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Letter to the Editor

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On the appropriate use and interpretation of dietary diversity scores. Response to: 'Farm production diversity and individual-level dietary diversity' by Koppmair and Qaim

Madam

We read with great interest the reply from Koppmair and Qaim to the letter from Verger *et al.* questioning the interpretation of the Household Dietary Diversity Score (HDDS) as a proxy indicator for dietary quality[1,2]. Furthermore, we appreciate the additional analysis Koppmair and Qaim carried out using individual dietary diversity scores[1]. Nevertheless, we would like to raise several points regarding the answer of Koppmair and Qaim to remove any ambiguity about the appropriate use and interpretation of dietary diversity scores.

We agree with Koppmair and Qaim when they say that 'the HDDS with twelve food groups is often used as an indicator of dietary quality at the household level'[1], but the point of our letter was precisely to highlight that this is a misinterpretation of the HDDS that is often made[2]. In addition, in one of the studies cited to support this assertion, the authors indeed clearly discussed the limitations of household dietary diversity scores and rightly limited the interpretation of their results to household-level dietary diversity[3]. In fact, Hoddinott and Yohannes initially showed that household dietary diversity was a good indicator of changes in household per capita energy availability and of changes in the per capita availability of energy from staples and non-staples[4]. Based on these results, the current twelve-food-group version of the HDDS was and is still widely promoted by the US Agency for International Development and the FAO as a proxy of household economic access to food[5,6]. To date, the HDDS has not been validated as a proxy indicator of dietary quality[7]. Furthermore, household-level food access does not always reflect individual-level dietary intake. Inequitable allocation of food within households has long been recognized as an important determinant of individual diets and nutritional status even within food-secure households[8]. For example, in northern Ghana it was found that the diets of children of influential members of the household were more adequate and that these children were taller than children of other family units[9]. In South Asia, numerous studies have found that male family members have more adequate food intakes compared with female members because of differences in intra-household food allocation[10]. Great caution should therefore be taken in making assumptions about individual-level diet from studies that use household-level consumption data, and even more so if studies use a proxy indicator of household economic access to food.

We also contest the interpretation of Koppmair and Qaim that using the twelve food groups of the HDDS at the individual level is 'not such a bad proxy for individual dietary quality'[1]. Indeed, it is no surprise that, using the same data, an indicator based on twelve food groups correlates well with another indicator based on a smaller number of food groups, even with a different grouping. This does not mean that using the twelve food groups of the HDDS at the individual level makes it an adequate reflection of individual dietary diversity. Using indicators that have been validated for assessing dietary diversity, the authors noted 'the effects of production diversity on individual dietary diversity are even smaller' than when using the twelve food groups of the HDDS[1]. This may well indicate that the effect of production diversity on the dietary diversity of individuals is not as large as was shown, rather than meaning that the indicator based on twelve food groups better reflects dietary diversity.

Finally, we would like to emphasize that 'dietary diversity' is not the sole dimension of dietary quality, which includes also adequacy, balance and moderation. Dietary diversity therefore does not equate to dietary quality and such an interpretation should be avoided. It is true, however, that dietary diversity is one key dimension of dietary quality which is particularly crucial in resource-poor settings, especially for vulnerable people like women of reproductive age and young children.

In many contexts, production diversification and improving market access may be synergistic approaches to improving diets[11]. However, in the context of studies of linkages between agriculture, markets and food consumption, whether the objectives are to improve human nutrition, sustain productive ecosystems, ensure economic development or a combination of these, great care should be exercised when selecting and interpreting metrics. In order to allow comparisons across studies, regions or countries, it is crucial that standardized dietary diversity scores, accepted by the international scientific community, are used.

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Eric O Verger[1], Andrew D Jones[2], Marie-Claude Dop[1] and Yves Martin-Prével[1]

[1]NUTRIPASS, IRD, Université Montpellier, SupAgro
911 avenue d'Agropolis, 34000 Montpellier, France
Email: eric.verger@ird.fr

[2]School of Public Health
University of Michigan
Ann Arbor, MI, USA

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