The contribution of less documented indigenous leafy vegetables to total micronutrient intake of children below five years in a rural semi-arid area in Tanzania: Implications for policy and nutrition interventions

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Background
Indigenous vegetables are known to mark significant contributions to food and nutrition security in rural communities of developing countries but for various reasons they are generally undervalued and hence underutilized. In semi-arid regions of Tanzania, in particular, indigenous vegetables although less documented are part of the culture and have potential for high nutrition impact to the communities.

Objective
This study ascertained the contribution of some of the undocumented indigenous vegetables to total micronutrient intake of children below five years of age in two rural villages in the semi-arid region of Dodoma in Tanzania; where production, preservation and consumption of these vegetables were promoted.

Design
Exploratory cross-sectional study with a longitudinal 24 hour dietary recall (four repeated one month apart) assessment factor was employed. Household surveys were conducted to elicit information on socio-economic and demographic profile and food consumption patterns at household level. An intervention which combined nutrition education and promotion of production, preservation and consumption was conducted. Vegetables targeted for promotion of production included Corchorus trilocularis and amaranth among many which have been found to increase crop diversity in both diets and production systems, resulting in healthier people, healthier food systems and improved livelihoods.

The study employed stepped-up advocacy, information and community education in changing the attitudes of people by mobilizing champions and role model farmers and demonstration of kitchen gardening and nutrient sensitive cooking demonstrations.

Food intake reported in household measures was converted into weight and nutrient contents were computed by using various food composition tables and literature. The SAS software package was used to convert food intake to macro and micronutrients. For the vegetables commonly consumed, intake was calculated and expressed as a percentage of total intake.

Four types of indigenous vegetables, namely *Ipomoea pandurate* which is locally known as *chiwandagulu, Corchorus trilocularis* (*ilende), Ipomoea obscura (chipali) and Amaranthus graecizans (fwene)* were tested during the study.

Setting
Households (n=350) with at least one child below five years and a woman caregiver in Mzula and Chinoje villages in Chamwino District, Dodoma Region.

Results
With regards to production, reported major constraints were inappropriate crop varieties, infestation by major pests and diseases leading to low quality produce. An impact assessment study showed that nearly 40% of households growing vegetables increased their income, while almost half had increased their consumption of indigenous vegetables.

Total dietary intake of nutrients was significantly improved for children who consumed indigenous vegetables. (Vegetables mostly consumed during 24 hours preceding the dietary surveys were native to the area and included *Ipomoea pandurate* which is locally known as *chiwandagulu, Corchorus trilocularis* (*ilende), Ipomoea obscura (chipali) and Amaranthus graecizans (fwene)*. For most vegetables, leaves and stems were common parts consumed.)

The proportion of children who consumed indigenous leafy vegetables during the 4 days recall period ranged from 28% (first survey) to 89% (last survey) after four weeks of promotion, the average number of times that children consumed vegetables ranged from 1.2 (first survey) to 3.1 (last survey).

Dietary recalls revealed very low intake quantities of these vegetables. The average portion size consumed was approximately ¼ of a cup (78 ± 42 g) for *Ipomoea pandurate* and 78 ± 37 g for *Corchorus trilocularis*. Among children who consumed these vegetables, their total dietary intake of nutrients was significantly improved. These included calcium (18 to 35% of total intake), iron (21 to 38%), vitamin A (39 to 61%) and riboflavin (7 to 24%) of total intake.

Conclusion
The indigenous leafy vegetables significantly contributed to increasing total nutrient intake of children for some of the micronutrients. This positive impact can conceivably be augmented if these vegetables will be consumed more frequently and by a larger quantity and in a larger children population. Implicitly, policies and interventions need to be devised in order to achieve wider consumption through production, conservation, processing, promotion, documentation and effective nutrition education. This can have significant impact on increased micronutrient intakes among children in this community through readily available indigenous vegetables.