



## Animal sourced foods and child nutrition in South Asia: Policy priorities

### Policy priorities

- Use agriculture and trade policies to reduce prices of animal sourced foods
- Use behavioral change campaigns, other nutrition and social protection programmes to increase demand for animal sourced foods
- Encourage vegetarian populations to include eggs in the diet, especially for young children
- Raise awareness of human health risks stemming from livestock fecal contamination and zoonotic diseases;
- Develop WASH and livestock programmes that reduce human health risks from livestock

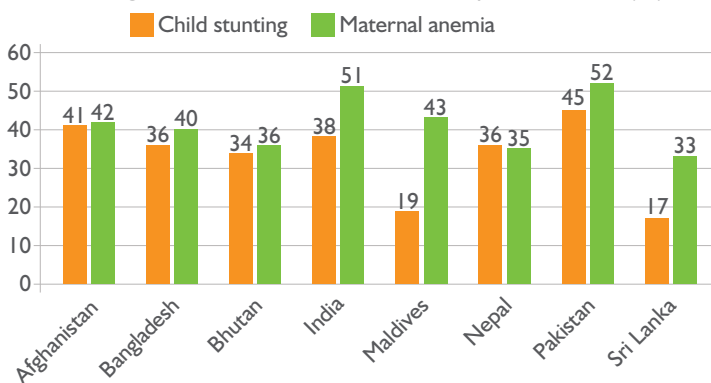
Although some South Asian countries have recently made impressive progress against undernutrition, indicators of maternal and child nutrition remain extremely poor across South Asia (Figure 1). In all countries except the Maldives and Sri Lanka, more than a third of pre-school children are stunted, 33–52 percent of adult women have anemia and most countries have wasting prevalence in excess of 10% (considered “alarming”).

These exceptionally high rates of undernutrition are caused by many underlying factors such as poverty, poor education, and limited access to health, family planning and WASH services (Headey, et al., 2016a). Yet one neglected dimension of South Asia’s undernutrition problem is low intake of animal sourced foods (ASFs). ASFs are rich in

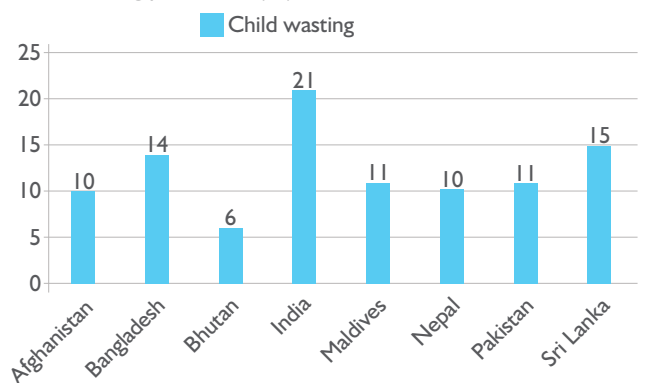


**Figure 1** Maternal and child nutrition indicators in South Asia

Child stunting and maternal anemia in South Asia, prevalence rate (%)



Child wasting prevalence (%)



Source: World Health Organization.

**Table 1** Patterns of animal sourced food consumption among children 6–23 months of age in South Asia

	1 + ASFs yesterday	2+ ASFs yesterday	Dairy yesterday	Eggs yesterday	Meat yesterday	Fish yesterday
Bangladesh	63%	27%	27%	24%	13%	35%
India	50%	7%	45%	5%	3%	5%
Nepal	58%	11%	48%	7%	13%	3%
Pakistan	68%	25%	52%	27%	16%	2%

Source: DHS surveys from the most recent round in each country, compiled and analyzed by Headey, et al. (2017).

high quality proteins containing essential amino acids, but also highly bioavailable micronutrients such as iron, B12, zinc and calcium that are essential for child growth and cognitive development. Moreover, since different ASFs contain different nutrients, consuming multiple ASFs is more beneficial to growth and development than a diet based on only 1 or 2 ASFs. For example, milk is rich in calcium, but does not contain any iron, while most others ASFs are rich in iron, but have low levels of calcium. Hence, regular and varied ASF intake is critical for meeting nutrient requirements in early childhood.

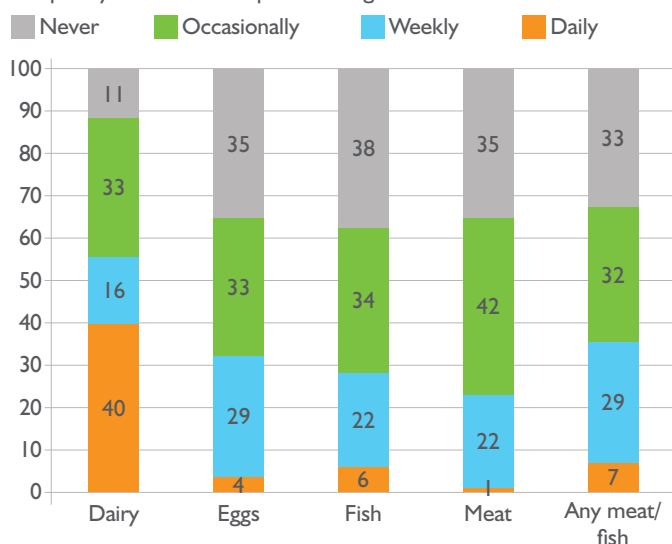
This LANSAs brief therefore summarizes recent research from LANSAs and other nutritional research programs (ARENA) that address several key policy questions in the South Asian context.

## How adequate are ASF consumption patterns in South Asia?

Demographic Health Survey (DHS) data shed light on the frequency of ASF consumption among young children (6–23 months) in Bangladesh, India, Nepal and Pakistan, while the

**Figure 2** Patterns of animal sourced food consumption among women 15–49 years old in India, 2005/06

Frequency of ASF consumption among Indian women



Source: 2005/06 National Family Health Survey (IIPS and Macro Int., 2007).

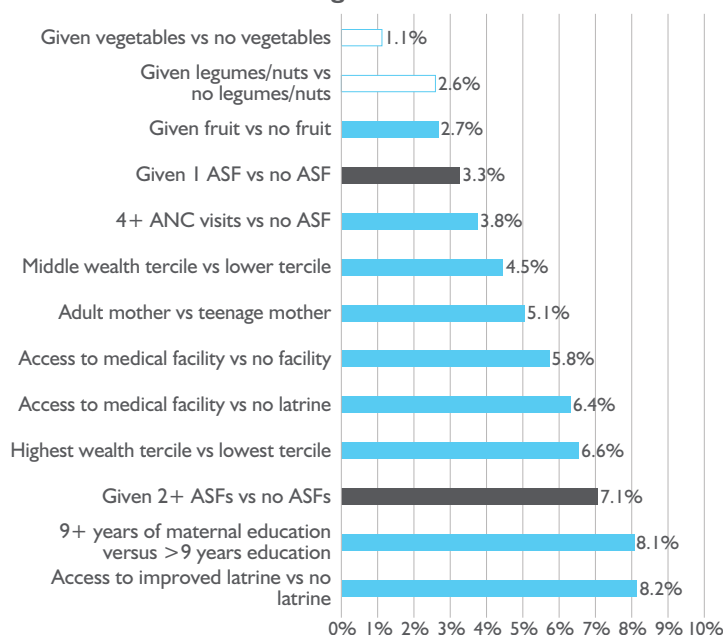
2005–06 Indian DHS also tells us about ASF consumption frequency among adult men and women (Table 1). Among children, ASF consumption on a daily basis is still shockingly low. In all four countries, only one half to two-thirds of children consumed at least one ASF in the 24 hours prior to the survey. In Bangladesh and Pakistan around one quarter consume 2 or more ASFs, but just 7% and 11% of children meet this requirement in India and Nepal. Among specific ASFs we also see distinct patterns across countries, with dairy relatively unimportant in Bangladesh, where fish is a more important ASF even in children’s diets.

Among Indian women we also see signs of very low ASF consumption, with the exception of dairy (Figure 2). Over a third of Indian women state that they never consume eggs or meat, suggesting they follow relatively strict vegetarian practices. Income and price constraints are also likely to be important, though, since a third or more of women also state that they only occasionally consume ASFs.

## Is animal sourced food consumption associated with reductions in stunting?

How costly for child growth outcomes is the low consumption of ASFs? A recent paper tries to assess this question (Headey, et al., 2017), while a forthcoming LANSAs paper looks specifically at the growth impacts of dairy consumption in Bangladesh (Choudhary and Headey 2018). Figure 3 reports the predicted reduction in stunting prevalence from improving various dietary and household conditions in four South Asian countries. The black bars report the impacts of giving either 1 ASF or 2 ASFs, which predict a 3.3 and 7.1 percentage point decline in the risk of stunting, respectively. Clearly the expected growth benefits of giving a child at least two ASFs far exceed those of 1 ASF. Moreover, the expected benefits of receiving at least 2 ASFs on a daily basis are essentially as large as any other underlying determinant of nutrition, including improved toilets, 9 or more years of maternal education, and moving from the lowest wealth class (tercile) to the highest wealth class. These results are highly consistent with results for the larger sample of 46 countries reported in Headey et al. (2017), but also with more biologically oriented research on the importance of ASFs.

**Figure 3 Giving at least two animal-sourced foods on a daily basis would predict a 7.1 percentage point decline in the child's risk of being stunted**



Source: DHS surveys from the most recent round of data in India (2005/06), Nepal (2011), Bangladesh (2011) and Pakistan (2012/13), compiled and analyzed by Headey, et al. (2017). Data pertain to children 18–23 months in order to capture the cumulative growth benefits of exposure to improved conditions. Dark grey bars refers to ASF indicators, while empty bars report results that are not statistically significant.

Although the results above are not derived from an experimental analysis, quasi-experimental research from LANSA confirms the growth benefits of cow ownership and regular access to dairy products in rural Bangladesh (Choudhary and Headey 2018). These authors find that cow ownership results in roughly a 0.5 standard deviation increase in height-for-age Z scores for children 12–23 months. However, that research also highlights potential substitution between breastfeeding and cow's milk consumption, suggesting the need to more rigorously promote exclusive breastfeeding for children 0–6 months of age.

### What are the barriers to increasing ASF consumption in South Asia?

There are no simple explanations of why ASF consumption is so low in South Asia, particularly among children. As we saw above, a large proportion of the Hindu populations of India and Nepal never consume non-dairy ASFs, but do consume dairy. Agroecological factors also explain consumption patterns to some degree: Bangladesh's flood plain and coastal ecologies leave it highly suitable for fish production, but not for large scale dairy production. Cultural factors may also be important since parents often have strong beliefs about which foods are healthy or unhealthy for young children. And incomes and prices jointly play an important role in influencing consumption patterns of ASFs. As income increase consumers desire higher value sources of calories richer in protein, fats and micronutrients (Choudhury and Headey, 2017). Whether they can afford specific ASFs depends not only on their

### Further reading

Choudhury, S., Headey, D., 2017. What drives diversification of national food supplies? A cross-country analysis, *Global Food Security*. Early online version. <https://www.sciencedirect.com/science/article/pii/S2211912416301377>

Choudhury, S., Headey, D., 2017. Household dairy production and child growth: Evidence from Bangladesh, Unpublished mimeograph. Washington DC.

George, C.M., et al. (2015). Fecal Markers of Environmental Enteropathy are Associated with Animal Exposure and Caregiver Hygiene in Bangladesh. *Am J Trop Med Hyg*, 93, 269–275.

<http://www.ajtmh.org/docserver/fulltext/14761645/93/2/269.pdf?expires=1513891642&id=id&accname=guest&checksum=E5318003AD4E20C579CCC4FBEC3DC7DA>

Headey, D., Hirvonen, K., Hoddinott, J., 2017. Animal sourced foods and child stunting. IFPRI Discussion Paper. International Food Policy Research Institute (IFPRI), Washington DC. Available at [http://ageconsearch.umn.edu/record/264958/files/Headey\\_Hirvonen\\_Hoddinott\\_ASSApaper\\_ASF\\_stunting.pdf](http://ageconsearch.umn.edu/record/264958/files/Headey_Hirvonen_Hoddinott_ASSApaper_ASF_stunting.pdf).

Headey, D., et al., 2016a. Drivers of nutritional change in four South Asian countries: a dynamic observational analysis, *Maternal & Child Nutrition*. 12, 210–218. <http://onlinelibrary.wiley.com/doi/10.1111/mcn.12274/full>

Headey, D., et al. 2016b. Is Exposure to Animal Feces Harmful to Child Nutrition and Health Outcomes? A Multicountry Observational Analysis, *The American Journal of Tropical Medicine and Hygiene*.

IIPS, Macro Int., 2007. National Family Health Survey (NFHS-3), 2005–06. <http://www.ajtmh.org/docserver/fulltext/14761645/96/4/961.pdf?expires=1513890703&id=id&accname=guest&checksum=F277CBC7028A1EBCDEA0B957B1442695>

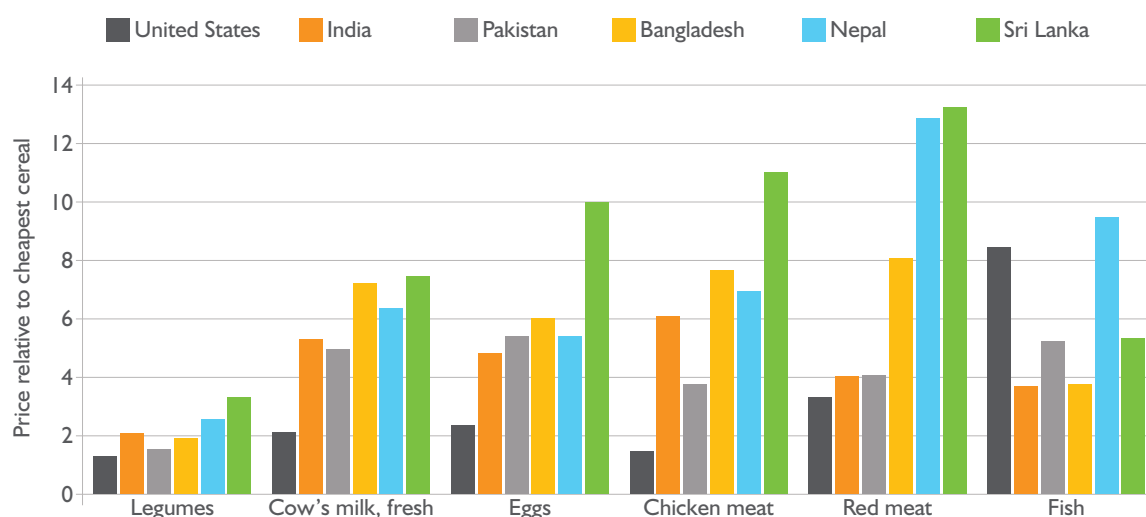
Headey, D., et al. 2017. The relative prices of healthy and unhealthy foods in 177 countries. Conference presentation at the *Agriculture for Nutrition and Health Academy Week*. Kathmandu, July 7th, 2017.

Sharifa, N., Salah Uddin, K., Stephen, P. L., Emily, S. G., Jaynal, A., Rashid Uz, Z., Badrul Munir, S., Mustafizur, R., et al. 2015. Highly Pathogenic Avian Influenza A(H5N1) Virus Infection among Workers at Live Bird Markets, Bangladesh, 2009–2010, *Emerging Infectious Disease journal*. 21, 629.

incomes and food budgets, but also on the price of ASFs relative to staple foods.

Figure 4 reports results from a recent analysis by IFPRI researchers on the per calorie cost of different foods relative to the cost of the cheapest cereal in a given country (Headey, et al., 2017). For example, Figure 4 shows that in the USA a calorie from cow's milk is only twice as expensive as a calorie from the cheapest staple cereal (bread). In contrast, in South Asia cow's milk is 5 times as expensive as the cheapest cereals in India and Pakistan, but 6–7 times as expensive in other South Asian countries. A similar pattern holds for eggs, chicken meat and red meat, whereas fish is cheaper in India, Bangladesh and Sri Lanka, but is relatively expensive in Nepal.

**Figure 4** Relative to cereal-based calories, most ASFs are expensive sources of calories in South Asia



Source: Headey et al. (2017). These are relative prices denote the price of 1 calorie of each food relative to 1 calorie from the cheapest cereal in each country (typically rice, except in Pakistan where wheat is the cheapest staple cereal).

These price patterns are consistent with relatively low levels of productivity and efficiency in South Asia's livestock and fisheries sector relative to the USA. Hence there is an important role for agriculture, trade and value chain policies and investments to help drive down the relative prices of ASFs, as well as an important role for demand-side policies to encourage increased consumption of ASFs. The latter could include nutritional counselling and media campaigns, inclusion of ASFs in nutrition and social protection programs, and specific messaging around the inclusion of eggs in vegetarian diets.

### Are there potential health risks with ASF production and consumption in South Asia?

Despite their nutritional benefits, there are potential health risks associated with ASFs. Most of the research and policy focus on ASFs has been on food safety dimensions, such as adulteration of dairy supplies. Yet there is also new evidence on health risks from livestock production. Earlier research from Africa and Latin America showed

that young children often directly ingest poultry faeces or faecally contaminated soils. This exposure emerges because young children are often left unattended on dirty homestead floors, and because traditional low-input poultry systems involve birds scavenging for food in and around the household, rather than being corralled. A study in Bangladesh found that children from households contaminated by animal faeces were also more likely to be stunted (Headey, et al., 2016b), while another study in Bangladesh linked exposure to poultry to gut infections and stunting (George et al. 2016). Overall, this suggests that exposure to animal faeces is a potentially important health risk for young children, although there are also zoonotic diseases of concern, including Avian Influenza (Sharifa, et al., 2015). Hence more attention is needed from the public health and agricultural sectors on reducing children's exposure to these kinds of livestock-based health risks. For example, WASH programs in South Asia have been very active in trying to encourage toilet use, but very few WASH programmes try to address problems with animal faeces.

### Credits

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