Global Food Security xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Global Food Security

journal homepage: www.elsevier.com/locate/gfs

Review article

Adapting an experiential scale to measure food insecurity in urban slum households of India

Chandana Maitra

The University of Queensland, School of Economics, St Lucia Campus, Brisbane, QLD 4072, Australia

ARTICLE INFO

Keywords:
SDG 2.1
Food access
Experiential scale
Urban
India
Targeting

ABSTRACT

In the background of the Sustainable Development Goal 2.1 which proposes promoting universal access to food to all populations across the globe by 2030, this paper measures experiential food insecurity in low income urban households of India. A nine-item experience-based food security scale is constructed by adapting the United States Household Food Security Survey Module in the context of slum households of Kolkata, according to which 15.4% of the households are food insecure. Findings also indicate that multi-sectoral interventions are required to tackle the problem of urban food insecurity – nutritional interventions combined with appropriate education and income support programs and employment generation schemes. Additionally, the experiential indicator has excellent potential to be an alternative metric to measure household food security in urban India.

1. Introduction

India is a country which is facing the paradox of strong economic growth and grim food security conditions. Access to food remains an issue of grave concern as reflected in the fact that the country still hosts the second largest number of undernourished in the world (FAO, 2014). The country's hunger status is classified as 'serious' by the Global Hunger Index (Grebmer et al., 2014). Issues like 'hidden hunger' which were dormant so long have now come to the surface with a growing body of academic literature voicing concern that it might push the country into the potential risk of being trapped in the cycle of hunger, poverty and stalled development (Grebmer et al., 2014; Black et al., 2013). It seems, the benefits of economic growth have not trickled down to those who are the most disadvantaged. Unless India is able to combat food insecurity the country will not be able to progress towards the agreed indicators of the Sustainable Development Goal (SDG) 2.1 which states: "by 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round" (UN, 2016).

Given this dichotomy of rapid economic growth and lagged progress in battling food insecurity, it is important that the households with difficulty in food access are accurately identified so that they are able to reap the benefits of targeting. In identifying the vulnerable households in need of social protection, it is important to highlight the urban food insecure due to the fact that food insecurity of urban households remains relatively invisible to policy makers (Maxwell, 1999), and hence might easily jeopardise such concerted efforts by the government to ameliorate food security as the National Food Security Act (NFSA).[1] India is urbanizing rapidly, however the rate of decline of urban poverty has lagged behind that of rural poverty in recent decades (GOI, 2011), resulting in 'urbanization of poverty'— from about one-in-eight of the poor living in urban areas in the early 1950s to one-in-three in 2012 (Datt et al., 2016). Such developments have implications for food security as well since urban poor, being 'net buyers' of food, are likely to be the hardest hit if there is a sudden hike in food prices as the most recent one in 2008 (FAO, 2010). Urban poor also spend a relatively larger portion of income on food which broadly means that the poverty problem gets translated to a food-insecurity problem.

Against the above backdrop, the key objective of this paper is to capture the extent of food insecurity in low income urban households using an experience-based food security scale. The scale is adapted from the United States Household Food Security Survey Module (US HFSSM); and is based on data collected from 500 randomly selected slum households of Kolkata surveyed in 2010–11. The use of an experiential scale as a metric to measure food insecurity is relevant given the fact that the SDG indicator 2.1.2 is an experience-based indicator — *prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale (FIES)* (UN, 2016).

Experience-based food security scales (EBFSS) which measure the 'access' component of food security are one of the most recent

E-mail addresses: chandana.maitra@uqconnect.edu.au, chandana.maitra@sydney.edu.au.

[1] The National Food Security Act, passed by the Parliament on 10th September 2013 has the objective to provide for food and nutritional security in human life cycle approach, by ensuring access to adequate quantity of quality food at affordable prices to people. The Act provides for coverage of upto 75% of the rural population and upto 50% of the urban population for receiving subsidized food grains under the Targeted Public Distribution System (TPDS) of India, thus covering about two-thirds of the population (GOI, 2016).

http://dx.doi.org/10.1016/j.gfs.2017.04.005
Received 12 July 2016; Received in revised form 11 April 2017; Accepted 22 April 2017

developments in the literature on food security measurement. These indicators are direct measures of access to food, as opposed to indirect or proxy measures like income, food expenditure, household poverty status, dietary intake or nutritional status (Ballard et al., 2013). These scale measures rely on people's direct responses to a series of questions regarding their access to adequate food based on data collected at the household or individual level. Following Pérez-Escamilla (2012), of the SMART criteria used to evaluate the efficacy of indicators the EBFSS have been shown to be specific (and valid), measurable (frequent data collection), achievable (technically possible), and timely (rapid application and sensitive to changes including seasonality and pre/post program).

Given the above, the use of EBFSS in measuring food insecurity has become increasingly popular among researchers worldwide and India is no exception. The present study adds to the existing body of literature. The study is one of the first applications of experiential indicators in India whereby the food security scale is constructed based on locally meaningful standards. The scale is tested for reliability and validity prior to being applied for measuring food insecurity in urban households. Subsequently, the determinants of urban food security are also identified.

The rest of the paper is organized as follows. Section 2 presents a review of the US HFSSM focusing on its theoretical background; Section 3 presents the method of adapting the US HFSSM in Kolkata; Section 4 reports results; Section 5 discusses the results and Section 6 concludes with policy recommendations and directions for future research.

2. Literature review

2.1. The United States Household Food Security Survey Module (US HFSSM): The background

The initial development of experiential scales took place in the U.S. where, in response to a report by President's Task Force on Food Assistance (1984), researchers at the Cornell University (Radimer et al., 1990; Wehler et al., 1992) embarked on concerted efforts to develop methodologically sophisticated measurement scales for food security. Subsequent events led to the development of the 18-item questionnaire referred to as the United States Household Food Security Survey Module (US HFSSM) which was first administered nationally in April 1995. Two measures of household food security are computed from the core module data: Household Food Security Scale which is a continuous measure and Household Food Security Status which is a categorical measure.

Previous research suggested that food insecurity manifests at the household level as a managed process of efforts to cope with inadequate supplies of food and resources to obtain food, which moves through an observable set of stages as food insecurity increases (Radimer et al., 1990; Wehler et al., 1992). In the first stage, household members experience anxiety about their food situation, and adjust their budget and food management patterns. In the second stage, adults reduce their food intake, but in households with children they try to protect the children's food intake. In the third stage, the children also experience a reduction in food intake, and adults' food intake is more sharply reduced.

The 18-item US HFSSM which includes ten adult-referenced items and eight child-referenced items, attempts to capture the above experiences of food insecurity. A six-item short form of the survey module (Blumberg et al., 1999) is also available. The development of the US HFSSM subsequently led to several other attempts to develop a generic tool to measure food insecurity across diverse cultures and contexts around the globe such as the nine-item Household Food Insecurity Access Scale (HFIAS) (Coates et al., 2007) or the eight-item Food insecurity Experience Scale (FIES) (Ballard et al., 2013). FIES is the global version of an experience-based food insecurity scale that originated from a regional initiative in Latin America and the Caribbean-Latin American and Caribbean Food Security Scale (ELCSA) (Pérez-Escamilla et al., 2007).

2.2. Theoretical framework of the US HFSSM

The statistical model that provides the theoretical basis for the experiential scales is a type of nonlinear factor-analytic approach called the single parameter Rasch model (Bond and Fox, 2001). Though this model was used to develop the US HFSSM, its roots are in psychometry and Item Response Theory (IRT), where it is commonly employed to construct educational tests intended to measure 'ability' based on an individual's responses to progressively more difficult questions. In the food security literature, the latent construct of interest is household 'food insecurity' rather than 'ability', and the items representing the underlying phenomenon are arranged along a continuum of 'severity' rather than 'difficulty'. Under the assumptions of Rasch model, food insecurity is viewed as a continuous, unidimensional and unobservable quantity that varies from household to household. Psychometric assessment involves estimating fit statistics and severity parameters for final selection of items necessary to construct the scale.

The item severity parameters represent the position of the items along the constructed food security measurement scale. An item with a high positive severity indicates a greater degree of food insecurity (Hamilton et al., 1997b). The household severity parameter (household scale score) is a continuous interval-level measure of the extent of food insecurity in the household. A higher number of affirmative responses indicate greater household food insecurity. The mathematical form of the relationships assumed by the model are logistic, which allows both the item and the household severity parameters to be placed on an equal interval scale (logit-based) of the construct being measured (see Appendix B for more details).

Individual items are assessed using 'fit' statistics of which 'infit' is an "information-weighted" statistic for each item that is sensitive to responses by households with severity scores in the range near the severity level of the particular item. 'Outfit' is not weighted and is sensitive to highly improbable responses (outliers). Infits in the range of 0.8–1.2 are considered to be good and 0.7–1.3 are acceptable (Nord et al., 2002). High value of infit indicates a weaker association than expected between that item and the underlying condition of food insecurity and implies, the item may not be suitable for inclusion in the scale.

Once the scale is estimated and tested for reliability and internal and external validity (method discussed in Appendix B), food security categories are created by placing thresholds on the estimated scale using expert judgment.[2] Researchers have often adapted the U.S. scale by selecting cut-offs on the test scale using the U.S. scale as reference (see Nord et al., 2002 for details) (see Appendix B for brief discussion). However, for within-country use it is advisable that each country specifies thresholds and gives the resulting ranges of severity labels that are meaningful in the context, language, and culture predominant in that country typically based on expert opinion.

2.3. Application of the US HFSSM in India

A recent study in India commissioned by the United Nations Children's Fund (UNICEF) (Sethi et al., 2016) with a view to examine the potential of an experiential indicator to be a uniform tool to measure food insecurity in India, identified 10 studies (in addition to the Kolkata study) from the published as well as grey literature which report the use of the US HFSSM in some form: the 18-item US HFSSM (Nord et al., 2002; Gopichandran et al., 2010), the 8-item child scale (Gupta et al., 2013, 2014; UHRC, 2011) and the 6-item short-form adult scale (Agarwal et al., 2009a, 2009b; Mukhopadhyay et al., 2010; Mukhopadhyay and Biswas, 2011; Wright and Gupta, 2015) (see

[2] The estimated statistical model produces a ruler. The decision about appropriate thresholds on the ruler to identify ranges of severity of interest, and the appropriate labels to attach to the ranges, is subjective and should be based on expert opinion.