

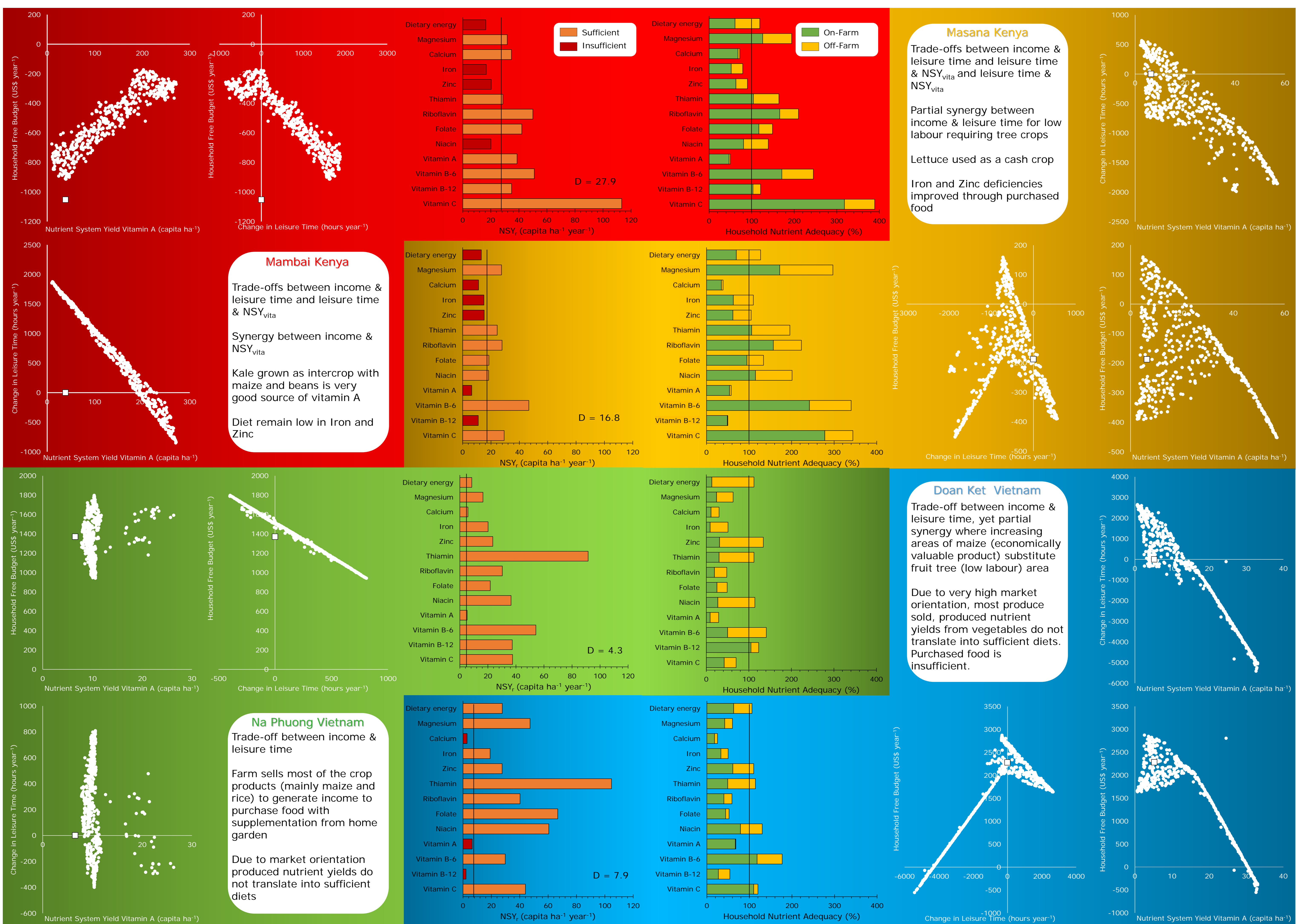
More household income does not translate into better diets: Solution Spaces for Improved Smallholder Nutrition

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Abstract

We used a whole-farm, multi-objective optimization model to explore crop diversification options for meeting human nutrition requirements, whilst simultaneously improving household economic performance in contrasting smallholder farming systems. Based on nutritional, labour and productive objectives we generated 'solution spaces' comprising crop compositions and management configurations that satisfied human/dietary nutritional needs. Results indicated site-specific synergies between household income and Nutritional System Yield for vitamin A (NSY_{vita}). Diversification with few novel vegetables can improve NSY_{vita} by 10 to 31 extra people fed per hectare leading to greater household income (increases of between 25 to 185%) for some farmers, crops and sites although reducing leisure time. Our results highlight the potential to improve dietary diversity, agrobiodiversity, productivity and resource management in these farming systems through crop diversification.



Conclusions

- o Despite farms in the Vietnamese sites exhibiting greater nutrient system yields (NSY_v) than those in Kenya, the Kenyan household diets had greater nutrient adequacy due to the fact that the Vietnamese farmers sell greater proportions of their on-farm produced foods;
- o According to our multi-objective model explorations only small areas of the currently grown crops were substituted by 'intervention' crops, in both Kenya and Vietnam, indicating that new configurations of currently grown crops in terms of area share were sufficient to meet the modelled nutritional objectives;
- o Farmers in all locations faced the classic trade-off between income and labour, more income required more labour; three of the four case study farms also showed a trade-off between household free budget and nutrient system yield for vitamin A (NSY_{vita}), while the case study farm in Mambai (Kenya) exhibited synergy between these two objectives.



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