Linking Agriculture to Nutrition: The Evolution of Policy

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Abstract:

- Purpose: This paper summarizes the evolution of global and national policies linking agriculture to nutrition in 2010-2020, and provides insights on the recent policy trajectory in China to illustrate how individual countries are addressing agriculture and nutrition.
- Design/methodology/approach: The authors utilize a non-comprehensive review of gray and peer-review literature, as well as a case study approach.
- Findings: Select countries have made initial strides in linking agriculture and nutrition through policy, though progress is not widespread and uneven.
- Practical implications: Researchers can begin closing the existing knowledge gaps on agriculture and nutrition. Policymakers can learn from the country lessons and experiences in agriculture and nutrition policy.
- Originality/value: This paper provides one of the only overviews of global policy on agriculture and nutrition during the period 2010-2020.

Keywords: agriculture; nutrition; food security; China; policy; malnutrition; poverty; developing countries; multisectoral; health

Introduction

Agriculture historically has been used to feed people and solve the problem of hunger. Only until recently, has the sector been tasked with not only improving nutrition, but also addressing environmental sustainability and other development goals such as poverty reduction and unemployment (Fan et al., 2019). The world today faces many challenges. Most countries are beset by the multiple burden of malnutrition, including undernourishment, micronutrient deficiency, and overweight and obesity. More than 820 million people are hungry, this figure seeing virtually no progress during the past 3 years. More than 2 billion people suffer from micronutrient deficiency and 149 million children remain stunted (FAO et al., 2019). The key question then is whether agricultural policy has shifted to address these obstacles. This paper summarizes how agricultural policy has changed over time at the global level and in key developing countries to tackle malnutrition challenges. It first discusses how agriculture is conceptually linked to nutrition through multiple channels. It then reviews recent global policy initiatives, followed by highlights of the trajectory of policy in select countries. China is then presented as a case study, due to its role as the largest developing country, with particularly useful lessons on agriculture and nutrition to be gleaned and shared. The paper discusses

how policy can be further strengthened to improve the link between agriculture and nutrition before identifying knowledge gaps that have not yet been addressed.

Linkages between Agriculture and Nutrition: A Conceptual Framework

During the past few decades, academics have developed a range of conceptual frameworks, reflecting different disciplines, to describe the relationship between agriculture and nutrition. Figure 1 reflects the latest thinking regarding agriculture as not only a source of caloric energy, but also macronutrients and micronutrients essential for growth. The delivery of nutrients to individuals, as well as the dietary diversity of children, depends on diverse agricultural production, especially for many food-producing households, which consume what they produce (Kumar et al., 2015).

As Figure 1 shows, households' assets and economic activities also boost income, which can then be used for food and non-food purchases. Optimistically, households use their income to buy safe, healthy, and diverse foods as well as health services and education, thereby improving nutrition status. Unfortunately, as reflected in the triple burden of malnutrition in many countries, this income can also be used to purchase processed foods, contributing to malnutrition and overweight or obesity, due to the high cost of healthy foods or lack of consumer awareness about the importance of good diets (Ecker, 2019).

Households' economic activities can also empower women to control income and assets, helping them improve their childcare and feeding practices and serve as stewards for the nutrition of their households, especially children. A growing literature points to the potential of agriculture to give women increased decision-making power over income and agricultural assets such as land and livestock, in turn improving the welfare of their households (Kadiyala et al., 2014; Malapit, 2019). Again, women's participation in agriculture can also negatively affect their nutrition as well as that of their children, such as when they spend less time on childcare, are exposed to occupational health hazards, or when they expend excessive energy in intense agricultural labor.

In an upward feedback loop, improved nutritional outcomes can lead to national economic growth, physical development, and cognition, shaped in part by nutrition-friendly policies at the national and global levels. The role of policy is critical, as it can mean the difference between a positive or negative impact on nutrition. For example, agriculture-mediated zoonotic and vector-borne diseases pose widespread health risks, as do unsafe foods unless well regulated. Unregulated agricultural practices can

also lead to environmental degradation, as can be seen in the role of agriculture in the climate-change crisis, and agricultural national policies can also worsen inequality, such as when they marginalize smallholders. It is therefore useful to explore the trajectory of agriculture-nutrition policy during the past decade, in order to identify whether progress has been made in leveraging agriculture to improve nutrition.

The Evolution of Agriculture-Nutrition Policy at the Global and Regional Levels

Nutrition was not part of the global debate on agriculture for decades. The past decade, however, has seen the establishment of various policy platforms and mechanisms for addressing agriculture and nutrition both directly and indirectly. These have had varying levels of success, in terms of translation into action.

The United Nations' Sustainable Development Goals (SDGs) implicitly focus on the intersection of agriculture and nutrition through their second goal. SDG 2- Zero Hunger seeks to "end hunger, achieve food security and improved nutrition and promote sustainable agriculture," thereby combining agriculture and nutrition into one goal (Canavan et al., 2016). The International Conference on Nutrition 2, held in 2014, released the Rome Declaration on Nutrition, which recognized that food systems, including agriculture, have a role to play in providing nutritious, diverse, and balanced diets. It called for investment in smallholder agriculture as a way of overcoming malnutrition. The UN Decade of Action on Nutrition, 2016–2025, serves as an operational plan for working toward sustainable, resilient food systems for healthy diets and the support of cross-sectoral policies (WHO, 2017). Internal progress has been encouraging. For example, the International Fund for Agricultural Development (IFAD), the first UN agency to commit to the Nutrition Decade, has reported that in 2018, 100% of its country strategic opportunities programs were nutrition-sensitive and 48% of its projects were nutrition-sensitive (surpassing its target of 33%) (UNSCN, 2019). At the national level, however, only three countries (Brazil, Ecuador, and Italy) have made explicit commitments to the Nutrition Decade.

Recognition of the role of agriculture and nutrition in climate change has been present in several major documents and agreements, but has ultimately fallen short. The 5th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), released in 2014, highlighted the role of agriculture in exacerbating malnutrition, stating an 'increased likelihood of under-nutrition resulting from diminished food production in poor regions (high confidence)'; and 'increased risks from food-and water-borne diseases (very high confidence) and vector-borne diseases (medium confidence)' (IPCC,

2014). The 2019 UN Climate Change Conference (COP25) in Madrid, the longest on record, featured forceful rhetoric on the need to radically transform not only agriculture but food systems in order to curb Greenhouse Gas Emissions, but the conference ended with no agreement on regulations for carbon markets and funding for mitigation and adaptation actions. The Koronivia joint work on agriculture, a series of workshops examining how to conduct agriculture under climate change, continued at COP25 but with no concrete decisions or recommendations and little explicit mention of nutrition (Carbon Brief, 2019).

Africa has led the way in achieving some progress in agriculture-nutrition within regional policy circles. In 2011–2013, the African Union Commission and New Partnership for Africa's Development (NEPAD) engaged 600 stakeholders from the Comprehensive Africa Agriculture Development Programme (CAADP) in a Nutrition Capacity Development Process. Stakeholders drafted roadmaps for 48 countries to integrate nutrition within CAADP investment plans, from targeting and implementation to communication and evaluation (FAO, 2015). In 2015, nutrition indicators were integrated into CAADP's Results Framework. The 2019 CAADP Biennial Review, however, shows that the continent is not on track to meet its commitments for food security and nutrition (Africa Lead, 2020).

In 2014, the African Union adopted the Malabo Declaration on Accelerated Agricultural Growth and Transformation. Commitment 2 of the Malabo Declaration aligns with SDG2 and Commitment 3 aims, among other targets, to reduce the prevalence of child stunting to 10 percent, an explicit integration of agriculture and nutrition. Other nutrition targets are being carried out through the Malabo Declaration on Nutrition Security for Inclusive Economic Growth and Sustainable Development in Africa, also released in 2014 (NEPAD, 2020).

Several key reports have been published, in an effort to keep agriculture and nutrition at the top of the global and regional policy agendas. In 2016, the Global Panel on Agriculture and Food Systems for Nutrition published a foresight report on food systems and diets projecting that if current malnutrition trends continue, the costs will represent an annual loss of 10 percent global GDP, equal to a global financial crisis every year (GLOPAN, 2016). In 2017, the High Level Panel of Experts on Food Security and Nutrition published a report on nutrition and food systems, which called for integrating a nutrition-focused food system approach to national policies, programs, and budgets, and seize upon opportunities to improve nutrition outcomes along food supply chains, among other key recommendations (HLPE, 2017). IFPRI's 2017 Global Food Policy Report made a strong case that rapid urbanization has brought new challenges to food and nutrition security for urban population and argued

that integration of rural/agricultural and urban food policy is essential for improving nutrition of both rural and urban residents (Fan et al., 2017). The next year, the world's leading science academies published a global synthesis report on food and nutrition security and agriculture calling for more coordinated, multidisciplinary research in this area (Inter-Academy Partnership, 2018). Finally, in 2019, the EAT–Lancet Commission on healthy diets from sustainable food systems quantified a universal healthy diet that could feed 10 billion people in 2015 within planetary boundaries (Willett et al., 2019).

The Evolution of Agriculture-Nutrition Policy at the Country Level

After the second World War, many countries were struggling to feed their rapidly increasing populations. Land reforms, public investment in irrigation and flood control, and the development of yield-enhancing technologies were major policy initiatives in support of this goal. The Green Revolution that occurred in South, Southeast, and East Asia, however, was the key driver in improving food security for a large swath of the population. Agricultural technologies, particularly semi-dwarf wheat and rice varieties, developed by CGIAR in partnership with national agricultural research systems doubled yields in approximately a decade. Without these advances, millions of people would have likely starved. Yet the Green Revolution also led to a shift toward monoculture agriculture, focused almost exclusively on rice, wheat, and maize, at the cost of more nutritious crops such as fruits, vegetables, and legumes. The 2000s saw increased awareness of the need for diverse production and diets, but progress really began to accelerate in the 2010s.

During the past decade, a number of countries have worked to bridge their agriculture and nutrition sectors. Some have integrated nutrition into their agricultural plans and strategies. For example, Uganda passed its National Agriculture Policy in 2013, the document calling for supporting local governments in ensuring household nutrition, and promoting the production and consumption of nutritious foods, including indigenous foods (Republic of Uganda, 2013). Guinea took a similar strategy, mainstreaming nutrition for the first time in its 2011-2015 agricultural investment strategy (Scaling Up Nutrition, 2015). Other countries have done the reverse, enlisting the help of their agricultural ministries to achieve nutrition outcomes. Vietnam and Peru, for example, both tasked their agricultural ministries with helping to carry out their national nutrition strategies (Government of Vietnam, 2012; Action Contre la Faim, 2013).

Another viable strategy has been to form cross-sectoral mechanisms, whereby different ministries work together toward common aims. Rwanda, for example, formed an inter-ministerial steering committee to

implement its National Food and Nutrition Policy and National Food and Nutrition Strategic Plan, while Laos relied on a similar committee to coordinate actions on nutrition (Compact2025, 2016; Scaling Up Nutrition, 2015). In 2016, Ethiopia launched its first National Nutrition-Sensitive Agriculture Strategy, which calls on the agricultural sector to use production and productivity; agricultural income; and women's empowerment to address malnutrition (Bossuyt, 2019). Similarly, Bangladesh has relied on multisectoral coordination, especially nutrition-sensitive agriculture, to implement its National Nutrition Policy, passed in 2017 (Shahan and Jahan, 2017).

There have been numerous other national-level approaches to linking agriculture and nutrition. One has been helping smallholders provide agricultural produce to local schools, improving nutrition and the local economy. Although school feeding programs are ubiquitous around the world, Brazil became the first country to enact a law linking agricultural production with school feeding by requiring 30% of the national school feeding program budget to be allocated to procurement from local, family-owned farms (Hawkes et al., 2016). Another approach has been biofortification, whereby the density of vitamins and minerals in a crop is increased through plant breeding, transgenic techniques, or agronomic practices. Through the work of HarvestPlus, as of the end of 2018, over 300 varieties of 11 staple crops have been delivered to farmers in over 30 countries, with a goal to benefit one billion consumers worldwide by the end of 2030 (Herrington et al., 2019). Some of these countries have integrated biofortification into their national nutrition agendas.

China: A Case Study in Agriculture and Nutrition

In the space of a generation, China has witnessed rapidly-changing dietary patterns and the emergence of the "triple burden of malnutrition," the co-existence of overweight and obesity, undernutrition, and micronutrient deficiencies (Fan, et al., 2014, and Yuan et al., 2019) although substantial differences exist across various income classes (Ren, et al., 2018). In 1993, China released the first Food Structure and Development Outline, followed by the Food and Nutrition Development Outline (2001-2010), as a way of setting national aims for food consumption and nutrient intake (Table 1). The most recent Food and Nutrition Development Outline (2014-2020) reflects vast progress in acknowledging that dietary diversity—and as a result, production diversity-- is key to tackling malnutrition. The Outline calls for upgrading Chinese citizens' standard diet from its traditional focus on starches and meat, to a diverse assortment of cereal (recommended to comprise 50% of calories), meat (of which 45 percent should be high-quality protein), vegetables, fruits, milk, and soy. It also reduces the recommended average daily

intake of energy per person from 2,600 kilocalories (kcals) in 1990 to 2,200-2,300 kcals (Chen and Wang, 2019).

Health has also jumped to top of the national political agenda in the country. In 2016, the Central Party Committee and the State Council approved Healthy China 2030, for the first time ever calling for national level action to evaluate and communicate to consumers the nutritional content of agricultural products and foods. The plan has a special focus on vulnerable populations. Healthy China Action (2019-2030) sets out specific targets and actions to be undertaken by 2020 and 2030 by different areas and levels of government, an indication of a move toward using foods as a preventative health strategy (Gao et al., 2020).

As proof of continued political will for nutrition, China released the *National Nutrition Plan (2017-2030)* in 2017, laying out specific nutrition goals, reaffirming the value of existing nutrition programs, and proposing new interventions for nutritionally vulnerable populations, such as infants and children (Xiang et al., 2014). Unfortunately, the nutrition needs of other populations such as seniors and the urban poor have been overlooked throughout the policy process. The latest Plan also calls for more nutrition research, in areas such as measuring people's iodine intake, improving the collection and dissemination of nutrition and health data, and regulating the content of oil, salt, and sugar in processed foods.

As part of this renewed focus on a nutrition-sensitive food system, China has increasingly enacted policy that explicitly links agriculture to nutrition, albeit at a slow pace. The *Food and Nutrition Development Outline 2014-2020* mentioned previously emphasizes not only food quantity but also food quality, coordination of production and consumption, and innovation in building up a nutrition-driven food industry, while retaining the healthier components of local, traditional diets.

Food fortification is common in China, with foods such as iodized salt, iron-fortified soy sauce, and fortified flour used by many households (Gao et al, 2020). In 2012, China began scaling up the dissemination of Ying Yang Bao, a soybean-based micronutrient fortified food supplement, to children. To date, 4 million children in 341 poor countries have received the supplement, decreasing the prevalence of anemia and diarrhea (Gao et al., 2020)

The latest version of China's *No.1 Central Document,* arguably the country's most significant agricultural policy document, released in early 2020, pushes for more high-quality agricultural products; better certification of nutritious foods, organic produce, and source of production; and expansion of e-commerce in rural areas as a poverty reduction strategy (XinhuaNet, 2020). Nutrition labelling standards

have been mandatory since 2013 (Gao et al., 2020). Other agricultural policies, such as the *13th Five Year Plan on National Agricultural Product Quality and Safety Improvement* and the *13th Five Year Plan on Agricultural Technology Development*, also integrate nutrition, calling for the assessment of agricultural products' quality and nutritional content, and improving the safeguarding of nutrition as food is processed, stored, and transported (Chen and Wang, 2019).

The Power of Policy in Leveraging Agriculture for Nutrition

Agricultural policy in many countries, including China, has historically had the aim of addressing energy intake and food security in emergency settings. As a result, much of policy is still focused on producing staple foods. But as can be seen in the experiences of China and other countries, nutrition-driven agricultural policies, interventions, and investments can make steady gains against malnutrition.

Agricultural subsidy reform can be one target area. Distortionary agricultural policies leave little incentive for farmers to diversify their production away from staples and toward more nutrient-dense foods such as animal-source products, fruits, and vegetables. They also keep the costs of healthy foods high, making them inaccessible to poor consumers. Eliminating distortionary agricultural subsidies, accompanied by social safety nets to protect poor smallholders, can go a long way toward using agriculture to improve the nutrition of both producers and consumers (Ecker, 2019). Another option is to subsidize the production, processing, transportation, and marketing of nutritious foods through investments in research and development (for example, breeding crops that are both nutrient-dense and tolerant of drought and salinity, to reap multiple benefits), infrastructure such as roads and renewable energy, and technologies such as cold storage.

Nutrition-driven agricultural policies, programs, investments, and strategies can only be achieved when nutrition is proactively integrated into their design. This means using clear and measurable nutrition outcomes to measure success, such as improved anthropometry, micronutrient status, and dietary diversity (Fan et al., 2019). The design phase of a program also provides an opportunity for program developers to think through possible unintended consequences of their interventions. This paper's case study on China, for example, illustrated how the myopic focus of the country's large-scale nutrition programs on infants and children has unintentionally left seniors and the urban poor behind. Up to 30% of Chinese citizens aged 60 or older are malnourished (Peking University, 2017). Another challenge is micro-nutrients deficiency of school children in rural China that may inhibit learning (Yue, et al., 2018).

Future policy design must take this into consideration as well, particularly focusing quality of school meals that can also link to local food supply chains.

Integrating behavior change communication into program design can potentially improve the ability of nutrition-driven agricultural interventions to impact child nutrition outcomes such as dietary diversity, nutrient intakes, anemia, diarrhea, and wasting (Ruel, 2019). Similarly, activities that not only engage and empower women but also work toward gender equality within households have the potential to improve nutrition. Finally, providing micronutrient- fortified products directly to children and pregnant women can affect nutrition status. To illustrate, a dairy value chain project based in Senegal rewarded female dairy farmers who had increased their milk production with micronutrient- fortified yogurt. The intervention also delivered behavior change communication on infant and young child feeding. An evaluation of the intervention found that children from households that had received the yogurt and behavior change communication had greater increases in hemoglobin than the control group that had received just behavior change communication (Malapit, 2019).

Incentives also matter. Actors within the agricultural system, including within ministries and extension offices, need incentives to work across sectors. Research has found that professionals working in "nonhealthy sectors" are amenable to promoting nutrition but lack management support systems and incentives to do so (Gillespie and Nisbett, 2019). The private sector also needs incentives to promote nutrition goals; this can be achieved by creating market demand for nutritious foods, such as through information and education campaigns, or by adding 'visible value' through nutrition labelling. (Allen et al., 2019). Public policy, in the form of regulation, can also advocate for consumer health and nutrition. Setting food safety and quality standards for locally-produced food products, such as fortified baby cereals, can help countries like China build up trust in nutritious foods among local populations and make healthy diets more affordable.

Conclusion

Agriculture and nutrition has grown tremendously as an academic field during the past decade. For example, the global research community has made strides in tweaking the design of agricultural interventions so as to maximize the benefits to nutrition; demonstrated the efficacy of biofortified crops such as iron bean and iron pearl millet in improving nutritional status; and gleaned important insights about the role of gender equality in improving household level nutrition. But far more work is still needed, so that global and national policies can be informed by high-quality evidence. Fan et al. (2018)

reviewed evidence of returns of public investments and their impact on agricultural growth and poverty reduction. Similar studies are needed to evaluate impact of public investment on nutrition improvement. More research is also needed on how to sustain nutrition gains beyond the end term of agricultural projects. Program implementers require access to stakeholder analyses that can illuminate the power dynamics of multi-sectoral cooperation, and cost–benefit analyses of nutrition-driven agricultural policies. Policymakers in Africa and the Middle East are in dire need of region-specific evidence on how particular agricultural policies impact nutrition, and good, reliable data on expenditures on specific agricultural investments. These are just select examples of knowledge gaps still present.

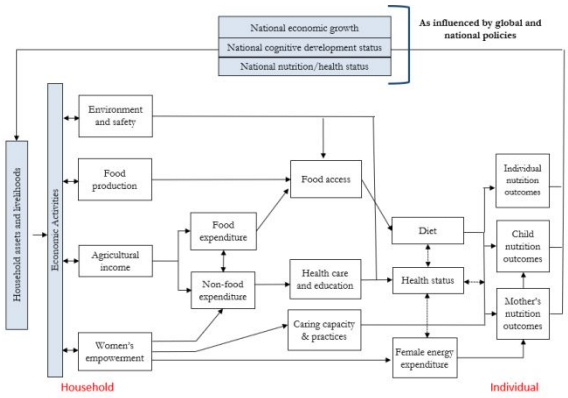
As the world faces significant challenges that include the triple burden of malnutrition, as well as climate change and urbanization, investments in research and development can help policymakers, program designers, and civil society work together to re-orient agriculture and food systems toward nutrition and sustainability. The proliferation—and subsequent evaluation--of agriculture-nutrition policies and programs can serve as useful lessons for poor and rich countries alike, as they work toward ending hunger and malnutrition.

Table 1. Linking Agriculture to Nutrition: Major Policy Initiatives in China

Year	Plan/Strategy/Guideline	Objectives/Goals
1993	Guideline on the Reform and Development of Food Composition	After the agricultural reforms, hunger (calorie based) was largely solved in 1993. The State Council issued the first nutrition-specific official guideline to help improve the composition of food production and diets of people.
1997	1997 China Nutrition Improvement Action Plan (1996-2000)	The plan was developed to reduce the incidence of hunger, undernourishment, protein-energy malnutrition, and prevent or eliminate micronutrient deficiencies by ensuring food supply and implementing appropriate interventions.
2001	China's Food and Nutrition Development Outline (2001-2010)	The objective of the outline was to ensure effective food supply, optimize the food structure, and improve citizens' nutrition. The outline represents the first official document to link agriculture and food supply specifically to improving nutrition.
2014	Food and Nutrition Development Outline (2014-2020)	This guideline aims to ensure that major staple foods should be mostly self-sufficient, and that the production of high-quality foods takes into account balanced diets to reduce micronutrient deficiencies, particularly for children, pregnant women, the elderly, and people living in remote areas. It also seeks to reduce diet-related noncommunicable diseases.
2016	Healthy China 2030 Plan	This latest document represents a strategic shift from medical care to health promotion, with more emphasis on multi-sector cooperation in prevention and public health strategies, laying the foundation for the implementation of nutrition and health care policies and activities. It also moves from a dhisease-centered approach to a health-centered approach, focusing on the main factors affecting people's health in an all-round way including nutrition and diets.

Sources: Gao et al., 2020 and official Chinese documents (available online).

Figure 1



Source: Modified from Fan et al. 2019. Re-printed with permission from CAB International. PLSClear License Reference No. 34036.

References

Action Contre la Faim. (2013). Reconciling agriculture and nutrition: Case study on agricultural policies and nutrition in Peru. ACF-International Case Study. Paris: ACF.

Africa Lead. (2020). African Union CAADP & Biennial Review Toolkit. Accessed 17 February 2020. [https://www.africaleadftf.org/caadp-brtoolkit/]

Allen, S., Maestre, M., Gelli, A. (2019). "Food value chains for nutrition." in Fan, S., Yosef, S., and Pandya-Lorch, R. (Eds.), Agriculture for Improved Nutrition: Seizing the Momentum, International Food Policy Research Institute (IFPRI) and CABI, Wallingford, UK, pp. 27-35.

Bossuyt, A. (2019). "Moving toward nutrition-sensitive agriculture strategies and programming in Ethiopia." in Fan, S., Yosef, S., and Pandya-Lorch, R. (Eds.), Agriculture for Improved Nutrition: Seizing the Momentum, International Food Policy Research Institute (IFPRI) and CABI, Wallingford, UK, pp. 165-177.

Canavan, C.R., Graybill, L., Fawzi, W., Kinabo, J. (2016). "The SDGs Will Require Integrated Agriculture, Nutrition and Health at the Community Level" *Food and Nutrition Bulletin*, Vol. 37 No. 1, pp. 112-115.

Carbon Brief. (2019). "COP25: Key Outcomes Agreed at the UN Climate Talks in Madrid". [Accessed 17 February 2020] https://www.carbonbrief.org/cop25-key-outcomes-agreed-at-the-un-climate-talks-in-madrid

Chen, K. Wang, Z. (2019). "China's road to a nutrition-driven agricultural and food system", in Fan, S., Yosef, S., and Pandya-Lorch, R. (Eds.), Agriculture for Improved Nutrition: Seizing the Momentum, International Food Policy Research Institute (IFPRI) and CABI, Wallingford, UK, pp. 198-208.

Compact2025. (2016). *Rwanda: Ending Hunger and Undernutrition, Challenges and Opportunities*. Scoping report for roundtable discussion. International Food Policy Research Institute (IFPRI), Washington, DC.

Ecker O. (2019). "Reshaping agriculture to reduce obesity", in Fan, S., Yosef, S., and Pandya-Lorch, R. (Eds.), Agriculture for Improved Nutrition: Seizing the Momentum, International Food Policy Research Institute (IFPRI) and CABI, Wallingford, UK, pp.81-92.

Fan S., Chen, K., Rheenen, T., Nie, F., Fang, X. (2014). China's Food and Nutrition Security under Rapid Transformation: Enhanced Strategic Partnership with WFP, Project Report to World Food Programme and Ministry of Agriculture, China. International Food Policy Research Institute: Washington DC.

Fan, S., Cho, E. and Rue, C. (2018), "Returns to public agricultural and rural investments in China", *China Agricultural Economic Review*, Vol. 10 No. 2, pp. 215-223.

Fan, S., Cho, E. and Rue, C. (2017), "Food security and nutrition in an urbanizing world: A synthesis of the 2017 Global Food Policy Report", *China Agricultural Economic Review*, Vol. 9 No. 2, pp. 162-168.

Fan, S., Yosef, S., Pandya-Lorch, R. (2019.) "Seizing the momentum to reshape agriculture for nutrition" in Fan, S., Yosef, S., and Pandya-Lorch, R. (Eds.), Agriculture for Improved Nutrition: Seizing the Momentum, International Food Policy Research Institute (IFPRI) and CABI, Wallingford, UK, pp.1-15.

FAO. (2015) Nutrition: policies and programs: Capacity development: CAADP nutrition, FAO, accessed 17 February 2020, < http://www.fao.org/nutrition/policies-programmes/capacity-development/caadp/nutrition-task-force/en/>.

FAO, IFAD, UNICEF, WFP and WHO. (2019). *The State of Food Security and Nutrition in the World 2019. Safeguarding against economic slowdowns and downturns*. Rome: FAO. [accessed 14 February 2020].

Gao, C., Xu, J., Yang, Y. (2020). "Nutrition policy and health China" , European Journal of Clinical Nutrition (forthcoming)

Gillespie, S., Nisbett, N. (2019). "Governance and leadership in agri-food systems and nutrition", in Fan, S., Yosef, S., and Pandya-Lorch, R. (Eds.), Agriculture for Improved Nutrition: Seizing the Momentum, International Food Policy Research Institute (IFPRI) and CABI, Wallingford, UK, pp. 122-133.

Global Panel on Agriculture and Food Systems for Nutrition. (2016). Food Systems and Diets: Facing the Challenges of the 21st century. GLOPAN: London, UK.

Government of Vietnam. (2012). National Nutrition Strategy for 2011-2020, with a Vision toward 2030. No: 226/QD-TTg. Hanoi: Government of Vietnam.

Hawkes, C., Gerken Brazil, B., Rugani Riberio de Castro, I., Constante Jaime, P. (2016). *Revista de Saúde Pública,* Vol. 40 No. 47, pp. 122-133.

Herrington, C., Lividini, K., Angel, M.D., Birol, E. (2019). Prioritizing Countries for Biofortification Interventions: Biofortification Priority Index Second Edition (BPI 2.0). HarvestPlus Working Paper No. 40. Washington, DC: HarvestPlus.

HLPE. (2017). Nutrition and Food Systems. A Report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. HLPE: Rome.

InterAcademy Partnership (IAP). (2018). Opportunities for future research and innovation on food and nutrition security and agriculture: The InterAcademy Partnership's global perspective. IAP: Trieste, Italy.

Intergovernmental Panel on Climate Change (IPCC). (2014). *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC: Geneva, Switzerland.

Kadiyala, S., Harris, J., Headey, D., Gillespie, S. (2014). "Agriculture and Nutrition in India: Mapping Evidence to Pathways" *Annals of the New York Academy of Sciences,* Vol. 1331 No. 1, pp. 43-56.

Kumar, N., Harris, J., and Rawat, R. (2015). "If They Grow It, Will They Eat and Grow? Evidence from Zambia on Agricultural Diversity and Child Undernutrition" *Journal of Development Studies*, Vol. 51 No. 8, pp. 1060-1077.

Malapit, H. (2019). "Women in agriculture and the implications for nutrition", in Fan, S., Yosef, S., and Pandya-Lorch, R. (Eds.), Agriculture for Improved Nutrition: Seizing the Momentum, International Food Policy Research Institute (IFPRI) and CABI, Wallingford, UK, pp. 58-67.

NEPAD. (2019). "Overview: CAADP". Accessed 17 February 2020. [https://www.nepad.org/caadp/overview]

Peking University. (2017). China Health and Retirement Longitudinal Study. Accessed 16 April 2018. [http://charls.pku.edu.cn/en

Ren, Y., Zhang, Y., Loy, J. and Glauben, T. (2018), "Food consumption among income classes and its response to changes in income distribution in rural China", *China Agricultural Economic Review*, Vol. 10 No. 3, pp. 406-424.

Republic of Uganda Ministry of Agriculture, Animal Industry and Fisheries. (2013). National Agriculture Policy. Kampala: Ministry of Agriculture, Animal Industry, and Fisheries.

Ruel, M. (2019). "New evidence on nutrition-sensitive agricultural programs", in Fan, S., Yosef, S., and Pandya-Lorch, R. (Eds.), Agriculture for Improved Nutrition: Seizing the Momentum, International Food Policy Research Institute (IFPRI) and CABI, Wallingford, UK, pp. 93-103.

Scaling Up Nutrition movement. (2015). The contribution of agriculture and social protection to improving nutrition. Scaling Up Nutrition in Practice No. 4. Geneva: SUN Secretariat.

Shahan, A.M., Jahan, F. (2017). Opening the policy space: the dynamics of nutrition policy making in Bangladesh. Montpellier, France: Agropolis International, Global Support Facility for the National Information Platforms for Nutrition initiative.

United Nations System Standing Committee on Nutrition. (2019). "The UN Decade of Action on Nutrition 2016-2025: IFAD Demonstrates Progress on Nutrition Decade" Rome: UNSCN. [accessed 17 February 2020].

Willett, J., Rockstrom, J., Loken, B., et al. (2019). "Food in the Anthropocene: The EAT–Lancet Commission on Healthy Diets from Sustainable Food Systems"
Lancet, Vol. 393 No. 10170, pp. 447-492.

Xiang, Z., Huang, W., Song, T., He, J., Yin, L., Zhang, Y. (2014) "Nutrition Improvement Measures for Vulnerable Populations in Rural Areas of China: A Systematic Review" *Chinese Journal of Evidence-Based Medicine*, Vol. 14 No. 11, pp. 1389-1395.

XinhuaNet. (2020). "China's No. 1 central document prioritizes poverty relief, improving rural weak links". Accessed 18 February 2020. [http://www.xinhuanet.com/english/2020-02/05/c_138758267.htm]

Yuan, M., Seale Jr, J., Wahl, T. and Bai, J. (2019), "The changing dietary patterns and health issues in China", *China Agricultural Economic Review*, Vol. 11 No. 1, pp. 143-159.

Yue, A., Tang, B., Shi, Y., Tang, J., Shang, G., Medina, A. and Rozelle, S. (2018), "Rural education across China's 40 years of reform: past successes and future challenges", *China Agricultural Economic Review*, Vol. 10 No. 1, pp. 93-118.