Food and Nutrition Insecurity

Subjects: Social Issues
Contributor: Ricardo Sibrián

Food and nutrition insecurity means low resilience on food nutrition Security Indicators according to Resilience Index Measurement and Analysis (RIMA) outlined in FAO 2016.

Keywords: resilience ; food and nutrition security ; structural equation models

1. Introduction

Natural, economic, and political factors, including corruption and diversion of resources from public policies, reduce food and nutrition security. Consequently, resilience is lower in rural and urban areas [1][2].

The term ‘resilience’ has been widely adopted within policies, programming, and thinking around climate change adaptation (‘adaptation’) and disaster risk reduction—DRR [3]. As interest and financial investments in resilience have grown, many measurement approaches emerged that created a vast data-driven literature. Findings from these analyses provide decision-makers with inputs for targeting populations and prioritizing actions for supporting public policies toward improving the food and nutrition security of vulnerable people.

We use the Resilience Index Measurement and Analysis (RIMA) outlined in FAO 2016 [4] to estimate Resilience on Food Nutrition Security (RFNS) indicators. It builds upon the definitions and approaches to measure resilience as endorsed by the Technical Working Groups on Resilience Measurement and drafted in Constas and Barrett [5]. In particular, RIMA is designed around the following definition of resilience: the capacity that ensures shocks and stressors do not have long-term developmental consequences.

The increasing interest in resilience analysis has recently boosted the necessity to develop affordable estimation methods to produce a cross-country comparison [6]. Significant emphasis has been placed on finding culturally transferable measures of resilience that provide valid comparisons across contexts [7][8][9] and identifying a set of attributes, processes, that hold across all conditions along with those that depend on local conditions [6]. The nature and relative importance of objective indicators for resilience capacities vary between shock/stressor types, livelihood contexts, and cultures [9][10][11]. There is scarce data-driven cross-countries evidence on context-specific resilience drivers. d’Errico, Pietrelli, and Romano in 2016 [12] is the only work on household resilience in more than one country (Uganda and Tanzania). Generally, policies reflecting local conditions are crucial in addressing food insecurity [13] and country-specificities, particularly relevant policy design and resilience-enhancing interventions.

Extreme climate change in Central America and the Caribbean impacts food production such as maize, beans, rice, and sorghum as well income-generating activities [14][15]. The impact is so strong that neither self-food consumption for smallholder farmers in rural areas nor food purchase for labor in rural areas and marginal urban communities are appropriate for food and nutrition security, particularly in vulnerable populations [16]. Moreover, Latin American and Caribbean countries are highly heterogeneous in agriculture and vulnerability both among and within countries [17].

Farming is still the main economic activity in rural areas and the primary source of employment for the economically active population in these regions. There is ample evidence of the links between farm diversity and resource use efficiency. Variety assumes here two meanings: a heterogeneous approach to farming practice, one of agriculture’s principal assets to respond to uncertain futures, and alternatively, context-specific response mechanisms. The challenges for agroecological transitions are not the same for all farmers in every area or context; they can face different social and biophysical conditions.

Farm diversity is positively correlated with household diet diversity and nutritional quality, especially for ultra-poor, subsistence-oriented farmers. Diversification is a primary livelihood strategy for improving food and nutrition security, given the pervasiveness of agriculture and farm in rural areas [18]. The combined effect of resilience-enhancing initiatives

with agroecological interventions can effectively reduce the adverse effects of shocks on wellbeing, thus being associated with higher recovery capacity [19]. Policies addressed to small farms in rural areas need to support diversified farming systems to specific contexts [20]. Indeed, resilience is associated with diversification systems worldwide and even within the same region [20].

2. Household Resilience to Food and Nutrition Insecurity in Central America and the Caribbean

Policies call for entry points that allow programmatic actions identifiable in key determinants as causes and food and nutrition security indicators as responses. As some key determinants result from others and depend on the context, policies should address dimensions of key determinants coherent to resources and local settings.

Most likely, the main entry points call for strengthening dimensions from the household adaptive capacity (AC), with or without measurements from private or public social safety nets (SSN), and dimensions aiming at the improvement of access to essential services (ABS) and increasing household assets (AST), targeting household groups with low resilience.

Enhancing adaptive capacity (AC) involves taking advantage of dimensions depicting positive relation with RFNS, targeting territories, and house groups with low levels of those dimensions or low RFNS. Several actions should improve the knowledge and practice of successful agricultural experiences (crops, livestock, aquaculture, and fishery) to better diversify food production and food availability of farm households and non-agricultural households in local markets. It involves the training of economically active populations for utilizing technologies and collaborative strategies for increasing agricultural productivity and farming diversity, making available a higher food consumption diversity (HDDS). It includes training household member caregivers to incorporate more comprehensive options of food adequate in quantity and quality for food consumption patterns, taking into consideration local culture in preferences and preparation of food, especially for young children, lactating women, and senior household members. As income is one of the standard dimensions with high correlation, income-generating diversified activities are needed in all countries, strengthening education for adults in El Salvador, Guatemala, and the Dominican Republic and formal education for youngsters in Guatemala and the Dominican Republic.

Policies supporting social safety nets (SSN) have two main objectives. The core objective is not resilience but short-term relief to crises or emergencies, in particular, vulnerable families with inputs for the consumption of basic needs such as food and health; for example, pension funds should keep up with inflation rates in Costa Rica [21], and governmental transfers should target households in need in El Salvador and the Dominican Republic ([22][23]). The second objective is to improve the adaptive capacity (AC) with productive inputs for providing eroded assets and livelihoods, for example, helping the effective use of external remittances in all countries except Costa Rica.

Policies supporting access to essential services (ABS) are sort of transfers in kind to the population and subsidized services to vulnerable people, for example, electricity to rural households. Investments in making more accessible essential services to the population increase food security in all countries; however, higher returns are mainly in essential services (electricity, solid disposal, and sewage) in all countries, excepting the Dominican Republic; in improving sanitation services in El Salvador, Guatemala, and the Dominican Republic; and in supporting housing improvements in Costa Rica and Honduras.

Policies for improving assets (AST) for a better RFNS are costly; however, by supporting the other key determinants simultaneously, assets may build up, and resources may become more available so that resilience in the sense of being prepared for short-term shocks is improved. Policies tackling the building up of assets (AST) call for education and orientation of diversified programs targeting rural populations, in particular, smallholder farmers for the promotion of autochthonous seed production, production, and utilization of organic fertilizers and natural pesticides for staple food crop production and complement with yellow and green vegetables as well as yellow fruits (rich in iron, beta-carotene, and vitamin C), yellow roots, and tubers (rich in beta-carotenes and carbohydrates). It also includes local small livestock reproductive units for an enhanced production for own-production consumption such as eggs and poultry. It also includes selling shows in local markets for income-generating purposes and complementing food consumption diversity by purchasing food such as salt fortified with iodine and fluoride, sugar fortified with vitamin A, vegetable oil, and other non-locally produced food items.

Policies tackling dimensions measured by food and nutrition security indicators should be sensitive to resilient food systems. Resilient food systems are based on agriculture and small livestock activities oriented first toward increasing

resilience to food and nutrition insecurity by improving the quantity (FEXPPD or EngelR) and quality of dietary patterns with more diversified food consumption (SSEXR and HDDS) from own-production, including local agro-industry and second toward generating income for meeting food needs from local markets (FEXPPD) and non-food needs (health, education, communications, etc.).

For example, diversity in food may increase the demand for cheese and other dairy products, household bakeries using local inputs such as eggs, maize flour, and dry legume flour (soybeans or pigeon pea or chickpea, or any available legume), and vegetables and fruits as well as roots and tubers. Actions should aim at improving the food and nutritional status of young children and women in pregnancy or lactation, for example, promoting the consumption and production of optimized food mixtures in essential amino acids based on local recipes. By adding non-starchy food to the local diet, the share of staple starchy food (SSEXR) may lower and increase dietary quality, reaching macronutrient contributions to total energy as recommended by experts.

The increasing lack of diversity in farming and food systems is one of the greatest threats to long-term sustainability. Climate-related shocks are key push factors for diversification [24][25]. In the context of food insecurity and risk of the resilience of agri-food systems under climate change and land degradation, farm diversity is a flexible approach to avoid such shocks ex-ante [26]. Livelihood diversification strategies, including crop and income diversification, are fundamental in these contexts [25][27]. Diversified farming implies farms that integrating several crops and animals in the production system and promote agrobiodiversity across scales, regenerating ecosystem services and reducing the need for external inputs [28]. Specifically, approaching diversity at the farm level stimulates technology, information, and knowledge [29], which can be used by farmers to cope with current or future challenges, reducing vulnerability [30] and improving adaptive capacity [31].

Generally, smallholder farming systems are highly heterogeneous in many characteristics such as land access, soil fertility, cropping, livestock assets, off-farm activities, labor and cash availability, socio-cultural traits, farm development trajectories, and livelihood orientations [32]. Cross-countries evidence in Central America shows that small farmers, using diversification practices such as cover crops, inter-cropping, and agroforestry, suffered more minor damage than conventional monoculture neighbors after extreme climatic events [33]. In particular, there are an estimated 17 million family farms in Latin American and the Caribbean, which represent around 60 million people, 80 percent of all farms, and 35 percent of the cultivated land in the region. Family farming contributes 40 percent of total agricultural output and generates over 60 percent of jobs related to agriculture in the area [34].

Country evidence shows different sensitivity to food and nutrition security indicators. For example, food quantity (FEXPPD) more than food quality (SSEXR) and inequality in food quantity (for Costa Rica, El Salvador, and the Dominican Republic) should be addressed. Guatemala and Honduras should address both food quantity (FEXPPD) and food quality (SSEXR). Making sure that the right quantity of food reaches low-income population groups becomes crucial, accompanied by comprehensive nutritional education on how food quality can be achieved or maintained. Especially in Guatemala and Honduras, we advise not only addressing food quality and food quantity but also providing comprehensive nutritional education and farm diversification training for improving food consumption patterns [35][36].

It would be a mistake to consider only key determinants of RFNS, dimensions of food, and nutrition security. It should be part of any policy.

As a possible way forward for this analysis, we think that additional rounds of data would better understand the changes and dynamics of resilience and food security in the region. Additionally, we believe that adopting better indicators for social safety nets (such as remittances and transfers, currently present in few countries only) would allow a deeper evaluation of the essential role of social cohesion and social protection.

References

1. Sabates-Wheeler, R.; Devereux, S.; Mitchell, T.; Tanner, T.; Davies, M.; Leavy, J. Rural Disaster Risk–Poverty Interface; Institute of Development Studies, the University of Sussex: Brighton, UK, 2008.
2. United Nations International Strategy for Disaster Reduction (UNISDR). Risk and Poverty in a Changing Climate: 2009 Global Assessment Report on Disaster Risk Reduction; United Nations: Geneva, Switzerland, 2009.
3. Bahadur, A.; Pichon, F. Analysis of Resilience Framework and Approaches: A Bird’s Eye View; Overseas Development Institute (ODI): London, UK, 2017.

4. FAO. RIMA-II: Resilience Index Measurement and Analysis II; FAO: Rome, Italy, 2016.
5. Constas, M.; Barrett, C. Principles of Resilience Measurement for Food Insecurity: Metrics, Mechanisms and Implementation Plans. Presented at the Expert Consultation on Resilience Measurement Related to Food Security, Rome, Italy, 19–21 February 2013; FAO and WFP: Rome, Italy, 2013.
6. Food Security Information Network (FSIN). Resilience Measurement Principles: Toward an Agenda for Measurement Design; Technical Series No. 1; Resilience Measurement Technical Working Group: Rome, Italy, 2014.
7. Food Security Information Network (FSIN). A Common Analytical Model for Resilience Measurement. Causal Framework and Methodological Options; Technical Series No. 2. Resilience Measurement Technical Working Group: Rome, Italy, 2014.
8. Barrett, C.; Constas, M.C. Toward a theory of resilience for international development applications. Proc. Natl. Acad. Sci. USA 2014, 111, 14625–14630.
9. Jones, L.; Tanner, T. Measuring 'Subjective Resilience': Using Peoples' Perceptions to Quantify Household Resilience. SSRN Electron. J. 2016.
10. Food Security Information Network (FSIN). Measuring Shocks and Stressors as Part of Resilience Measurement; Technical Series No. 5; Resilience Measurement Technical Working Group: Rome, Italy, 2015.
11. Béné, C.; Al-Hassan, R.M.; Amarasinghe, O.; Fong, P.; Ocran, J.; Onumah, E.; Ratuniata, R.; Van Tuyen, T.; Allister-McGregor, J.; Mills, D.J. Is resilience socially constructed? Empirical evidence from Fiji, Ghana, Sri Lanka, and Vietnam. Glob. Environ. Chang. 2016, 38, 153–170.
12. d'Errico, M.; Pietrelli, R.; Romano, D. Household resilience to food insecurity: Evidence from Tanzania and Uganda. Presented at the Fifth AIEAA Congress, Bologna, Italy, 16–17 June 2016; Italian Association of Agricultural and Applied Economics (AIEAA): Bologna, Italy, 2016.
13. Coleman-Jensen, A.; Rabbitt, M.P.; Smith, M.D. Who is the World's Food Insecure? New Evidence from the Food and Agriculture Organization's Food Insecurity Experience Scale. World Dev. 2017, 93, 402–412.
14. Bouroncle, C.; Imbach, P.; Rodríguez-Sánchez, B.; Medellín, C.; Martínez-Valle, A.; Läderach, P. Mapping climate change adaptive capacity and vulnerability of smallholder agricultural livelihoods in Central America: Ranking and descriptive approaches to support adaptation strategies. Clim. Chang. 2016, 141, 123–137.
15. Imbach, P.; Beardsley, M.; Bouroncle, C.; Medellin, C.; Läderach, P.; Hidalgo, H.; Alfaro, E.; Van Etten, J.; Allan, R.; Hemming, D.; et al. Climate change, ecosystems, and smallholder agriculture in Central America: An introduction to the special issue. Clim. Chang. 2017, 141, 1–12.
16. Harvey, C.A.; Saborio-Rodríguez, M.; Ruth Martinez-Rodríguez, M.; Viguera, B.; Chain-Guadarrama, A.; Vignola, R.; Alpizar, F. Climate change impacts and adaptation among smallholder farmers in Central America. Agric. Food Secur. 2018, 7, 57.
17. Hernández, M.F.; Torero, M.; Gallegos Robles, M.A.; Falconi, C.A.; Maruyama, E. A Framework for Sustainable Food Security for Latin America and the Caribbean; Technical Note No. 441; Inter-American Development Bank: Washington, DC, USA, 2012.
18. Zezza, A.; Winters, P.C.; Davis, B.; Carletto, C.; Covarrubias, K.; Quinones, E.; Stamoulis, K.G.; Di Giuseppe, S. Rural Household Access to Assets and Agrarian Institutions: A Cross Country Comparison. In Proceedings of the European Association of Agricultural Economists' 106th Seminar, Montpellier, France, 25–27 October 2007.
19. Serfilippi, E.; De Los Rios, C.; d'Errico, M. Coffee in crisis offers a lesson in resilience: Evidence from Guatemala. In FAO Agricultural Development Economics Working Paper 20-02; FAO: Rome, Italy, 2020.
20. Bennett, E.; Carpenter, S.R.; Gordon, L.; Ramankutty, N.; Balvanera, P.; Campbell, B.; Cramer, W.; Foley, J.; Folke, C.; Karlberg, L.; et al. Toward more resilient agriculture. Solut. Sustain. Desirable Future 2014, 5, 65–75.
21. ARSANCOR; PROGRESAN-SICA. Costa Rica. Medición y Análisis de Resiliencia en Seguridad Alimentaria y Nutricional: Lineamientos de Política Pública Regional; PROGRESAN-SICA/IT-005/2019; PROGRESAN-SICA: San José, Costa Rica, 2019.
22. ARSANES; PROGRESAN-SICA. El Salvador. Medición y Análisis de Resiliencia en Seguridad Alimentaria y Nutricional en El Salvador. Informe Final; PROGRESAN-SICA/IT-009/2019; PROGRESAN-SICA: San Salvador, El Salvador, 2019.
23. ARSANDOR; PROGRESAN-SICA. República Dominicana. Medición y Análisis de Resiliencia en Seguridad Alimentaria y Nutricional en República Dominicana. Informe Final; PROGRESAN-SICA/IT-011/2019; PROGRESAN-SICA: Santo Domingo, Dominican Republic, 2019.

24. Romeo, A.; Meerman, J.; Demeke, M.; Scognamillo, A.; Asfaw, S. Linking farm diversification to household diet diversification: Evidence from a sample of Kenyan ultra-poor farmers. Food Secur. 2016, 8, 1069–1085.
25. Asfaw, S.; Scognamillo, A.; Di Caprera, G.; Sitko, N.; Ignaciuk, A. Heterogeneous impact of livelihood diversification on household welfare: Cross-country evidence from sub-Saharan Africa. Word Dev. 2019, 117, 278–295.
26. Carlisle, L. Diversity, flexibility, and the resilience effect: Lessons from a social-ecological case study of diversified farming in the northern Great Plains, USA. Ecol. Soc. 2014, 19, 45.
27. Doss, C.R. Men's crops? Women's crops? The gender patterns of cropping in Ghana. World Dev. 2002, 30, 1987–2000.
28. Garibaldi, L.A.; Gemmill-Herren, B.; D'Annolfo, R.; Graeub, B.E.; Cunningham, S.A.; Breeze, T.D. Farming Approaches for Greater Biodiversity, Livelihoods, and Food Security. Trends Ecol. Evol. 2017, 32, 68.
29. Darnhofer, I.; Bellon, S.; Dedieu, B.; Milestad, R. Adaptiveness to enhance the sustainability of farming systems. Rev. Agron. Sustain. Dev. 2010, 30, 545–555.
30. Martin, G.; Magne, M.A. Agricultural diversity to increase adaptive capacity and reduce the vulnerability of livestock systems against weather variability—A farm-scale simulation study. Agric. Ecosyst. Environ. 2015, 199, 301–311.
31. Urruty, N.; Tailliez-Lefebvre, D.; Huyghe, C. Stability, robustness, vulnerability, and resilience of agricultural systems. Rev. Agron. Sustain. Dev. 2016, 36, 1–15.
32. Alvarez, S.; Timler, C.J.; Michalscheck, M.; Paas, W.; Descheemaeker, K.; Tittonell, P.; Andersson, J.A.; Groot, J.C.J. Capturing farm diversity with hypothesis-based typologies: An innovative methodological framework for farming system typology development. PLoS ONE 2018, 13, e0194757.
33. Altieri, M.A.; Funes-Monzote, F.R.; Petersen, P. Agroecological efficient agricultural systems for smallholder farmers: Contributions to food sovereignty. Agron. Sustain. Dev. 2012, 32, 1–13.
34. International Fund for Agricultural Development (IFAD). The Latin America and Caribbean Advantage: Family Farming—A Critical Success Factor for Resilient Food Security and Nutrition; IFAD: Rome, Italy, 2019; 52p.
35. ARSANGUA; PROGRESAN-SICA. Guatemala. Medición y Análisis de Resiliencia en Seguridad Alimentaria y Nutricional: Informe Final; PROGRESAN-SICA/IT-008/2019; PROGRESAN-SICA: Ciudad de Guatemala, Guatemala, 2019.
36. ARSANHON; PROGRESAN-SICA. Honduras. Medición y Análisis de Resiliencia en Seguridad Alimentaria y Nutricional en Honduras. Informe Final; PROGRESAN-SICA/IT-011/2019; PROGRESAN-SICA: Tegucigalpa, Honduras, 2019.