



## Fragile environment, seasonality and undernutrition in Bangladesh

Undernutrition among mothers and children remains one of the main public health challenges of the 21st century, particularly in low and middle-income countries (Victora et al., 2010). The causes of malnutrition are directly related to inadequate dietary intake as well as disease, though many factors contribute to the indirect causes. While most nutrition interventions are delivered through the health sector, non-health interventions can also be crucial. Availability of, and access to, sufficient nutritious food produced in the agricultural sector at the national and household level are among such factors. Agricultural growth and the diversity of food production and consumption thus assume importance as drivers of good nutrition which are in turn affected by seasonal differences and the ecological environment.

The spatial distribution of poverty in Bangladesh shows that poverty is concentrated in ecologically unfavourable areas (Chowdhury & Christa, 2014). Recently, the issue of spatial distribution of undernutrition has emerged as a matter of concern, considering the growing evidence for a strong persistence of existing inequalities (Bredenkamp et al., 2014). The fragility of the environment may affect the household's ability to grow food, which may in turn influence nutritional status negatively. Therefore, whether ecological differences have affected nutritional outcomes is becoming an important issue for research.

Seasonal fluctuation is another important factor influencing poverty and the nutrition and growth of children. Seasonality refers to any regular pattern or variation that is correlated with the seasons (Devereux et al., 2012).

Seasonality manifests itself in multiple dimensions of livelihoods such as employment of workers, food availability, prices, health and access to services, which



affect livelihood opportunities and options (Zug, 2006). People adopt different strategies such as migration and access to credit to augment income and consumption during slack seasons. Seasonality is significantly related to food insecurity, with pre-harvest

↑ Taking food to flood prone areas in Sunamgunj, Bangladesh.

PHOTO: BRAC

times being accompanied by food shortages. In Bangladesh, this situation is described as *monga*, and is widely prevalent in the north-western districts in areas adjacent to the rivers Jamuna and Teesta (Zug, 2006).

The objectives of the LANSa study “Fragile Environment, Seasonality, and Maternal and Childhood Undernutrition in Bangladesh” were to understand whether spatial and seasonal variations in food production/availability affect maternal and childhood undernutrition in Bangladesh. Other proximate drivers of nutrition, such as socioeconomic factors and non-food environments, were taken into consideration to separate the effects of agroecology and food seasonality. The null hypothesis of whether agricultural and household incomes are the same across different production environments was tested, and an in depth analysis of the effect of unfavourable ecologies on maternal and child malnutrition was carried out.

## Study design and approach

A longitudinal dataset comprising a nationally representative data sample collected in 2014 was used to assess agricultural performance across production environments. Sample households were divided into three ecosystem groups: a) flood-prone areas, b) salinity-affected coastal areas and c) favourable areas (as control). Household income and its components were compared across the ecosystems using multiple regression models.

To assess the effect of different environments on maternal and child nutrition, data from the Food Security Nutrition Surveillance Project (FSNSP) was used. The key variables of interest were food seasonality, comparing pre-harvest, post-harvest and monsoon seasons and geographical location, exploring regional inequality.

## Key findings

Household income was not equal across agro-ecological zones, with coastal areas of Bangladesh found to be less dependent on agriculture. Per capita income has been increasing in coastal areas of Bangladesh, led by remittance (money sent home by migrant



↑ A woman farmer harvesting vegetables.  
PHOTO: BRAC

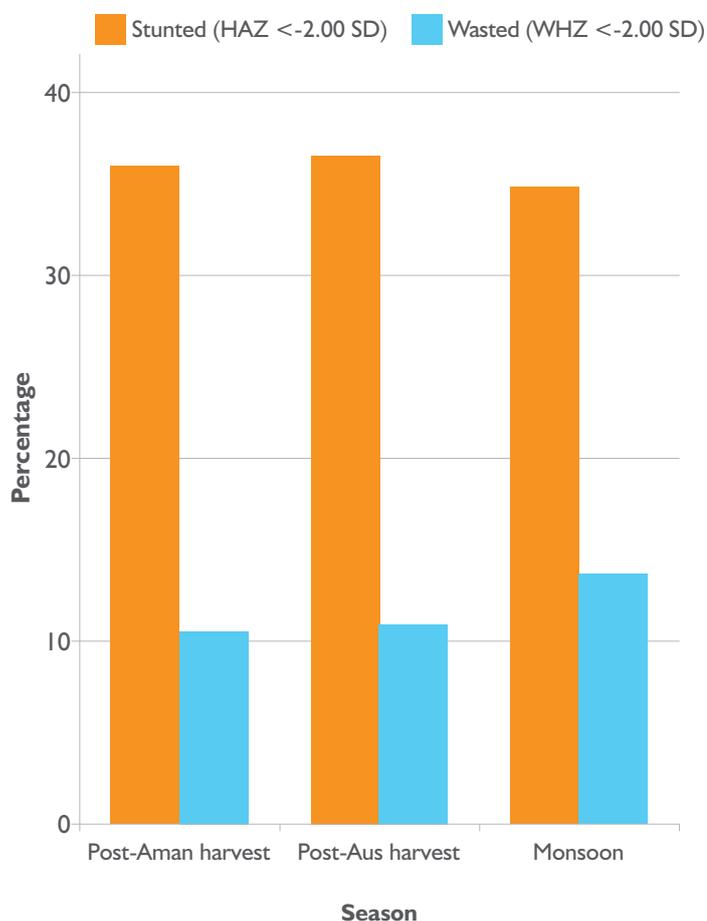
workers) growing at 8% per year against 6% in other areas. Regression analysis showed that a household in a coastal zone earned 19% less than one in more favourable zones. Although the income from farm practices was found to be lower in unfavourable areas, the deficiency was compensated by increased non-farm incomes. Entitlement arising out of the growth of non-agricultural – especially remittance – income could help increase access to food. Hence, giving higher priority to development interventions for these ecologies could result in substantial improvement in food security and nutrition at the national level.

After correction for demographic and socioeconomic variables, unfavourable agro-ecology and seasonality were found to be associated with the nutritional status of children. There were significantly higher rates of child wasting in the monsoon season compared with the two harvest seasons (figure 1).

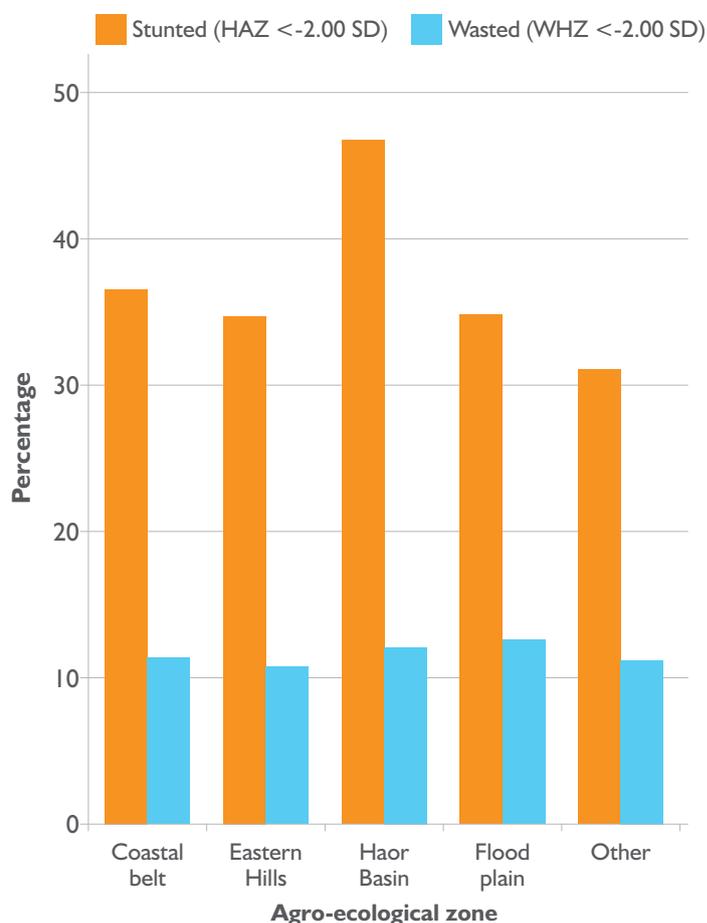
A strong regional heterogeneity in undernutrition was found, with alarmingly high levels of stunting (figure 2) and maternal underweight in the Haor Basin.

“ The null hypothesis of whether agricultural and household incomes are the same across different production environments was tested. ”

**Figure 1** Prevalence of stunting and wasting in children (aged <5 years) by season



**Figure 2** Prevalence of undernourished children (aged <5 years) in different agro-ecological zones (FSNSP surveys 2011 and 2012).



## Conclusions and recommendations

In order to determine the most effective strategies for reducing the burden of undernutrition and accelerating development, it is important that the determinants of undernutrition are known, especially in the context of unfavourable areas of a country, such as the *Haor* Basin in Bangladesh. It appears that though per capita income has increased over time, it has not yet translated into the consumption of nutrient-rich diversified foods. Hence, an appropriate policy guideline that focuses on altering the nutritional intake of poor children, especially in the regions with higher prevalence of childhood undernutrition, is needed; more focused programmes targeting specific issues like ‘diversified diet at low cost’ should be implemented and evaluated.

A study done on the 1992 and 2000 data from the Nutritional Surveillance Project (NSP) by Torlesse *et al.* (2004) revealed an association between rice expenditure and the nutritional status of children, and concluded that macroeconomic food policies that keep the price of food staples low (e.g. open market sales of rice and wheat) could contribute towards reducing the percentage of undernourished children; this low price allows households to spend more money on non-rice foods, and thereby diversify their diet by consuming non-rice foods more frequently (Torlesse *et al.*, 2003).

For greatest effect, Miller *et al.* (2013) suggested that intervention strategies have to be seasonally related. Health workers need to recognize the complex interplay of seasonality in order to find a mix of interventions to address this problem. This paper demonstrates the importance of bringing seasonal thinking back into the current debates on hunger and nutrition. Food availability and food security issues came out as major concerns for Bangladesh as they have a direct impact on nutritional status. Education, especially of females, should still be one of the key policy options to achieve the SDG on undernutrition in Bangladesh.



↑ A woman farmer using a mechanised tractor for rice cultivation in Domar, Bangladesh.

PHOTO: BRAC

## Credits

This research brief was written by Dr. Masuda Mohsena, Researcher, BRAC Bangladesh.

This product is from a study conducted by BRAC under the LANSAs initiative: 'Fragile Environment, Seasonality And Maternal And Childhood Undernutrition In Bangladesh' by M Mohsena, M Hossain, B Chakraborty, A Bayes and ANM Rahman, *Journal of Biosocial Science*, page 1 of 25, September 2017. Cambridge University Press, 2017.

Readers are encouraged to quote and reproduce material from issues of LANSAs briefings in their own publication. In return, LANSAs requests due acknowledgement and for quotes to be referenced as above.



LANSAs is an international research partnership, exploring how agriculture and agri-food systems can be better designed to advance nutrition in South Asia. Led by MS Swaminathan Foundation, members include BRAC, Collective for Social Science Research, Institute of Development Studies, International Food Policy Research Institute and Leverhulme Centre for Integrative Research for Action on Health. LANSAs is funded by the UK Government. The views expressed in this document do not necessarily reflect the UK Government's official policies.

**Web** [www.lansasouthasia.org](http://www.lansasouthasia.org) **Email** [lansa.southasia@gmail.com](mailto:lansa.southasia@gmail.com) **Twitter** @LANSAsresearch

## Further reading

Bredenkamp, C., Buisman, L. R. & Van De Poel, E. 2014. Persistent inequalities in child undernutrition: evidence from 80 countries, from 1990 to today. *International Journal of Epidemiology* 43(4), 1328-1335. DOI: 10.1093/ije/dyu075.

Chowdhury, N. Y. & Christa, R. 2014. Targeting the Poorest. In Braun, J. V. & Gatzweiler, F. W. (eds) *Marginality: Addressing the Nexus of Poverty, Exclusion and Ecology*. Springer New York, London, pp. 101-115.

Devereux, S., Sabates-Wheeler, R. & Longhurst, R. 2012. Seasonality Revisited: New Perspective on Seasonal Poverty. In Devereux, S., Sabates-Wheeler, R. & Longhurst, R. (eds) *Seasonality, Rural Livelihoods and Development*. Earthscan New York.

Miller, J., Ritchie, B., Tran, C., Beggs, S., Lada, C. O., Whetter, K. & Cobiac, L. 2013. Seasonal variation in the nutritional status of children aged 6 to 60 months in a resettlement village in West Timor. *Asia Pacific Journal of Clinical Nutrition* 22(3), 449-456. DOI: 10.6133/apjcn.2013.22.3.10.

Torlesse, H., Kiess, L. & Bloem, M. W. 2003. Association of household rice expenditure with child nutritional status indicates a role for macroeconomic food policy in combating malnutrition. *Journal of Nutrition* 133(5), 1320-1325.

Torlesse, H., Moestue, H., Hall, A., De Pee, S., Kiess, L. & Bloem, M. 2004. Dietary diversity in Bangladesh: evidence from the Nutritional Surveillance Project. In Bouis, H., Hassan, N. & Kabir, K. (eds) *Alleviating malnutrition through agriculture in Bangladesh: Biofortification and diversification as sustainable solutions*. IFPRI Washington, D.C., pp. 44-49

Victoria, C. G., De Onis, M., Hallal, P. C., Blossner, M. & Shrimpton, R. 2010. Worldwide timing of growth faltering: revisiting implications for interventions. *Pediatrics* 125(3), e473-480. DOI: 10.1542/peds.2009-1519.

Zug, S. (2006) Monga – Seasonal Food Insecurity in Bangladesh – Bringing the Information Together. *The Journal of Social Studies* 111, 1-14.