Weight for age Underweight Food intake at home	* The control group increased weight by 275g and the combined treatment group increased weight by 171 grams more than this (difference statistically significant). No difference between control and either of the other two groups. * For the combined treatment group, prevalence of low weight-for-age was reduced by 4.2%. * The effect of the combined

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
			recipes which are easy-to-make, economical and using locally available ingredients.) There were four groups, two for each of the above, the third had both interventions, and the fourth had none.		treatment had still lasted nine months after the incentive scheme was withdrawn (increase of borderline statistical significance) but no long-term impact for the other two intervention groups. * The group which received both interventions had better communication between the worker and the mother, wherein the incentivized worker made efforts to monitor mothers through personalized home visits. * The combined treatment was much more effective in increasing calorific and protein-rich food at home relative to the incentive only treatment. * The authors suggest there is complementarity between providing incentives to workers and information to mothers, and that the study findings indicate the need for future research into interventions that target both the supply-side and demand-side.

4.iii Agriculture-related nutrition-specific programming

Agriculture related nutrition-specific programming: reviews with evidence not specific to urban context		
Sources	**Topic and design**	**Findings relevant for urban programming**
Berti P, Krasevec J, FitzGerald S. (2004) A review of the effectiveness of	Review of the impact of agriculture interventions on nutritional status in participating households, and analysed the characteristics of interventions that improved nutrition outcomes	* Most of the interventions increased food production, but did not necessarily improve dietary, anthropometric, biochemical/clinical or morbidity indicators within participating households. * Of the 19 interventions that had a positive effect on nutrition, 14 of them invested in four or five types of capital in addition to the agriculture intervention. Of the nine interventions that had a

agriculture interventions in improving nutrition outcomes. *Public Health Nutrition.* 7(5): 599-609.	The projects were assessed as to whether they invested in five types of 'capital' (physical, natural, financial, human and social) as defined in the Sustainable Livelihoods Framework (a conceptual map of major factors that affect people's livelihoods.) 13 of the 30 studies included had high risk of bias	negative or no effect on nutrition, only one invested in four or five types of capital. * Thus interventions that invested broadly in different types of capital (especially human capital including nutrition education and consideration of gender issues) were more likely to improve nutrition outcomes. * Of the interventions that benefited households' nutritional status, most used a multiple approach focusing on nutrition education, amongst others, in combination with increased food production. * Home gardening was the most successful intervention in increasing levels of household nutrition.
Masset E, Haddad L, Cornelius A, Isaza-Castro J. (2012) Effectiveness of agricultural interventions that aim to improve nutritional status of children: systematic review. *BMJ.* 344:d8222.	Systematic review to assess the effectiveness of agricultural interventions in improving the nutritional status of children in developing countries. Included bio-fortification, home gardens, small scale fisheries and aquaculture, dairy development, and animal husbandry and poultry development. Only studies with a valid counterfactual analysis were included. Before/after studies and participants/non-participants comparisons affected by selection bias were excluded. N = 23 studies, mostly home gardens.	The interventions had positive effect on production of the agricultural goods promoted, but not on households' total income. The interventions were successful in promoting consumption of food rich in micronutrients and protein. There was only a weak effect of these interventions on nutritional status. No evidence was found of effect on iron absorption, but there was some evidence of a positive effect on Vitamin A absorption. Very little evidence was found of a positive effect on the prevalence of stunting, wasting, and underweight among children aged less than 5 years. The authors caution that methodological weaknesses of the included studies cast doubts on the validity of these findings.

Agriculture related nutrition-specific programming: Evidence specific to urban context

EVALUATIONS

Authors, date	Location, population, sample size	Intervention	Outcomes	Design and evidence score (ES)	Findings	Relevance to learning about urban programming
Armar-Klemesu M, Maxwell D. (2000) Accra: Urban agriculture as an asset strategy. In: Bakker N, Dubbeling M, Gundel S, Sabel-Koschella U, de Zeeuw H (Eds.) *Growing Cities, Growing Food: Urban Agriculture on the Policy Agenda.* Germany: GTZ/DSE, 183-208. **No evidence (rating C) of effectiveness**	Ghana (Accra) 559 respondents in 16 enumeration areas in the Accra Urban Food and Nutrition Study (1997)	Any form of agriculture in immediate urban or peri-urban area of Accra	The exact nutrition outcomes are not specified.	Cross-sectional comparative and descriptive study **<u>Evidence classification: O-</u>** *Cross-sectional comparative study with high risk of bias.* *Sampling method was not described,* *Small sample.*	76 households (only 14%) engaged in agriculture. Of these, 25% engaged in crop production, 64% in livestock production (mostly poultry) and 11% in both. 11 (2% of the sample) reported fishing as a livelihood. Farming ranked 9th as primary livelihood category, 2nd as secondary activity, and 2nd as tertiary activity No association between urban farming and child nutritional status was found (but the exact nutritional outcomes were not specified).	* Most of the production was by men and most of the trading was by women. * Land (access and tenure security) was the main problem mentioned. Need deliberate intervention in the land market to reserve land for agricultural purposes.

Agriculture related nutrition-specific programming: Evidence specific to urban context						
EVALUATIONS						
Authors, date	**Location, population, sample size**	**Intervention**	**Outcomes**	**Design and evidence score (ES)**	**Findings**	**Relevance to learning about urban programming**
Jensen P. (2013) *The urban gardens program for HIV-affected women and children: A review and look to the future.* Washington, DC: FANTA. **Evidence (rating C) of effectiveness**	Ethiopia (Addis Ababa, Bahir Dar, and Adama) Evaluation of urban gardens project: Phase I 2005 - 2008, and Phase II 2009 - 2012.	1) 188 school gardens targeting orphans and vulnerable children (OVC) and 2) 186 community group gardens targeting a group of adult people living with HIV (PLHIV) in 23 urban centres	The exact outcomes assessed are not specified.	**<u>Evidence classification: [N]</u>** *Not controlled* *Qualitative outcomes*	Qualitative findings only. No nutritional outcomes were assessed. • More than 122,000 OVC and 10,000 PLHIV were directly affected by the program and experienced improved food and income and a greater overall sense of well-being and empowerment. • Most participants reported social benefits were more important to them than financial and nutritional benefits • Gardeners continued to experience financial, nutritional, and social benefits 18 m. after graduating from the program[9]. • Community group gardens were well established and were deemed likely to continue to operate successfully without further interventions. • However, the school gardens ceased to function once UGP funding was lost and technical support ended. • Very few of the trained 122,000 OVC continued to use the skills they had learned in micro-gardening.	* The paradigm that a lot of space is needed to grow enough vegetables to make a difference must be changed to fit the urban reality of limited land availability. New paradigm = 'grow more with less'. * To be successfully adopted and adapted, any intervention must stem from local resources and be socially, economically, and environmentally acceptable. Specific recommendations included: * Provide adequate and locally appropriate training in techniques for container gardening to local implementing partners and gov. agricultural extension services. * Most gardens should move to simpler, more locally appropriate watering methods (the drip irrigation technology was too large, costly, and difficult to repair/maintain, and unsuitable for urban living) * Create outdoor classrooms (25 m^2 bio-intensive 'permagardens') linked to school curriculum (biology/ chemistry, economics/ nature) and allocate smaller land area (2m^2 not 25m^2 per student) to increase numbers who can participate
Karanja N, Yeudall F, Mbugua S, et al. (2010) Strengthening	Kenya (Nakuru)	Small livestock and horticulture projects	* Food security status was assessed using	Descriptive findings from evaluation only. (baseline quantitative	Detailed findings reported only from baseline survey * Nearly all households were food	Lessons learnt * The value of multi-stakeholder partnerships, representing a broad range of

[9] http://dai.com/stories/urban-gardens-program-closes-dramatic-results-ethiopian-women-and-children

Agriculture related nutrition-specific programming: Evidence specific to urban context						
EVALUATIONS						
Authors, date	**Location, population, sample size**	**Intervention**	**Outcomes**	**Design and evidence score (ES)**	**Findings**	**Relevance to learning about urban programming**
capacity for sustainable livelihoods and food security through urban agriculture among HIV and AIDS affected households in Nakuru, Kenya. *International Journal of Agricultural Sustainability.* 8(1):40-53. AND Mbugua S, Andersen N, Tuitoek P, et al. (2008) *Assessment of food security and nutrition status among households affected by HIV/AIDS in Nakuru Municipality, Kenya.* Abstract TUPE0665 at XVII International AIDS Conference, Mexico City, August 3–8, 2008. **Evidence (rating C) of effectiveness**		implemented by the Sustainable Environments and Health Through Urban Agriculture (SEHTUA) partners for HIV / AIDS affected households Aim was to strengthen agricultural sustainability, social assets, food security and livelihoods among HIV/AIDS-affected Households Baseline survey of 154 households	Household Food Insecurity Access Scale, and household diet diversity scale (number of food groups). * Nutrition security assessed through dietary intake (via 24-hour recall) and anthropometric measures (weight, height, mid-upper arm circumference, triceps skin-fold measure) of an index child between the ages of 2 and 5 years in the household.	data were reported but follow-up data were not provided) **<u>Evidence classification: N-</u>** *No control group.* *Sampling method is not described* *Anthropometric outcomes*	insecure: 73% severely, 24% moderately and 2% mildly * Mean household dietary diversity score was 8.1 / 15, and negatively correlated with food insecurity. * Plant-based foods were consumed more frequently than animal source foods, apart from dairy products. * Non-vitamin A-rich vegetables were consumed more frequently than Vitamin A-rich and other fruits * Oils and fats were consumed by almost all participants. * Prevalence of stunting was 33.1% and underweight 26.0%[10]. Based on "preliminary analysis of a repeat survey" increased access to land for agriculture, livestock, technical support services, banking facilities, health facilities and social clubs all "seemed to have occurred among participating households". Farming activities and participation in social groups had increased in non-participating households too, suggesting diffusion of knowledge from participants to non-participants. Indicators of household food security improved among participants, and slightly declined among non-participants.	experience, knowledge and perspectives, in addressing the complex set of issues facing agriculture for social purposes in urban settings. * The key role of self-help group organizations, and securing of institutional commitments to support farming by vulnerable persons affected by HIV-AIDS. * The usefulness of evaluative tools using mixed methods to monitor progress towards goals and identify supports and barriers to success. Challenges: * Participation in farm labour was difficult due to the distance of some farms and illness among people living with HIV/AIDs * Moving from food handouts to food production * Political, election related troubles in early 2008 led to interment of some participants * Water shortage affected quality and quantity of vegetable and sweet potato fodder production * High kid and goat mortality despite substantial, ongoing veterinary treatment, (perhaps due to low quality of feed during dry season).
Maxwell D, Levin C,	Uganda	Any form of	* Z scores of	Cross-sectional	* 35% households engaged in some	* Urban agriculture is a successful strategy

[10] More findings related to food security are in: Cole DC, et al. Livelihoods, crises & food security among HIV/AIDS affected households in Nakuru, Kenya. Presentation at XVII International AIDS Conference, Mexico City, Aug 3–8, 2008.

Agriculture related nutrition-specific programming: Evidence specific to urban context						
EVALUATIONS						
Authors, date	**Location, population, sample size**	**Intervention**	**Outcomes**	**Design and evidence score (ES)**	**Findings**	**Relevance to learning about urban programming**
Csete J. (1998) Does urban agriculture help prevent malnutrition? Evidence from Kampala. *Food Policy.* 23: 411-424. **Evidence (rating C) of effectiveness**	(Kampala) 360 urban households selected into a multi-stage, random sample For child comparisons n = 130 farming and n = 160 non-farming	farming	Height-for-age, weight-for-height, weight-for-age * Stunting, wasting and underweight * Dietary adequacy based on consumption frequency of categories of food over 4-day period. *Hours spent on child-care per day	comparative and descriptive study Two-rounds of data collection **<u>Evidence classification: O-</u>** *Cross-sectional comparative study with high risk of confounding* *Sampling method and size fine* *Anthropometric outcomes*	form of agricultural production within city. * Most is production of staple foods for home consumption * 80% labour provided by women * Prevalence of stunting and underweight were significantly lower among children in farming households, particularly in lowest SES groups. * Little difference between farming and non-farming HH with regard to wasting	in buffering the impact of economic hardship on nutritional status * It was not clear if strong association between farming and nutrition status was due to better food consumption or more time for child care * Access to land was a constraint, as was lack of legal basis for activities
Mboganie-Mwangi A, Foeken D. (1996) Urban agriculture, food security and nutrition in low income areas in Nairobi. *African Urban Quarterly.* 11: 170-179. **Evidence (rating C) of effectiveness**	Kenya (Nairobi) Random sampling. Three groups A) 48 Korogocho farmers (35 children) B) 67 Korogocho non-farmers (84 children) C) 62 farmers (30 children) with Undugu Society Urban Agriculture	Three groups, A) those who practised urban farming B) those who did not practise urban farming C) group involved with urban farming project giving access to land, training and technologies (USUAP group)	* Energy and protein consumption per unit consumption (equivalent to an adult male) derived from 7 day dietary records; * Welfare index derived from household resources; For 6 – 60 m.o.: * Z scores of Height-for-age, weight-for-height, weight-for-age	Cross-sectional comparative study of role of farming activities performed by low income dwellers in the food security and nutritional condition of their households. **<u>Evidence classification: O-</u>** *Cross-sectional comparative study with likely confounding* *Sampling method and size fine* *Anthropometric outcomes*	* Food production was mainly for home consumption * All three anthropometric indicators had lowest values in non-farming households and highest in USUAP households * Energy and protein intakes in USUAP group were higher than other two groups * Urban farming was inferred to play a prominent role in food security, which is translated into a better nutritional condition of the young children	Unusual study as shows positive impact of urban farming on both dietary intake and nutritional status Plots were allocated to 105 households through local government. Uncertainty as to fairness of this process leads to doubts with regard to reliability of comparisons between group C with A and B. Nonetheless, the differences between groups A & B indicate farming's beneficial effect

Agriculture related nutrition-specific programming: Evidence specific to urban context						
EVALUATIONS						
Authors, date	**Location, population, sample size**	**Intervention**	**Outcomes**	**Design and evidence score (ES)**	**Findings**	**Relevance to learning about urban programming**
	Project (USUAP gp)		* Stunting, wasting and underweight	*assessed*		
Njogu EW. (2009) Household food security among urban farmers in Nairobi, Kenya. In: Redwood M (Ed.) *Agriculture in Urban Planning - Generating Livelihoods and Food Security.* London: Earthscan and IDRC. **No evidence (rating C) of effectiveness**	Kenya (Nairobi) Study done in collaboration with the Ministry of Agriculture and Ministry of Livestock and Fisheries Development 300 households in the study, of which 30 were included in intervention	Selected respondents trained on utilization of their small land-holdings to produce diversity of crops, rear small livestock and nutrition. Provision of fencing material, seeds, seedlings and small livestock	Dietary intake of children < 5 y.o. was assessed using a 24-hour recall * Mean intake of calories, protein, iron and vitamin A * Prevalence of intakes below the RDA of calories, protein, iron and vitamin A * stunting, wasting and underweight	Before and after controlled comparison of an intervention to diversify the household farming practices from October 2005 to February 2006 to enhance household food security No statistical testing undertaken, so the advantage of increased power offered by paired nature of the data was not exploited in analysis **<u>Evidence classification: O-</u>** *Before-after controlled study* *Sample size small* *Anthropometric outcomes assessed*	* Consumption of energy, protein, vitamin A and iron increased in all HHs. * % of those with caloric intakes below RDA decreased from 23 (77%) before to 20 (67%) after intervention. * % of those with below RDAs in protein intake decreased from 17 (57%) to 12 (40%), in vitamin A intake from 22(73%) to 18(60%) and in iron intake from 29(97%) to 25(83%) before and after intervention, respectively. * Anthropometric outcomes showed mixed changes. Rates of moderate and severe stunting reduced and of mild cases increased, however rates of mild wasting increased while rate of normal cases decreased.	Improvements in nutrient intake were attributed to the activities of the intervention of producing a diversity of crops and rearing of small livestock. Rates of stunting improved while of wasting worsened, however the sample size was small, as were the differences between rates. So no firm conclusions can be drawn.
Sebastian R, Lubowa A, Yeudall F, Cole DC, Ibrahim S. (2008) *The association between household food security and urban farming in Kampala.* In: Cole D, Lee-Smith D, Nasinyama G, eds. *Healthy city*	Uganda (Kampala) Total 296 household (HH) * Nonfarming HH (n = 61) * Livestock-farming HH (n	Farming Multivariable linear regression analyses were conducted on three population	A household food security (HFS) indicator and an asset based wealth indicator	Cross-sectional comparative and descriptive study 13 parishes in which urban agriculture was known to take place were purposively selected, and two zones in each parish were randomly selected.	There were no significant differences in HFS between farming and non-farming households. Among households raising animals, raising pigs was associated with greater HFS (borderline statistical significance). Most households raising pigs did this only for sale purposes.	The size of land being farmed mitigated the association between wealth and HFS. It seems greater access to land may alleviate the effects of urban poverty on HFS Higher education of the primary caregiver was strongly associated with HFS. So interventions aimed at increasing female education could be expected to impact on food security.

Agriculture related nutrition-specific programming: Evidence specific to urban context						
EVALUATIONS						
Authors, date	**Location, population, sample size**	**Intervention**	**Outcomes**	**Design and evidence score (ES)**	**Findings**	**Relevance to learning about urban programming**
harvests: Generating evidence to guide policy on urban agriculture. Lima, Peru: International Potato Center (CIP) and Makerere University Press:69-88. **No evidence (rating C) of effectiveness**	= 139) * Crop-farming HH (n = 215)	subsets: 1. All participants (n=296) 2. Participants growing crops (n=215), 3. Participants rearing livestock (n=139)		Households ≥ 1 child aged 2 to 5 years were eligible for inclusion. The method of sampling within the zones is not described under methods but in the discussion is described as "convenience" **Evidence classification: [O-]** *Cross-sectional comparative study with risk of bias* *Sampling not random* *Food security outcomes assessed*	Households with greater landholding had higher HFS scores. For those with greater landholding the association between Asset score and HFS was less steep compared to those with < 1.4 acre land. Greater HFS was seen among households where the primary caregiver had secondary education or higher, and also where the primary care giver had received nutrition education in the past.	
Webb NL. (2000) Food-gardens and nutrition: Three southern African case studies. Journal of Family Ecology and Consumer Sciences. 28: 62-67. **No evidence (rating C) of effectiveness**	South Africa North-West Province N not stated Age of children not specified.	No details provided	No details provided. Study methods apparently included food frequency questionnaire and biochemical measurements	Critique of cross-sectional comparative study, originally reported elsewhere **Evidence classification: [O-]** *Cross-sectional comparative study with probable confounding* *Sample size not specified* *Not all assessed outcomes were specified.*	Vegetables were eaten more frequently by children of cultivators than of non-cultivators. But both groups had low frequencies e.g. cultivators' children ate a portion of vegetables as relish 2x/week, while non-cultivators has this 3x/2 weeks. Vitamin E and cholesterol levels were higher in cultivators' children compared to non-cultivators', associated with a higher fat intake.	Based on the low vegetable intakes, the authors query that veg. gardens can usefully address nutritional problems. (However the apparently higher fat intake in cultivators' children indicates there may have been a positive impact of home gardening on household income)
Details as above **No evidence (rating C) of effectiveness**	Zimbabwe 85 <5 yo.children: 47 (53%) were from cultivating HH, 38 (47%)	No details provided	Heights and weights were not converted into Z scores, but analysed by age categories instead	Critique of cross-sectional comparative study, originally reported elsewhere **Evidence classification: O-** *Cross-sectional*	Findings presented only for female children. The differences between groups were small and would have been statistically insignificant (no findings from tests were provided)	The data do not support the assertion of the original authors that a significant correlation existed between urban agriculture and household nutrition

Agriculture related nutrition-specific programming: Evidence specific to urban context						
EVALUATIONS						
Authors, date	**Location, population, sample size**	**Intervention**	**Outcomes**	**Design and evidence score (ES)**	**Findings**	**Relevance to learning about urban programming**
	from non-cultivating HH			*comparative study with high risk of bias* *Sample size not specified* *Anthropometric outcomes*		
Wills J, Chinemana F, Rudolph M. (2010) Growing or connecting? An urban food garden in Johannesburg. *Health Promotion International.* 25(1):33-41. **Evidence (rating C) of effectiveness**	South Africa (Johannesburg)	Siyakhana project = food garden established by University of Witwatersrand with support of City authorities and a perma-culture organization.	The project's objective was to provide food for children attending early-childhood development centres and for beneficiaries of NGOs providing home-based care for people living with HIV/AIDS. Qualitative data were collected, the produce of the garden was not quantified.	Cross-sectional descriptive study **<u>Evidence classification:</u>** **<u>[N]</u>** *Not controlled* *No quantitative outcomes*	* Project participants felt that the Siyakhana project had had a beneficial impact on health. They used herbs as remedies and the vegetables * Mobilizing around the food garden supported bonding among third-sector organizations, through increased opportunities for networking which built trust, reciprocity and resource exchange. * Project provides a model for community–university partnership, providing opportunities for service learning by students and for social investment by the university. * The geographical location of the garden constrained the regular participation of NGO members and limited the garden's development.	Social capital developed in the urban food garden is both bonding and bridging but was not located in the garden itself. A defining feature of the project was "dislocation, distance and the need for transport" since some of the NGO members worked 2–3 km from the garden and commute to these sites from their homes, which may be 20 km or more from their places of work. The issue of transport is central to participation in socioeconomic activities in Johannesburg and limited the potential benefit of this project.
World Bank. (2013) *Urban agriculture - findings from four city case studies.* Urban development series knowledge papers, No.18. Washington, DC: Urban Development & Resilience Unit,	Ghana (Accra) N = min. 600 producer HH and 300 non-producing HH	Household were defined as producers" if at least one family member was currently practicing urban agriculture. "Urban agriculture" =	24-hour recall data were used to assess dietary diversity. Food was classified into twelve groups (p.31 Table A1)	Cross-sectional study of contribution of urban agriculture to health, livelihoods, food security and urban environment among poor households. Based on four case-studies. Random sampling of	Tubers were consumed by more non-producers than producers Green leafy vegetables were consumed by more producers than non-producers. (p.63 Figure E10)	Across the four case-studies, in terms of food groups consumed, there were no major differences between producers and non-producers, though some differences were found for particular food groups, such as green leafy vegetables and beta-carotene rich foods. The trends suggest that farming enabled the very poor to diversify their diet.

Agriculture related nutrition-specific programming: Evidence specific to urban context						
EVALUATIONS						
Authors, date	**Location, population, sample size**	**Intervention**	**Outcomes**	**Design and evidence score (ES)**	**Findings**	**Relevance to learning about urban programming**
World Bank. **Evidence (rating C) of effectiveness**		growing crops or rearing animals or both. If no family member was involved in any form of urban agriculture, the household was referred to as a "non-producer."		households from administrative units (AU) along transect from inner city to peri-urban interface in three areas: 1) Urban: Inner city, heavily built up areas or more recently built up areas with more open spaces (two AUs) 2) Peri-urban transition: City fringe areas with intensive urban development (one AU) 3) Peri-urban: Includes areas with strong agricultural presence mixed with limited development (one AU) **<u>Evidence classification: [O-]</u>** *Cross-sectional comparative study* *Sampling method and size* *Dietary outcomes assessed*		Higher consumption rates by producers of protein-rich food in Nairobi could be associated with a higher purchasing power from the sale of vegetables. However dietary differences were not all in favour of producers. For example in Accra, tubers were consumed more by non-producers than producers, as were milk and dairy products in Lima.
Details as above **No evidence (rating C) of effectiveness**	India (Bangalore) N = min. 600 producer HH and 300 non-producing HH				Only a few (marginal) differences in food consumption between producers and non-producers, relating to consumption of some types of fruit and vegetables. (p.49 Figure D11)	
Details as above **Evidence (rating C) of effectiveness**	Kenya (Nairobi) N = min. 600 producer HH and 300 non-producing HH				Some differences in consumption of food groups: Yellow/orange vegetables (e.g. pumpkins, carrots, sweet potatoes) were consumed by 18% producers compared to 12% non-producers. Fish, meat and legumes were consumed by more producers, as were tubers. (p.75 Figure F12)	
Details as above **No evidence (rating C) of effectiveness**	Peru (Lima) N = min. 600 producer HH and 300 non-producing HH				More producers ate green leafy vegetables, and orange-fleshed vegetables and legumes, compared to producers. More non-producers consumed milk and dairy products than producers.	
Yeudall F, Sebastian R, Cole DC, Ibrahim S, Lubowa A, Kikafunda J. (2007) Food and nutritional security of children of urban farmers in Kampala, Uganda.	Uganda (Kampala) *Same sample as reported above for study by Sebastien et al.*	* Crop purpose score (derived from number of crops grown and primary reasons for growing them (from selling to	* Food security score (derived from questions on eating non-preferred food; limiting portion sizes; skipping meals, and	Cross-sectional comparative and descriptive study 13 parishes selected in which urban agriculture was known to take place,	* No significant differences between farming and non-farming families in the anthropometric variables of index children * Nonsignificant trend toward improved growth and body composition in children from	This study is unusual in that it studies the impact of urban farming not only on dietary intake variables but also on both types of nutrition status variables i.e. anthropometric and biochemical. Findings were said by the authors to indicate the importance of efforts to

Agriculture related nutrition-specific programming: Evidence specific to urban context						
EVALUATIONS						
Authors, date	**Location, population, sample size**	**Intervention**	**Outcomes**	**Design and evidence score (ES)**	**Findings**	**Relevance to learning about urban programming**
Food & Nutrition Bulletin. 28: 237S-246S. **Mixed evidence (rating C) of effectiveness:** Effective for dietary intake but not for anthropometry	Total 296 household (HH) * Nonfarming HH (n = 61) * Livestock-farming HH (n = 139) * Crop-farming HH (n = 215) Dietary diversity n = 281 Anthropometric data from 2 – 5 y.o. children n = 256 Hb n = 251 Retinol n = 263	household consumption)) * Livestock purpose score (derived from tropical livestock units (=approx. 250 kg live weight) and reasons for raising livestock. * Both scores indicate produce was consumed or sold	borrowing money for food) * Asset-based wealth indicator * Z scores of Height-for-age, weight-for-height, weight-for-age and MUAC Finger-prick blood sample used for * Haemoglobin * Serum retinol * C-reactive protein (measure of infection). From 24-hour recall dietary intake data * Total energy *Dietary diversity score * % energy intake from animal-source foods	representing all 5 divisions of Kampala. Two zones in each parish were randomly selected. Households eligible for the study included those with at least one child aged 2 to 5 years. Sampling method within the zones is not described. **<u>Evidence classification: O-</u>** *Cross-sectional comparative study with risk of bias* *Sampling method not specified* *Anthropometric outcomes assessed*	families that raised livestock. * Household food security score was significantly positively correlated with the number of tropical livestock units ($p = .02$), dietary diversity ($p < .001$), %energy from animal source foods ($p = .002$), and WAZ ($p = .02$). * Path analysis showed a significant positive relationship between household food security and subsequent consumption of animal source foods, which in turn was positively associated with retinol. * Consumption of animal-source foods was significantly negatively associated with C-reactive protein, which in turn was significantly negatively associated with haemoglobin, and haemoglobin was significantly positively associated with WAZ.	enhance access to land for urban farming and of engagement in activities aimed at improving quality of dietary intake, especially with respect to increasing consumption of animal-source foods, since urban agriculture can apparently contribute to the alleviation of Vitamin A deficiency and anaemia. However household food security did not differ significantly between the three groups, nor did consumption of animal source foods. So the study findings do not provide evidence that farming is associated with better nutritional status

REVIEWS		
Authors, date	**Topic and design**	**Findings relevant for urban programming**
Korth M, Stewart R, Langer L, et al. (2014) What are the impacts of urban	Systematic review to assess the impacts of urban agriculture (UA) programs on food security in low and	198 full texts identified. No studies met the review's inclusion criteria. So the review found no available

REVIEWS		
Authors, date	**Topic and design**	**Findings relevant for urban programming**
agriculture programs on food security in low and middle-income countries: a systematic review. *Environmental Evidence.* 3: 21. **No evidence of effectiveness** as no studies were included in review	middle-income countries. Only impact evaluations that set out to measure the effectiveness of UA interventions on food security, as compared to the effects of not engaging in UA, qualified for inclusion. Studies had to have a comparison group and at least two data points.	evidence that supports or refutes the suggestion that urban agriculture positively impacts on individual or household food security in low and middle-income countries.
Zezza A, Tasciotti L. (2010) Urban agriculture, poverty, and food security: Empirical evidence from a sample of developing countries. *Food Policy.* 35: 265-273. **Evidence classification [R-]** *Review based on analysis of secondary data* *Food security outcomes assessed* **Evidence (rating B) of effectiveness**	Analysis of the importance of urban agriculture for the urban poor and food insecure. Used household survey data for 15 developing or transition countries from the Rural Income Generating Activities (RIGA) database, which is constructed from a pool of Living Standards Measurement Study (LSMS) and other multi-purpose household surveys. Used two measures of dietary diversity, one based on food groups and the other a count of food items consumed in a 2 week–1 month recall period.	In 10 of the 15 countries analysed there was a correlation between an active participation of urban households in agricultural activities and greater dietary diversity, after controlling for economic welfare and household characteristics.

4.iv Equity and resilience programming

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
SYSTEMATIC REVIEWS/CROSS-COUNTRY REVIEWS					
1. de Groot R, Palermo T, Handa S, Ragno LP, Peterman A. (2015) *Cash transfers and child nutrition: What we know and what we need to know.* Innocenti Working Paper No. 2015 -07, Florence: UNICEF Office of Research.	SUB-SAHARAN AFRICA purview Systematic review; focused on cash transfer (CT) efforts from multiple countries	**Evidence classification: [R]** The analysis is based on a very useful conceptual framework for exploring the pathways through which CTs can influence nutrition. Despite providing relevant data on the effectiveness of CTs, the presentation findings does not shed light on urban CT vs. rural CT Inadequate description of inclusion	Cash transfer programmes (conditional or unconditional)	Child nutritional status Child dietary intake IYCF Household food security	The majority of CTs in Africa are unconditional → higher administrative burden because there must be further assessment to determine behaviours/health and nutrition status. Mixed results on proximate determinants of child nutrition, especially re: the means by which cash transfers can positively impact growth-related outcomes

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
		criteria for literature, or of total number of publications/studies reviewed, according to region.			in children, particularly in sub-Saharan Africa. However, according to p. 9: "In all of the African countries and programmes reviewed, household consumption increased and the majority of the additional income from the transfer was spent on food. Most households also improved their diet diversity (Kenya: OPM, 2012; Malawi: Miller et al., 2008; South Africa: Case, 2004; Zambia: AIR, 2013) One study included in the review noted a positive relationship between women's empowerment and improved nutritional status (van den Bold et al., 2013)
2. Lagarde M, Haines A, Palmer N. (2009) The impact of conditional cash transfers on health outcomes and use of health services in low and middle income countries. *Cochrane Database Syst Rev.* 4:CD008137.	GLOBAL purview Systematic review (Cochrane) Extensive search of literature; only 10 papers (covering a total of 6 intervention studies) met the inclusion criteria	**<u>Evidence classification: R</u>** Only studies based on RCTs uninterrupted time series, or controlled pre-post designs were considered. Included studies (6 papers on 4 CCT programmes) of impact on child anthropometric outcomes (e.g., stunting prevalence, height increase)	Operational definition of "conditional cash transfer" (CCT): "monetary transfers made to households on the condition that they comply with some pre-determined requirements in relation to health care. "	The investigators deemed the quality of evidence re: nutritional outcomes as "moderate" In addition to child anthropometric status, some studies assessed immunisation status, health service utilisation,	The authors only identified one study (Attanasio 2005; Colombia) that highlighted positive impact in urban areas; findings on CCT impact on the nutritional status of children were mixed: positive for children under 24 months (e.g., an increase of 0.58 kg in new-born weight in the urban areas) but no impact on older children, or children in rural areas.
3. Stewart R, Van Rooyen C, Korth	GLOBAL purview	**<u>Evidence classification: [R-]</u>**	Interventions	Impact focused	Positive link between micro-

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
M, Chereni A, da Silva NR, De Wet T. (2012) *Do micro-credit, micro-savings and micro-leasing serve as effective financial inclusion interventions enabling poor people, and especially women, to engage in meaningful economic opportunities in low- and middle-income countries? A systematic review of the evidence*. London: EPPI-Centre, University of London.	Systematic review Limited to peer-reviewed literature published in 2011	Evidence did not establish a link between micro-savings/micro-leasing and nutritional outcomes A number of studies included rural and urban/peri-urban populations; however, the systematic review did not highlight urban-rural differences	spanned various forms of micro-finance interventions targeting the poor/extreme poor	primarily on income	finance and women's savings in Kenya
4. Wamani H, Åstrøm AN, Peterson S, Tumwine JK, Tylleskär T. (2007) Boys are more stunted than girls in Sub-Saharan Africa: a meta-analysis of 16 demographic and health surveys. *BMC Pediatrics.* 7: 17. http://doi.org/10.1186/1471-2431-7-17	SUB-SAHARAN AFRICA	**Evidence classification: R-** The study was not intended to present counterfactual evidence The analysis controlled for some confounders, although it did not explore potential urban-rural differences Very large sample sizes (DHS) Stunting was the primary outcome related to nutrition.	Not applicable (contextual evidence only)	Stunting was the primary nutritional outcome of interest Household socioeconomic status (SES), which was based on information collected on asset ownership and mothers' education.	Not specific to urban areas A male disadvantage in terms of stunting was most pronounced in the lowest SES quintile
5. Smith LC, Ramakrishnan U, Ndiaye A, Haddad L, Martorell R. *The importance of women's status for child nutrition in developing countries.* IFPRI Research Report 131. Washington, DC: International Food Policy Research Institute; 2003.	CROSS-COUNTRY ANALYSIS Demographic and Health Survey data on 117,242 children under three years of age from 36 developing countries spanning three regions.	**Evidence classification: [R]** Counterfactual evidence not applicable, although the authors assess the influence of women's status on child nutrition while controlling for multiple confounders Based on datasets with extremely large sample sizes	NOT APPLICABLE (provides contextual evidence)	2 primary measures of women's status: (1) women's decision-making power relative to that of their male partners; (2) degree of	The analysis highlighted various pathways of influence: (1) According to the analysis, living in an urban area reduces a child's nutritional status in South Asia; the converse was observed in sub-Saharan Africa. In Latin America and the Caribbean, urban residence did not affect short-term nutritional status but did have a

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
	Datasets were selected based on the availability of data on child nutritional status Entailed extensive statistical modelling Urban residence was a variable controlled for in the analysis	Generates evidence on ultimate nutritional outcomes of interest, in addition to proximate determinants		equality between women and men in their communities. There were a total of 25 nutrition-related dependent variables, ranging for anthropometric measures to IYCF and care seeking for childhood illnesses	bearing on long-term nutritional status. (2) In all three regions, urban residence is negatively associated with the quality of breastfeeding practices (except for breastfeeding duration). (3) In Latin America, work environments for women were deemed incompatible with childcare. (4) Urban residence is associated with an increased likelihood of an adult caregiver in South Asia and sub-Saharan Africa and a decreased likelihood in Latin America and the Caribbean.
INDIVIDUAL STUDIES					
6. Attanasio O, Battistin E, Fitzsimons E, Mesnard A, Vera-Hernandez M. (2005) *How effective are conditional cash transfers? Evidence from Colombia.* IFS Briefing note 54. London: Institute of Fiscal Studies. Birthweight findings in: 7. Attanasio O, Gómez LC, Heredia P, Vera-Hernandez M. (2005) *The short-term impact of a conditional cash subsidy on child health and nutrition in Colombia.* London: Institute of Fiscal Studies. Report summary: Familias 03	COLOMBIA 691 out of 1024 municipalities. In each qualifying town, all of the poorest households with 0-17 year old children were eligible.	**<u>Evidence classification: O-</u>** Before and after controlled design. Sampling method is not described. Sample size for evaluation is not provided. Duration of follow-up is not specified.	*Familias en Accion* programme HH with children under five years of age receive a nutrition subsidy of $US15/month Mothers are also encouraged to attend courses on hygiene, vaccination and contraception. HH with children aged 6–17 y. receive a separate	School attendance, household consumption, child health. Compared those eligible for programme (whether or not they enrolled in the programme) with children in control municipalities	* Boys heights increased more in programme areas than in control areas for the 12 m.o. group only, not the 36 month old or 60 month old group. * Birthweight significantly increased in urban areas (+ 0.58 kg) but not rural (+ 0.18 kg) * Statistically significant reduction in diarrhoea for children <24 months and between 24-48 months old in rural areas. There was a non-significant decrease in urban areas. * Total consumption increased by 20% in rural areas and 9% in urban. * Food consumption increased in both urban and rural areas, but

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
			grant per child, (conditional on the child attending at least 80% of school lessons) of about US$8/m for children attending primary schools and US$16 for children attending secondary school.		more in rural areas, especially of meat, chicken and milk. * School enrolment increased, particularly amongst 12- to 17-y.o. in both urban and rural areas. Urban: 8- to 11-year-olds Prog 97% Control 95% (not sig) Urban: 12- to 17-year-olds Prog 74% Control 69% (sig) Rural: 8- to 11-year-olds Prog 93% Control 93% (no diff) Rural: 12- to 17-year-olds Prog 56% Control 46% (sig)
8. Hamad R. Fernald L. (2010) Microcredit participation and nutrition outcomes among women in Peru. *Journal of Epidemiology and Community Health*DOI: 10.1136/ jech.2010.108399	PERU, in and around the city of Pucallpa. N = 1593 female clients of a microcredit organisation in Peru. All 2134 clients were contacted and 1855 consented to participate, of these 262 were men.	**<u>Evidence classification: N-</u>** Cross-sectional comparative study with no control group. The comparison is within the group and relates to the effect of duration of participation. No sampling (all clients were approached and response rate was 88%) Possible bias due to no-response - the primary reasons for non-response included absence of the client and refusal. No other information is available on non-responders. .	Clients organise themselves into loan groups. Average loan US$350, repaid over 6 months at a monthly interest rate of 4%. For evaluation the predictor variable was length of time as a microcredit client measured in number of completed loan cycles 0- 5.5 y.	Adult women: age-adjusted body mass index (BMI), haemoglobin levels (g/dl) and food insecurity measured using the US household food security survey module.	* Longer microcredit participation was associated with higher BMI ($p=0.06$), higher haemoglobin levels ($p<0.01$) and lower food insecurity ($p<0.01$). With the inclusion of demographic and socioeconomic variables, the associations with higher haemoglobin (p 0.04) and lower food insecurity ($p<0.01$) were sustained. * The study provides evidence that the nutritional status of female clients can benefit from microcredit participation. * However changes in the health and financial wellbeing of clients brought about by such participation may only be modest "in the absence of broad changes to the architecture of poor communities and in the context of global policies that continue to marginalise vulnerable populations".

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
					* The authors therefore suggest that microcredit programmes are best viewed as opportunities by which vulnerable populations can be linked to public health and poverty alleviation programmes.
9. Kimani-Murage et. al. (2014) Vulnerability to food insecurity in urban slums: experiences from Nairobi, Kenya. *Journal of Urban Health: Bulletin of the New York Academy of Medicine:* 91(6):1098-1113. doi:10.1007/s11524-014-9894-3	KENYA (Urban slums: Korogocho and Viwandani) Based on data from Nairobi Urban Demographic and Health Surveillance 70000 individuals from 30000 households Cross-sectional assessment using both quantitative and qualitative methods Quantitative data were gathered in three rounds: in March/April 2011, July/August 2011 and December 2011/ January 2012	**<u>Evidence classification: [N-]</u>** Large sample size Data on proximate determinants, not ultimate nutrition outcomes No counterfactual evidence (not expected given the study design)	Not Applicable (contextual evidence only)	Food security score based on a Household Food Insecurity Access Scale (HFIAS)	Provides evidence on how slum populations respond to acute crises 85% of the households were food insecure; 50% severely food insecure. Factors associated with food security: household level of income, source of livelihood, household size, dependence ratio, illness, perceived insecurity and slum of residence. As a result of external shocks (2007/8 post-election violence), Prices of staple foods (e.g., maize flour) doubled while household purchasing power eroded. The study also documented coping strategies to deal with food insecurity. One such strategy was buying precooked food on the streets, to save on cooking fuel.
10. Macauslan I, Phelps L. (2012) *Oxfam GB Emergency Food Security and Livelihoods Urban Programme Evaluation Final Report.*	Focuses on Kenya, Haiti, Gaza No uniformity of package implemented across the three sites	**<u>Evidence classification:[N-]</u>** The evaluation was limited to secondary analysis and the collection supplemental qualitative evidence (via focus group discussions, semi-structured interviews with selected	Emergency Food Security and Livelihoods (EFSL) was positioned as complementary strategy to WASH.	Diarrhoeal disease, acute malnutrition (GAM/SAM), and stunting in	IN NAIROBI: The cash transfer and livelihoods interventions were linked to improved food consumption. However, there was a need to refine targeting (which was largely dependent on local

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
		stakeholder groups). There is some of the evidence on 'impact' based on pre- and post-comparisons, the absence of strong counterfactual evidence compromises the rigor of the evaluation. It is not possible to draw definitive conclusions regarding 'cause and effect.'	NAIROBI: Centred on Nairobi Urban Social Protection Programme (NUSPP). HAITI: Introduced in post-earthquake era GAZA: Implemented in the midst of a humanitarian crisis	under-fives	officials) to ensure the most vulnerable households received the transfer for longer, rather than a small number of households benefitting from a large transfer. IN PORT AU PRINCE: Selection of cash transfer provider can improve value for money; Also, while targeting was fairly transparent and participatory, the scale of need in a post-disaster scenario necessitated strong consideration of a 'blanket approach' GAZA: The intervention assessed was not tailored to the urban context (vulnerability scorecard indicators were not urban specific)
11. Macauslan I, Schofield L. *Evaluation of concern Kenya's Korogocho Emergency and Food Security Cash Transfer Initiative.* Final Report. Oxford: Oxford Policy Management; 2011.	KENYA (Urban—Korogocho slum in Nairobi) Evaluation consisted of quantitative and qualitative components. N=156 recipients each at baseline and end line	**Evidence classification: [N-]** Baseline and end line assessment, although no anthropometric data are available from the baseline Qualitative data gathering targeted beneficiaries, non-beneficiaries, and social workers involved in targeting Evaluator notes potential reporting bias that might limit generalizability, as Korogocho is a target of a long-standing demographic and health surveillance system	Implemented in 2009 and 2010 The CT scheme was designed to transfer Ksh 1,500 on a monthly basis to 2,400 households (actual reach=1958) households), using mobile phone technology (M-PESA). Households selected based on targeting teams consisting of local	Anthropometric data (height, weight and mid upper arm circumference) are available at end line only	* Families spent funds primarily on food and school-related expense for their children. * Dietary diversity improvement was slight. * Poor sustainability prospects: Food consumption increased by 1 meal per day among beneficiaries; however, it has since receded since cessation of the intervention. * Also sustainability prospects were linked to family size (large families from the extreme poor category were least likely to benefit in the longer term.) * Long-term benefit was only achieved for families that were able to invest funds and reap positive returns.

Citation	Location, population, and study design	Comments on strength of evidence	Intervention description	Outcomes assessed	Findings and their relevance to urban programming
			social workers. Households were given a SIM card (for mobile transfer of funds) at registration		* Re. targeting, there are noted inclusion errors, particularly given the subjective nature of targeting by some staff. * The existence of a national identity card as a requirement to receive CTs was believed to exclude some eligible beneficiaries * The M-PESA mobile transfer system was extremely effective, provide encouraging evidence on the use of this modality for cash transfers
12. Ruel MT, de la Brière B, Hallman K, Quisumbing A, Coj N. (2002) *Does Subsidized Childcare Help Poor Working Women in Urban Areas?: Evaluation of a Government-sponsored Program in Guatemala City*. Washington DC: International Food Policy Research Institute	GUATEMALA Evaluation of government-sponsored Community Daycare Program, designed to assist working parents, single mothers in particular, with low-cost, quality child care within their community For evaluation used (1) a case-control design of approximately 250 beneficiary children matched with control children of the same age and neighborhood, and whose mothers also worked outside the home, and (2) a random sample of M = 1,363 households with children 0–7 years of age.	**<u>Evidence classification: [O]</u>** Case-control study with additional control group to control for two sources of potential selection bias (selection of mothers into the labour force and selection into the program) and also estimate coverage of the program of interest.	Parents select a local woman to be the care provider. She provides care, hygiene and food for up to ten children in her own home with monthly "incentive" of $3/child from parents and $5/child from the project. The programme also provides cash to purchase food for beneficiary children, and food is donated by WFP each month. These are usually 20 kg of maize, 1 gallon of cooking oil, and 6 kg of black beans or six cans of fish.	Children's dietary intakes, maternal wages For child nutrient intake used (1) direct weighing on weekdays in the daycare setting (during 10-hour observations), (2) recall methods to assess weekend diet and morning and evening diets (before and after the 10-hour observations).	The programme allowed poor working parents and their children to participate in spite of their busy schedule. The income of beneficiary mothers was 30% higher than the income of working mothers who used other child care alternatives. The programme had a positive impact on the diet of beneficiary children who consumed 20% more energy, protein and iron, and 50% more vitamin A on average than non-participants. There was no evidence of substitution at home Operational constraints included the lack of participation of the beneficiary parents (related to their heavy work and commuting schedule)

4.v. Physical environment

Physical environment: studies with evidence not specific to urban context		
Authors, date	**Topic and design**	**Findings relevant for urban programming**
Bhutta ZA, Ahmed T, Black RE, et al. (2008) What works? Interventions for maternal and child undernutrition and survival. *The Lancet.* 371: 417-440.	Review of WASH interventions that affect maternal and child undernutrition and nutrition-related outcomes. Included interventions that principally affect nutrition outcomes, or affect morbidity and mortality through a nutritional pathway	Sanitation and hygiene interventions (hand washing, water quality treatment, sanitation, and health education) implemented with 99% coverage would reduce diarrhoea incidence by an estimated 30%, which would in turn decrease the prevalence of stunting by only 2· 3%. Impact may have been underestimated since only diarrhoea was included in pathway.
Cairncross S, Hunt C, Boisson S, et al. (2010) Water, sanitation and hygiene for the prevention of diarrhoea. *International Journal of Epidemiology.* 39: i193-i205.	Overview of 3 systematic reviews, focussed on the effect of handwashing with soap on diarrhoea, of water quality improvement and of excreta disposal.	Handwashing with soap has a strong and consistent reduced risk of diarrhoea, (RR 0·52, 95% CI 0·34–0·65 so risk reduced by 48%). Improved water quality also appears to have large effect (propose risk reduction of 17%) but may be partly placebo effect. Little rigorous evidence exists for sanitation's health benefit (propose risk reduction of 36%)
Dangour AD, Watson L, Cumming O, et al. (2013) Interventions to improve water quality and supply, sanitation and hygiene practices, and their effects on the nutritional status of children. *Cochrane Database of Systematic Reviews.* 8.	Systematic review to evaluate the effect of interventions to improve water quality and supply (adequate quantity to maintain hygiene practices), provide adequate sanitation and promote handwashing with soap, on the nutritional status of children under the age of 18 years and to identify current research gaps.	Included 14 studies. Showed only small impact on growth of interventions to improve water quality and supply, and sanitation. The evidence from meta-analysis of data from cluster-randomised controlled trials with an intervention period of 9-12 months suggests a small benefit of WASH interventions (specifically solar disinfection of water, provision of soap, and improvement of water quality) on length growth in children < 5 y.o. The intervention studies were relatively short and none is of high methodological quality. So confidence in these findings is low.
Esrey SA. (1996) Water, waste, and well-being: a multicountry study. *American Journal of Epidemiology.* 143: 608-623.	Secondary data analysis to test if incremental improvements in water and sanitation conditions lead to incremental effects regarding diarrhoea and nutritional status. Data collected from eight countries in the late 1980's from nationally representative samples of 15-49 y.o. women, and 3-36 m.o. children were combined. Rural (n = 11,992) and urban (n = 4,888) samples were analysed separately. Optimal (on the premises) and intermediate (improved public water) water supplies were compared with unimproved water conditions. Optimal (flush toilets or water-seal latrines) and intermediate (latrines) sanitation levels were compared with unimproved sanitation.	Incremental improvements in in sanitation were associated with less diarrhoea and with additional increases in the weights and heights of children. The incremental differences may be due to usage patterns rather than the technology itself—perhaps optimal services facilitate better hygiene practices. Effects of improved sanitation were greater among urban dwellers (22 – 53%) than rural dwellers. Health benefits from improved water were less pronounced than those for sanitation. Benefits from improved water occurred only when sanitation was improved and only when optimal water was present.
Humphrey JH. (2009) Child undernutrition, tropical enteropathy, toilets, and handwashing. *The Lancet.* 374: 1032-1035.	A viewpoint paper proposing that tropical enteropathy (TE) and not diarrhoea.is the primary causal pathway from poor sanitation and hygiene to undernutrition. TE is a subclinical disorder of small intestine caused by	Sanitation and hygiene interventions may contribute much more to stunting than was previously thought, because they were mainly appraised for their effect on diarrhoea.

Physical environment: studies with evidence not specific to urban context		
Authors, date	**Topic and design**	**Findings relevant for urban programming**
	faecal bacteria ingested in large quantities by young children living in conditions of poor sanitation and hygiene.	Improved sanitation may substantially improve growth through its link with TE
Mishra V, Retherford RD. (2007) Does biofuel smoke contribute to anaemia and stunting in early childhood? *International journal of Epidemiology.* 36: 117-129.	Secondary data analysis (from 1998–99 National Family Health survey in India) to examine association between HH use of biofuels (wood, dung, and crop residues) for cooking / heating, and anaemia and stunting. N = 29 768 0 – 35 m.o. children in 92 486 HH	Prevalence of moderate-to-severe anaemia, and severe stunting were significantly higher among children in HH using biofuels than among children in HH using cleaner fuels, independent of other factors. 31% of moderate-to-severe anaemia and 37% of severe stunting in 6 – 35 m.o. children in India may be attributable to exposure to biofuel smoke.
Smith LC, Haddad L. (2015) Reducing child undernutrition: past drivers and priorities for the post-MDG era. *World Development.* 68: 180-204.	Cross-country secondary analysis of data from 116 developing countries collected between 1970–2012 to investigate roles of quantities of food available at national level and diversity of that food; women's education and degree of gender equality; and access to safe water and sanitation. Also investigated influence of national income and quality of governance.	Found safe water access, sanitation, women's education, gender equality, and the quantity and quality of food available were key drivers of reductions in stunting. Accelerating reductions in undernutrition will require increased investment in these priority areas. For Sub-Saharan Africa, of the determinants that made a positive contribution to the small estimated decline in child stunting that did occur in the region, improvements in safe water access made the greatest contribution, followed by increases in women's education.
Spears D. (2013) *How much international variation in child height can sanitation explain?* World Bank policy research working paper 6351. Washington, DC: World Bank.	Cross-country secondary analysis of data from 140 surveys in 65 countries, to examine how much of the variation in child height is explained by variation in rates of open defecation.	A 20 % reduction in open defecation was associated with 0·1 SD increase in child height. Open defecation explained 54% of international variation in child height, while GDP only explained 29% of the variation. Open defecation can account for much or all of the excess stunting in Indian children compared to African.
Thomson H, Thomas S, Sellstrom E, Petticrew M. (2013) Housing improvements for health and associated socio-economic outcomes. *Cochrane Database of Systematic Reviews.* 2.	Included 39 studies which assessed changes in health following housing improvement. Most of the studies were from high-income countries, including three of rehousing from slums (UK & USA). Two of the three studies from developing world were from rural areas. The one study from low-income urban context is described below (Spiegel et al. 2003).	Housing-led neighbourhood renewal programmes which improve housing regardless of individual need may not lead to clear improvements in housing conditions for all houses. So health improvements following area-based housing improvements are not always obvious - improved health is most likely when housing improvements are targeted at those with poor health and inadequate housing conditions. A study in rural Bangladesh showed improvements in child WFH were linked to latrine introduction; A study in rural Paraguay showed insecticides were more effective than housing improvement at reducing exposure to disease vectors for Chagas disease.
Wolff CG, Schroeder DG, Young MW. (2001) Effect of improved housing on illness in children under 5 years old in northern Malawi: cross sectional study. *BMJ.* 322: 1209-1212.	Household based cross sectional study in Malawi Rural communities centred near the small northern town of Ekwendeni. < 5.y.o. children N = 143 in Habitat house and N =114 in Traditional house	Improved housing significantly reduced burden of disease among < 5 y.o. children. Children living in improved homes were less likely to have respiratory, gastrointestinal, or malarial illnesses (odds ratio 0.56, 95% CI 0.35 to 0.91) after control for confounding factors by level of education and occupation of the head of the household.

Physical environment: Evidence specific to urban context - EVALUATIONS and CONTEXTUAL STUDIES						
Source	**Location, population, sample size**	**Design (and comment on its strength)**	**Intervention/ exposure**	**Outcomes**	**Findings**	**Relevance to learning about urban programming**
Abelson P. (1996) Evaluation of slum improvements: Case study in Visakhapatnam, India. *Cities.* 13(2): 97-108. **Evidence (rating C) of effectiveness**	Slum dwellers in Visakhapatnam. India 800 HH (one third of all households from 10 of the 45 slums improved in 1988-89) N = 612 HH in main survey N = 80 HH in nutrition survey	Uncontrolled before and after study The method of sampling the slums was not described **Evidence classification: N-** *Uncontrolled before and after study with risk of bias* *Sampling not described* *Anthropometric outcomes assessed*	Municipal government delivered slum upgrading including improved access to shared water supply and public toilets; drainage; roads and street lighting; health programme; health education, and socio-economic programmes	Delivery problems, post-natal consultations, persons sick, persons chronically ill, households undercaloried, children underweight. Children at preschool, literacy, adults employed, household income.	The % of children under-5s who were less than 80% of the relevant ICMR standard weight fell from fell from 47% to 32% in three years. Morbidity increased between 1988 and 1991. In both 1988, nearly all adults surveyed suffered from vitamin and iron deficiencies, and one-third suffered protein deficiencies.	Physical upgrading focused on roads and drains which were easier to achieve. There was little improvement in slum water supply (partly because of a chronic city-wide water shortage) or in sanitary facilities (partly because public facilities were considered less effective than private ones) Thus access to tap water and private latrines was not achieved, and communal latrines were not properly maintained. This might explain the lack of improved health outcomes
Badasu DM. (2011) *Urban housing and child nutritional and health status in Accra.* Sixth African Population Conference, 5-9 December 2011, Ouagadougou. **Evidence (rating C) of effectiveness**	Ghana – Accra 172 children < 5 y.o. from households and 38 from streets and a hospital ward. Sampled from high-, middle- and low-income areas.	Cross-sectional study of link between housing and nutritional status. No attempt to adjust for confounding factors **Evidence classification: O-** *Cross-sectional study with risk of bias* *Sampling not described* *Anthropometric outcomes assessed*	Residential area, size of house, facilities	Stunting, wasting and underweight of children < 5 y.o.	Statistically significant association between wasting and ownership of toilet facility. Children in households with no toilet facility were 4X as likely to be wasted as those in households with WC	This is not a rigorously designed study. But the much stronger link between sanitary facility and nutrition status compared to the other variables examined indicates this is an important pathway to poor nutrition status.
Brown J, Cumming O, Bartram J, et al. (2015) A controlled, before-and-after trial of an urban sanitation intervention to reduce enteric infections in children: research	Mozambique - informal neighbour-hoods of Maputo 760 children (380 children with household access	Controlled, before-and-after trial Children (from 29 days old to 48 m.o. at enrolment) to be followed at 2 time	Private pour-flush latrines (to septic tank) shared by multiple households in compounds or household	Primary outcome is combined prevalence of selected enteric infections among < 5 y.o. children. Secondary outcome measures include soil-	The study has not taken place yet. Onsite systems are the most common type of sanitation in cities of low and middle income countries but have received	Given that sewerage systems are unaffordable or impractical in most informal settlements, decentralised sanitation solutions (eg, pit latrines, septic tanks) may play a critical role in the expansion of sanitation in rapidly urbanising

Physical environment: Evidence specific to urban context - EVALUATIONS and CONTEXTUAL STUDIES						
Source	**Location, population, sample size**	**Design (and comment on its strength)**	**Intervention/ exposure**	**Outcomes**	**Findings**	**Relevance to learning about urban programming**
protocol for the Maputo Sanitation (MapSan) study, Mozambique. *BMJ Open.* 5:e008215. **No findings yet**	to interventions, 380 matched controls using existing shared private latrines in poor sanitary conditions	points: immediately before the intervention and at follow-up after 12 months.	clusters	transmitted helminth (STH) reinfection in children following baseline deworming, and prevalence of reported diarrhoeal disease.	little attention. This is the first controlled health impact trial of an urban decentralised (non-sewerage) sanitation intervention.	areas. The future findings from this study will be important for policy makers and planners
Buttenheim AM. (2008) The sanitation environment in urban slums: implications for child health. *Population and Environment.* 30(1-2): 26-47. **Evidence (rating C) of effectiveness**	N = 153 zero – 35 month old children in Dinajpur, NW Bangladesh.	Children were observed twice, a year apart. **Evidence classification:** **N** *No control group* *Sampling fine* *Anthropometric outcomes assessed*	Use of an improved latrine (Improved = water-sealed, unsealed but hygienic, and community; Unimproved = unsealed/unhy-gienic, hanging/ katcha latrine, and open space or field)	Weight for height Z score	* % HH using improved latrine use increased from 33% to 59% over 12 months. * Increase in the proportion of HH that use an improved latrine is associated with improvements in child weight-for-height	* Public, shared sanitation facilities can be acceptable and lead to improvements in children's health. Contradicts view that communal latrines cannot be considered an improved or sanitary option. * Neighbours' behaviour w.r.t. children's faeces disposal reduces exposure of children to contaminated faecal matter. * For best health gains, sanitation programs must encourage safe disposal of children's faeces.
Cattaneo MD, Galiani S, Gertler PJ, Martinez S, Titiunik R. (2009) Housing, health, and happiness. *American Economic Journal: Economic Policy.* 1(1):75-105. **Evidence (rating C) of effectiveness**	State of Coahuila in Mexico N = 1390 HH for treatment group N = 1393 in control group Adjusted for clustering effect in its analysis of results	Controlled study with matching of census blocks and regressions to control for confounders **Evidence classification:** **O-** *Counterfactual weak (only post-intervention data collection)* *Sampling method and size fine* *Anthropometric outcomes assessed*	Provision of cement flooring via the slum upgrading intervention, the Piso Firme project	Children <5 y.o. Parasite count Diarrhoea Anaemia, Cognitive scores Height for age Z Weight for height Z	Limited evidence that lower incidence of anaemia in children under six years old was associated with intervention, and also parasite count and diarrhoea were significantly lower. No evidence for differences in height-for-age and weight-for-height z scores.	The findings are consistent with the hypothesis that replacing dirt floors with cement floors interrupts the transmission of parasitic infestations and should therefore reduce the incidence of both diarrhoea and anaemia.

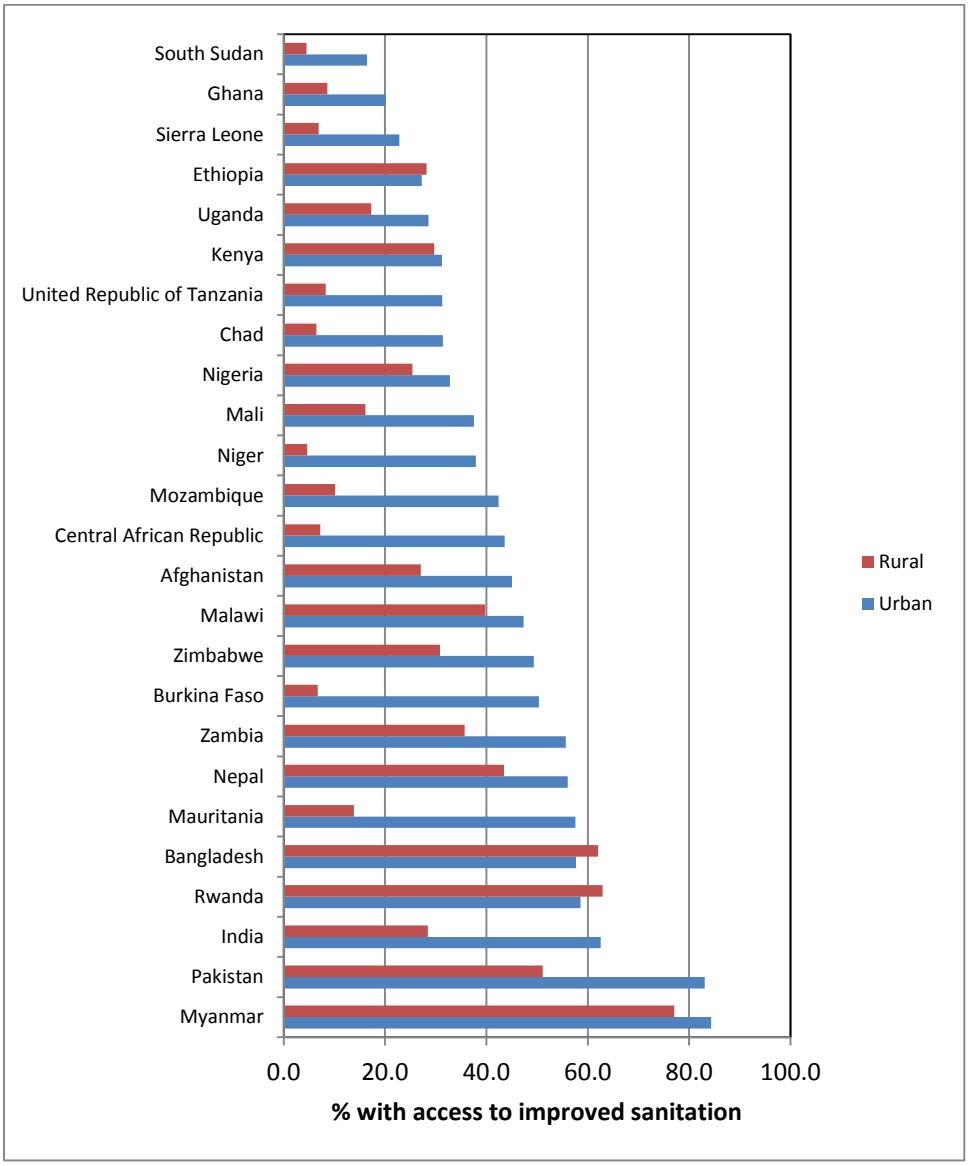
Physical environment: Evidence specific to urban context - EVALUATIONS and CONTEXTUAL STUDIES						
Source	**Location, population, sample size**	**Design (and comment on its strength)**	**Intervention/ exposure**	**Outcomes**	**Findings**	**Relevance to learning about urban programming**
Langford R, Lunn P, Panter-Brick C. (2011) Hand-washing, subclinical infections, and growth: A longitudinal evaluation of an intervention in Nepali slums. *American Journal of Human Biology.* 23(5): 621-629. **No evidence (rating C) of effectiveness**	3–12 m.o. infants living in the eight largest Kathmandu slums N= 545 intervention and N=545 control.	Before and after comparison with control group (Unexpected findings w.r.t. comparisons imply groups were not well matched) **Evidence classification: O-** *Before and after comparison with control group. But risk of bias as control group not well-matched* *Sampling method and size fine* *Anthropometric outcomes assessed*	In intervention areas, a small scale community-based hand-washing program was implemented for six months; in control areas, mothers continued their normal practices.	Levels of morbidity, mucosal damage, immune stimulation and growth (HFA, WFA and WFH Z scores).	Children with higher levels of mucosal damage exhibited worse growth over the period of the intervention (P 0.01 for HFA, p <0.001 for WFA and p 0.03 for WFH Z –scores. 41% reduction in diarrhoeal morbidity (P = 0.023) for the intervention group relative to control. However the hand-washing intervention did not lower levels of mucosal damage or immune stimulation, nor slow growth faltering.	The study confirms the importance of hand-washing campaigns for reducing childhood morbidity. Yet the data suggest that promoting hand-washing is necessary but not sufficient to address chronic, subclinical infections. Tackling the root causes of childhood infections is needed to address growth faltering in the context of highly contaminated slum environments.
Mahadevia D. (2011) *Tenure security and urban social protection in India.* Centre for Social Protection Research Report, No. 5. Brighton: IDS. **Descriptive**	Three locations in two cities in Gujarat State, India: Vasna and Amraiwadi wards in Ahmedabad and Varachha ward in Surat.	Cross-sectional descriptive study **Evidence classification: [N]** *No nutritional outcomes assessed*	Tenure security	Living conditions, human development, work participation rates, per capita incomes and access to entitlements such as ration cards.	Owning property enables the poor to borrow money from formal sector and expand their businesses. Outright titled ownership is not the only option; right of use (*de facto* or perceived security of tenure) can also protect people's rights to housing and have a positive impact on living conditions, access to services and livelihoods. *de jure* tenure may bring further benefits in addition to those gained through *de*	Tenure security is * a continuum of rights * highly contextual, and relates to nature of the state * *de facto* tenure security should be the goal not *de jure* Greater levels of tenure security lead to better living conditions, human development achievements, economic status and access to entitlements. Policies to improve de facto tenure security in Indian urban slums should be the starting point of any housing programme addressing the development of

Physical environment: Evidence specific to urban context - EVALUATIONS and CONTEXTUAL STUDIES						
Source	**Location, population, sample size**	**Design (and comment on its strength)**	**Intervention/ exposure**	**Outcomes**	**Findings**	**Relevance to learning about urban programming**
					facto tenure, but *de jure* rights can lead to evictions of poor people and housing capture by elites	existing slums.
Spiegel J, Bonet M, Yassi A, Tate RB, Concepción M, Canizares M. (2003) Evaluating the effectiveness of a multi-component intervention to improve health in an inner-city Havana community. *International Journal of Occupational and Environmental Health*. 9(2): 118-127 **No evidence (rating C) of effectiveness**	A "deprived and dilapidated" urban neighbour-hood in Cuba (Cayo Hueso) and control community (Colon). Household survey of 1,703 individuals in 30 neighbourhoods.	Before and after comparison with control group. Risk of confounding. **Evidence classification [O-]** *Controlled study but risk of bias* *Sampling method and size fine* *Health outcomes were self-rated and only assessed after the intervention.*	Repairs to housing as well as wider neighbour-hood improvements to water and sanitation infrastructure, street lighting, and repair of public buildings.	Self-reported health, smoking, respiratory illness, suicide attempts. Self-rated health was only assessed retrospectively	4 years after intervention. statistically significant improvements in self-reported health across all age groups among men in intervention group but only in youngest group of women (15 – 20 y), and not for the complete group of women	The difference in findings for men v. women is notable. However the authors do not discuss it. The men in both the control and intervention communities significantly increased self-rated health so there appears to have been confounding bias.

Physical environment: Evidence specific to urban context REVIEWS		
Source	**Topic and design**	**Findings relevant for urban programming**
Alirol E, Getaz L, Stoll B, Chappuis F, Loutan L. (2011) Urbanisation and infectious diseases in a globalised world. *The Lancet Infectious Diseases.* 11: 131-141. **Descriptive**	Narrative review of impact of urbanisation on infectious diseases in a globalised world	Describes the most important infectious diseases in tropical urban environments, and how transmission can be both hindered and promoted by characteristics of urban areas. Argues that health should be a major consideration in future town planning.
Jones H, Clench B, Harris D. (2014) *The governance of urban service delivery in developing countries - literature review.* London: ODI. **Descriptive**	Summary of governance challenges relating to solid waste management, water and sanitation and transport services in urban areas	Urban governance involves a large and diverse range of actors. There is a strong theme of working with or through the private sector for service delivery. Complex inter-sectoral challenges can be addressed with the provision of unified bodies for sectors, but alternatives are novel governance arrangements reached through local drive and experimentation, with a focus on 'networked' forms of governance

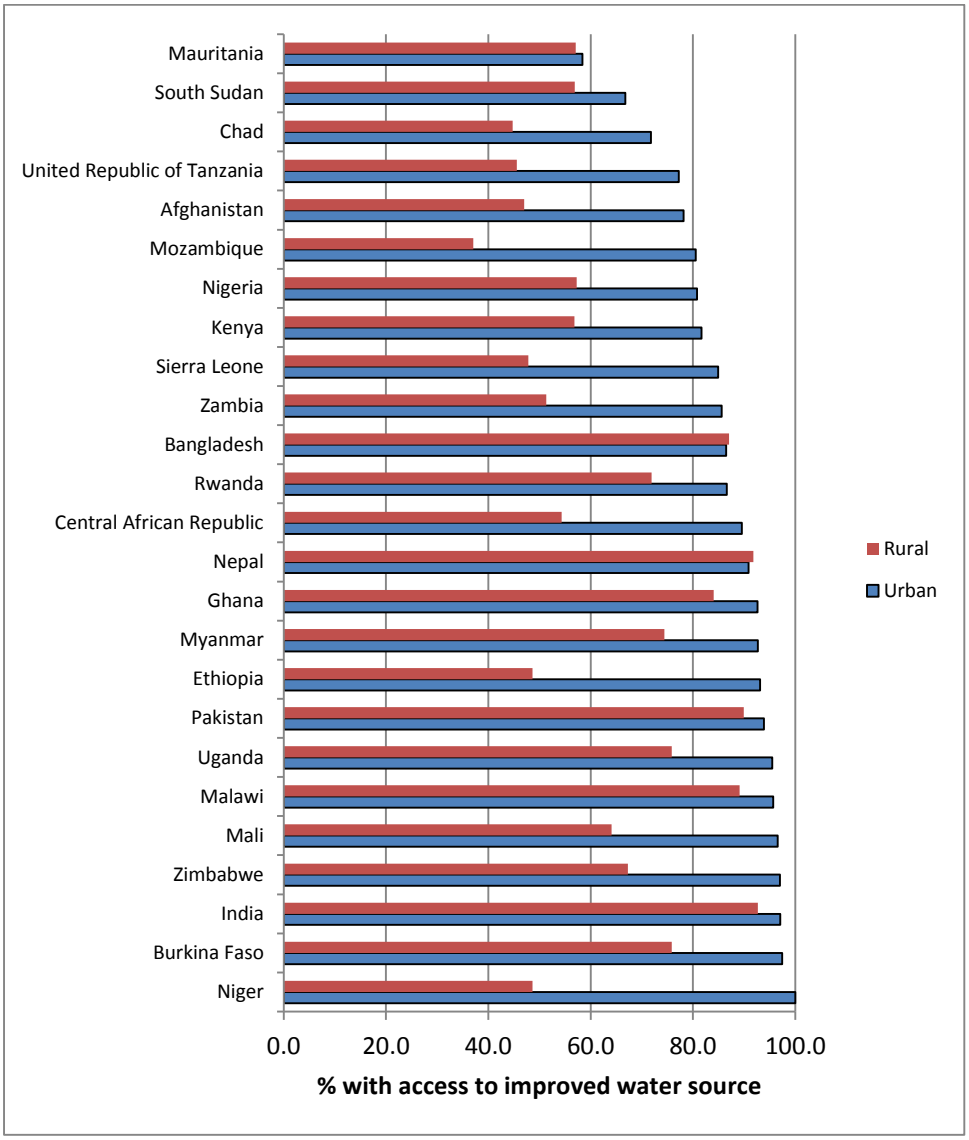
Physical environment: Evidence specific to urban context REVIEWS		
Source	**Topic and design**	**Findings relevant for urban programming**
Norman G, Pedley S, Takkouche B. (2010) Effects of sewerage on diarrhoea and enteric infections: a systematic review and meta-analysis. *The Lancet Infectious Diseases.* 10: 536-544. **Evidence (rating B) of effectiveness**	A systematic review and meta-analysis of the effects of sewerage on diarrhoea and enteric infections. **Evidence classification [R-]** *Counterfactual fine (conclusions not affected by omitting studies with inadequate multivariate adjustment procedures for confounding)* *Sampling method and size fine* *Outcomes assessed are not nutritional*	Included 25 observational studies (to date there had been no RCTs) Pooled estimates show that sewerage systems typically reduce diarrhoea incidence by about 30% (RR 0·70, 95% CI 0·61–0·79), or 60% when starting sanitation conditions are very poor. However in many contexts, sewerage might be less cost effective and sustainable than onsite alternatives e.g. pit latrines, septic tanks.
Turley R, Saith R, Bhan N, Rehfuess E, Carter B. (2013) Slum upgrading strategies involving physical environment and infrastructure interventions and their effects on health and socio-economic outcomes. *Cochrane Database of Systematic Reviews.* 1. **Evidence (rating B) of effectiveness**	A systematic review of the effects of slum upgrading strategies involving physical environment and infrastructure interventions on the health, quality of life and socio-economic wellbeing of urban slum dwellers in low and middle income countries (LMIC) **Evidence classification: [R]** *Systematic review* *Sampling method and size fine* *Outcomes assessed are not nutritional*	Five studies were included for the main analysis: one RCT and four controlled before and after studies, two of which had a high risk of bias. Nine supporting studies were included, of which all but one had a high risk of bias. There was a limited but consistent body of evidence to suggest that slum upgrading may reduce the incidence of diarrhoeal diseases and water-related expenditure. There were mixed results for whether slum upgrading reduced parasitic infections, general measures of communicable diseases, financial poverty and unemployment outcomes.
UNICEF and WHO. (2015) *Progress on sanitation and drinking water - 2015 update and MDG assessment.* Geneva: UNICEF and WHO. **Descriptive**	Report on global progress on sanitation and drinking water. Provides most recent estimates of urban/rural data for each country w.r.t. improved sources of water and sanitation	Identifies inequalities including gap between urban / rural residents, gender burden of water collection and persistent exclusion of the poor from water and sanitation services.

Figure 23: Per cent with access to improved sanitation for populations living in urban and rural areas of DfID countries, recent estimates from nationally representative surveys



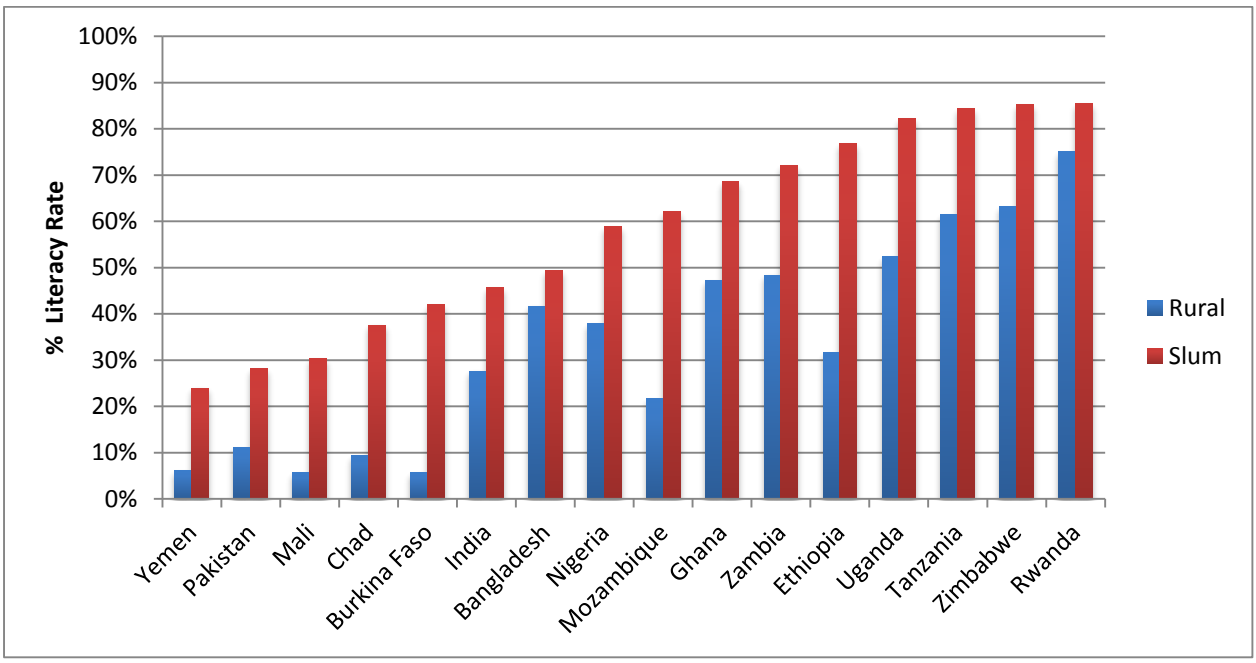
Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation http://www.wssinfo.org/.

Figure 24: Per cent with access to improved water source for populations living in urban and rural areas of DfID countries, recent estimates from nationally representative surveys



Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation http://www.wssinfo.org/.

Figure 25: Per cent literacy rate for populations living in urban and rural areas of DfID countries



Data source: UN-Habitat (http://urbandata.unhabitat.org/).