

Research Application Summary

**Socio-psychological determinants of the consumption oriented production of
biofortified sweetpotato among rural households in Uganda**

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Abstract

Biofortification is a well documented strategy geared towards alleviating micronutrient deficiencies. Often promoters of the strategy aim at replacing energy dense varieties with nutrient rich biofortified varieties for production and consumption at household level. In Uganda, biofortified sweet potato varieties have been promoted to replace white fleshed energy dense varieties so as to alleviate Vitamin A Deficiency (VAD). Since the strategy adopted is to disseminate Vitamin A among the rural households relying on a crop that is well integrated into production systems that have been implemented over several decades, the study assumes that the target communities already have the physical and skills infrastructure to support sweetpotato production. The study accordingly hypothesizes that the extent to which the new Vitamin A rich (VAR) varieties substitute the traditional varieties, in the fields and diets, are determined by the rational calculations and self-efficacy of major household actors. The study also envisages key roles for power relations and gender differences in resource access and utilisation especially in dealing with a hidden problem such as VAD. In this study, therefore, the Theory of Planned Behaviour (TPB), and the Health Belief Model (HBM) are combined to provide a framework for exploring the determinants of biofortified crop consumptions. Approaches and preliminary results are discussed.

Key words: Biofortification, hidden hunger, rural households, sweetpotato, Uganda

Résumé

La biofortification est une stratégie bien documentée visant à atténuer les carences en micronutriments. Souvent, les promoteurs de la stratégie visent à remplacer les variétés à énergie dense avec les variétés biofortifiées riches en nutriments pour la production et la consommation au niveau des ménages. En Ouganda, les variétés de patate douces biofortifiées ont été promues pour remplacer les variétés à chair blanche dense en énergie afin d'atténuer carence en vitamine A (CVA). Étant donné que la stratégie adoptée est de diffuser la vitamine A parmi les ménages ruraux dépendant sur une culture qui est bien intégrée dans les systèmes de production qui ont été pratiqués depuis plusieurs décennies, l'étude suppose que les communautés cibles ont déjà l'infrastructure physique et les

compétences nécessaires pour soutenir la production de la patate douce. Par conséquent, l'étude émet l'hypothèse que la mesure dans laquelle les nouvelles variétés riches en vitamine A (VRA) remplacent les variétés traditionnelles, dans les champs et les régimes alimentaires, est déterminée par les calculs rationnels et l'auto-efficacité des acteurs majeurs du ménage. L'étude envisage également un rôle clé des relations de pouvoir et des différences entre les sexes dans l'accès aux ressources et leur utilisation, en particulier dans le traitement d'un problème caché tel que la CAV. Dans cette étude, par conséquent, la théorie du comportement planifié (TCP), et le modèle des croyances à propos de la santé (MCS) sont combinés pour fournir un cadre pour explorer les déterminants de la consommation des cultures biofortifiées. Les approches et les résultats préliminaires sont discutés.

Mots clés: La Biofortification, la faim cachée, les ménages ruraux, la patate douce, l'Ouganda

Background

Micronutrient deficiency (also called hidden hunger), is a serious health problem especially in most sub-Saharan African countries and is responsible for a significant share of infant mortality and diminished human capital development. A common form of this deficiency is the Vitamin A deficiency (VAD) (de Brauw *et al.*, 2015). The VAD affects nearly 127 million, primary under five year old children, globally (Black *et al.*, 2008), 43 million of who live in SSA (Low *et al.*, 2009). It accounts for six per cent of all deaths among pre-schoolers globally (Black *et al.*, 2008). Among pre-school children, severe VAD causes high mortality rates (60%) while sub-clinical deficiency has been associated with 23% mortality (Andrade *et al.*, 2009). The VAD also increases the severity of infectious diseases, such as measles and diarrhoea in children, and/or slows their recovery from illness.

Despite the risk VAD poses, vitamin A deficiency prevalence is still high in Uganda. Between 2006 and 2011, for example, VAD prevalence in the country increased substantially in pre-school age children, from 20 per cent to 38 per cent while that in adult women increased from 19 per cent to 36 per cent (UBOS, 2007, 2012). In the Eastern and East Central sub-regions of the country, prevalence levels have shot as high as 40% and 51% among children and women, respectively. Rural areas and pregnant women are particularly more affected by VAD compared to urban areas and non pregnant women.

Aguayo and Baker (2005) argue that “effective and sustained control of VAD has the potential to be among the most cost-effective and high impact child-survival interventions in Sub-Saharan Africa”. Similarly UNICEF (2007) indicates that ending VAD can reduce child mortality by 23 per cent. Presently β -carotene rich biofortified crops, e.g. orange fleshed sweet potato (OFSP), cassava and maize, are being promoted for adoption in developing countries to reach rural households (Amagloh and Coad, 2014; Jenkins *et al.*, 2015; Jones and De Brauw, 2015; Sharma *et al.*, 2016; Talsma *et al.*, 2016). However, a sustainable mechanism to reach rural households with vitamin A through supplements, food fortification, and biofortification, the common options to end VAD, is yet to be found (UNICEF, 2007; Tanumihardjo *et al.*, 2016). The underlying assumption for biofortification is that since rural households derive their daily staple foods from own farms (Graeb *et al.*, 2016),

supplying nutrient rich varieties to replace commonly grown and consumed energy dense varieties already favoured among households, would diminish VAD (Asare-Marfo *et al.*, 2013).

In Uganda, OFSP has been promoted since the early 1990s as a VAD intervention (Mwanga and Ssemakula, 2011), given that sweet potato is widely grown across the country as a staple food crop (Asare-Marfo *et al.*, 2013). It is also widely considered a women's crop (Bashasha *et al.*, 1995), whose production and utilization women have significant control (Kurz *et al.*, 2001; HLPE 2013). Accordingly VAD interventions have particularly assumed that women in the country would be able to adopt the VAR varieties to address VAD problems that prevail among them and their children.

Literature summary

Socio-psychological models are useful in delineating the key determinants and cognitive antecedents of behaviour (Conner, 2015; McEachan *et al.*, 2016). Commonly used models include: the Theory of Planned Behavior (TPB), an extension of Fishbein and Ajzen's (Fishbein and Ajzen, 1975). Theory of Reasoned Action (TRA), the Health Belief Model (HBM) (Janz and Becker 1984; Rosenstock *et al.*, 1994), the Protection Motivation Theory (PMT) (Rogers, 1975), the Social Learning Theory (Bandura, 1977) and the Stages of Change (SoC) Model, also referred to as Trans-Theoretical Model (Prochaska and DiClemente, 1983; Prochaska *et al.*, 1992).

Several studies (e.g. Fredericks *et al.*, 2014) suggest that household consumption behavior is not entirely or even primarily driven by rational considerations. Often individuals strategically respond to norms in order to optimize self-motivated-interests. Thus individuals may fail to conform to rational calculus because of constraints imposed on decision making by social norms that shape their world viewpoint. In such contexts, the utility of the historical institutionalism (HI) framework (Steinmo, 2008) for analyzing behavior is likely to be enhanced. The HI asserts that how individuals behave depends on three variables: the individual themselves, the context, and the rules.

Working within the HI tradition, the study adopts a situated bounded rational choice (Donahue 2009) to establish the determinants of consumption-oriented biofortified crop production by rural households using constructs drawn from three interrelated behavioral change models: the TPB (Ajzen, 1991), the HBM (Becker, 1974; Janz and Becker, 1984) and the SoC (Prochaska and DiClemente, 1983). The integration of these elements is premised on the hypothesis that decisions regarding household production and consumption of OFSPs are largely determined by weighing two dimensions of behavioral change universe, namely the perceived net benefit of the outcomes and the perceived appropriateness of the activities undertaken in pursuit of such outcomes. The concepts drawn from the TPB, cater for the rural household decision makers' rational evaluation of benefits of a technology and its compatibility to their subjective norms. The elements borrowed from the HBM, on the other hand, are aimed at beneficiary assessment of the potential of OFSP to help households cope with perceived health threats posed by VAD. Cues to action, susceptibility and severity are said to determine actual behavior in HBM.

In the planned study, the Stages of Change (SoC) model will be used to model the dependent variable. In keeping with the SoC, household OFSP consumption behavior is envisaged as a journey that individuals walk iteratively, starting from pre-contemplation, contemplation, preparation, action that ideally should lead to maintenance, which is the desired stage. Echoing, TPB and HBM constructs, up and downstream movement along SoC stages is viewed as motivated by two constructs, self-efficacy and rational calculations made by individuals (Armitage *et al.*, 2004; Morris *et al.*, 2012).

Study description

The study will employ a cross-sectional design. The initial phase will rely on standard questionnaire to survey decision makers' perceptions of the cognitive and social as a main spine. Ajzen (2006) framework and procedures for constructing a TPB questionnaire will be adopted and/or adapted for developing the TPB questionnaire elements while for HBM Weissfeld *et al.* (1990) framework will be used. Districts targeted by OFSP promotion projects will be stratified into high, medium and low VAD prevalence categories from each of which two sub counties will be randomly selected to participate in the study. Quantitative data from the survey will be subjected to logit regression analysis. Empirical behavioural change categories identified by the logit regression will be used to select participants to be targeted for the key informant and focus group interviews. Qualitative data from these interviews will be analyzed using explanatory typologies and process tracing techniques.

Research application

The two-pronged approach proposed for the study is expected to generate two categories of outputs. The regression analysis is expected to identify key constructs that can be used to predict biofortified crop related behavioral change outcomes. This projection can be used by practitioners to improve intervention targeting and social marketing. The outputs of a well executed process tracing can be helpful to policy makers who are keen on creating an environment which simulates behaviour change trajectories that are unveiled in process tracing in order to deepen desired behavior. Practically, behavioural antecedents of biofortified crop consumption among rural households, which the study proposes to unveil, are important ingredients for designing biofortification policies and practical interventions that advance public health via agriculture.

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