STG Resilience Papers

Mainstreaming Food Systems Resilience into Health Resilience

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Summary

- Food production, distribution and consumption is a fundamental determinant of health resilience.
- Human, animal and environmental health are systemically entwined, and this relationship needs to be captured in health-related policies. Systemic thinking is necessary to understand the spillover impacts of food systems - related policies into the health dimension.
- The One Health and the agroecological approaches offer relevant frameworks to understand the food-health nexus and its implications in terms of health policy design.
- Policies based on the agroecological principles can drive the food systems and health transformation towards resilience, thanks to their capacity to reconcile the economic, environmental and social dimensions of sustainability.
- Five key areas of the food-health nexus should be considered: food insecurity, unhealthy dietary patterns, foodborne disease, environmental contamination and occupational hazards.

1. Introduction: The need of a systemic approach for resilience building

The Covid pandemic has highlighted that the strengthening of the health systems is not the only aspect to consider if we are to build health resilience. In the last years, definitions have moved away from a conceptualization of resilience as a set of qualities that a system must possess (see, for example, the City Resilience Framework) toward the identification of the capacities that must be built up into a

system for it to be regarded as resilient (e.g., the UN Common Guidance on Helping Build Resilient Societies). Yet, capacity frameworks fall short in accounting for the fact that resilience is less a set of capacities to gain than a quality that emerges from the interconnectedness between these capacities within a specific context (Faulkner and Sword-Daniels, 2021). Time is also to be factored into the definition: indeed the framework by Linkov, Trump and Haynes (2019) sees resilience as a function of both time and space and as the ability to plan and prepare (before disruption); absorb (during disruption) and recover and adapt (during and after disruption).

Societal systems are characterised by multiple links and feedback loops between processes and changes and by temporal, cross-systems and spatial cross-scale interactions (Brown, 2016; Faulkner and Sword-Daniels, 2021). Moreover they are exposed to systemic risks which transgress existing boundaries among nations, disciplines, sectors and societal systems, interact at different scales and in different times in a such manner that causal pathways among elements of risk are impossible to track (because they are non-linear) and failures can occur abruptly (after a long period of stability) with far-reaching effects that cascade through systems (Schweizer, 2019; Renn et al. 2020). It follows that resilience-building interventions must be systemic by design (Global Resilience Partnership, 2019), looking at the mutual influences between the components of a single system (e.g. actors, resources, enablers and constraints) as well as at the interactions and overlapping areas between different systems across scales and times, cognizant that a small change in a system can generate ripple effects on apparently unconnected and distant systems and over extended timeframes (OECD, 2020). Thus, there is an urgent case for unravelling the interplay between the determinants of resilience of different but connected domains. Departing from this interactional perspective, a definition of health resilience should capture the relationship between health, environment and economic growth considering the role of food.

This policy brief builds on the One Health Approach (OHA) developed by the United Nations Agencies and partner organisations, such as the World Organisation for Animal Health (OIE), that recognizes that human, animal and environmental health are systemically entwined. It seeks to make explicit the food-health nexus in the resilience perspective and offer policy recommendations that expose the entanglement between the components and operational features of food systems (in terms of food production, processing, distribution and consumption) that hinder or boost health resilience. The relationship between food and health has been highlighted in the first and second International Conference on Nutrition organized by FAO and WHO, in 1992 and 2014 respectively, and is widely recognized (CFS 2021). Agroecology is regarded as the approach that can drive the transition toward

reconciling economic gains, environmental resilience, social equity and health benefits at different scales (farm-level, community level, regional and national) (HLPE 2019; IPCC, 2019; IPES-Food 2016, 2017, 2018, 2021). Ultimately, this policy brief shows how health resilience has food systems resilience as a foundational element.

1. Background and purpose: Evidence about the relationship between health and food

Food systems affect health through multiple and interconnected pathways, directly and indirectly, locally and globally. Building upon a corpus of research and policy evidence, five key channels through which food systems impact human health can be identified (IPES-Food 2017).

a) **Food insecurity**, defined as insufficient or precarious access to food that is culturally acceptable and nutritious, produces poor health conditions, especially in those countries where population heavily and directly depends on natural resources (FAO, IFAD, UNICEF, WFP and WHO 2020).

b) **Unhealthy dietary patterns** impact health conditions through consumption of groups of foods with problematic health profiles (e.g., resulting in obesity and non-communicable diseases including diabetes, heart disease, cancers). These impacts affect people directly through their dietary unhealthy habits. New evidence links ultra-processed and high sugary foods with a range of health risks (Global Burden of Disease, 2017).

c) **Foodborne diseases** impact health by contamination of food and occur at any stage of the food production, delivery and consumption chain. They can result from several forms of environmental contamination including pollution in water, soil or air, as well as unsafe food storage and processing. Over 200 diseases are caused by eating contaminated food, the burden is carried disproportionately by low- and middle-income countries and by children under 5 years of age (WHO 2020).

d) **Environmental contamination** impacts health conditions directly through the exposure of whole populations to contaminated environments and flow from food production, via the pollution of soil, air, and water resources or exposure to livestock-based pathogens. Food safety, nutrition and food security are closely linked. Unsafe food creates a vicious cycle of disease and malnutrition, particularly affecting infants, young children, elderly and the sick (WHO 2020).

e) **Occupational hazards** impact physical and mental health of farmers, agricultural and other food chain workers due to exposure to health risks in the field/factory/workplace (e.g., acute and chronic pesticide exposure risks, production line injuries, livelihood stresses). An increasing number of workers

in the food production chain experience unhealthy life/work conditions and emerging vulnerabilities (Tagliacozzo et alt., 2020). Food systems require cheap, seasonal, replaceable labour which results in a particularly vulnerable workforce (ILO 2016). The biggest health risks tend to accrue to vulnerable groups, particularly hired and migrant labourers, making reporting of these impacts less likely (FAO 2020).

These five key channels through which food systems impact human health should be understood following the OHA as part of the interface between humans and animals, that is a critical juncture where zoonotic diseases emerge and re-emerge (i.e., H1N1 swine flu, zoonotic influenza or Bird Flu, Nipah virus or NiV, severe acute respiratory syndrome or SARS-CoV, and COVID-19). This interface is continuously affected by globalization, the growth and movement of human and livestock populations and the increasing changes in ecosystems vector and reservoir ecology; land-use and patterns of hunting (Davis and Sharp 2020).

3. Vulnerability and resilience drivers of food systems and their implications in terms of health

An urgent case for reforming food systems can be made on the grounds of protecting human health and fostering health resilience. In the following, we elaborate on the five key areas of the food-health nexus mentioned above to show the spillover effects of food systems' vulnerabilities on the society's health. The COVID-19 crisis has given full evidence of them. Levels of food insecurity around the globe have surged due to factors such as loss of control over the means of production, food chains' restructuring, market instability and food price shocks, among others. The resilience of food systems has been incrementally diminished by policies that have promoted agricultural production models oriented towards export markets, while increasing the importation of cheap food, and reducing the attention on agriculture for domestic consumption (IPES 2020; Ploeg 2020). These structural weaknesses have manifested clearly during the Covid-19 pandemic when both developing and food-importing countries and developed and food-exporting countries have experienced specific food shortages, the loss of market outlets, surpluses and sudden drops in farmers' incomes – i.e. in Bangladesh, India, and Sub-Saharan African countries as well as Italy and UK (Garnett et al. 2020; Laborde et al. 2020; Lioutas, Charatsari 2021; Oxfam 2020; UN 2020; WFP 2020). On the contrary, agroecological diversification would have strengthened ecological and socio-economic resilience, ensuring food security and nutrition and helping to stabilize incomes also during times of large-scale disruptions to markets, value chains and logistical networks (HLPE 2020).

As an additional vulnerability driver, industrial agriculture has championed energy-rich, nutrient-poor staple crop varieties, while pulses and other minor crops with high nutritional value have been overlooked. This shift in agriculture is connected to the development of mass food retailing, characterized by the abundance of relatively cheap highly-processed foods and the year-round availability of a wide variety of foods. Dietary shifts tend to be bifurcated according to class-income and education levels of consumers especially in urban areas. Financial hardships, reduced physical activity, and altered purchasing patterns favoring products with longer shelf life and often poorer nutrition profiles can lead to higher levels of food insecurity, undernutrition, and overweight/obesity (UNSCN 2021). Conversely the agroecology approach endorses the genetic diversity and context-specificity of varieties, breeds and species. This contributes to macronutrients, micronutrients and other bioactive compounds to human diets and lowers the occurrence of some nutrition-related disease such as overweight and obesity potentially leading to diabetes type 2.

Biodiversity loss and intensive food systems make zoonotic diseases more likely. Novel viruses have emerged from intensive systems of domestic livestock rearing (UNEP 2020). More than 50 % of zoonotic infectious diseases that have emerged since 1940 have been associated with measures to intensify agriculture (Rohr et al. 2019). Allergies and food intolerances have been directly linked to industrial food processing and resulting changes in molecular composition. Conversely, in livestock population low densities and genetic diversity, such as on agroecological farms, the spillover of viruses and other pathogens from wild animal populations to livestock can be reduced while at the same time, the resistance of livestock populations to diseases is increased. Besides reducing the need for antibiotics and other medicine in animals, this could also ultimately reduce the risks for antimicrobial resistance and emerging zoonotic diseases.

The intensification of agricultural production has been accompanied by unsustainable exploitation of natural resources, resulting in the degradation of ecosystems, rural society and knowledge. This degradation of the natural resource base, combined with increasing impacts of climate change and global uncertainties, exposes communities to more hazards and losses, and reduces their resilience in the future. Moreover, large-scale specialized livestock and feed production, which rely on the use of agrochemicals, have been driving natural habitat loss and have pushed the agricultural frontier into wilder and less-arable lands. This has the potential to create conditions that favor the circulation and mixing of viruses, which can then be spread to humans. Pesticide exposure in industrial farming systems has been linked to a range of health problems, e.g., Alzheimer's disease, birth defects, cancers, developmental disorders. Additionally, the preventative use of antibiotics in industrial animal

production systems has exacerbated the problem of bacterial resistance to antibiotics, creating health risks for human populations (CBD and WHO, 2015; IPBES, 2020).

Research has demonstrated that deprived and disadvantaged individuals and communities tend to experience disproportionate exposure to environmental risks such as air pollution and environmental contamination and degradation also connected to food production (Burger et al. 2020). Agroecological transition (Gliessman 2016) advocates for the substitution of external inputs, such as fertilizers, pesticides and hybrid seeds, while conserving, protecting and enhancing natural resources. By enhancing biological processes and recycling biomass, nutrients and water, producers are able to use fewer external resources, reducing costs and the negative environmental impacts of their use (Altieri and Nicholls 2020).

Disruptions in the food chain and lockdowns have impacted seriously both agri-food producers and workers as well as the most vulnerable and food insecure populations (FAO 2020). The pandemic has spotlighted the essential role of migrant workers in the agri-food system, but at the same time, it has exacerbated structural challenges of the agri-food system that are at the root of their vulnerability (Tagliacozzo et al. 2020). Oftentimes, food chain workers that are more exposed to contaminants and other hazards are also those who benefit less from legal and social protection (e.g., because of their irregular status). Their health conditions are aggravated by unhealthy living settings and by the impossibility to access essential services, which ultimately undermine the resilience of the individuals and of the entire food chain (Logan and Guikema, 2020)**.** Gender-specific vulnerabilities such physical and sexual abuse, childcare responsibilities, temporary and insecure employment and less access to information and power in decision making render women more exposed to some health risks. Good working conditions, protection of labourers' rights, and decentralized structures make agroecological farms excellent role models when it comes to reducing exposure to health risks of people working in agriculture (Timmermann, Felix, 2015). Agroecology reconnects producers and consumers prioritizing local markets, supporting local economic development and distributing wealth fairly among the different actors involved. Ultimately, reducing dependency on external resources empowers producers by increasing their autonomy and resilience to natural or economic shocks.

The European Commission has recognized the serious spillover effects between food systems vulnerabilities and society's health. The Green Deal, the new economic growth strategy of the European Union based on ecological transition, has at its core the "Farm to Fork Strategy for sustainable food" as an innovative and comprehensive policy framework to build a fair, healthy and

environmentally-friendly food system, putting consumers and producers at the center. New streams of funding are expected to support the adoption of more sustainable practices, through the Common Agricultural Policy and the Common Fisheries Policy reformed accordingly.

4. Policy and investment priorities in food systems with health resilience spillovers

As a **general recommendation**, operational definitions of health resilience should incorporate aspects of resilience and sustainability of food systems and account for the spillover impacts of food systems-related policies into the health dimension (OECD 2021). For this reason, it is recommended to include in the advisory committees on health-related policies at national and international level also experts in food production and consumption to illuminate the multiple direct and indirect pathways that connect human, animal and ecosystems' health outcomes (OECD 2020). In consideration of the complexity of the problems at stake, a multi-level and multi-stakeholder governance approach to food systems resilience could ultimately also contribute to increased safeguard of human rights and to knowledge co-construction. Stakeholders, including public health research entities and private organisations, should invest in R&D on agroecological and other innovative approaches, including the improvement of technologies and the identification of clear data and performance measurements to assess the benefits of transitioning to sustainable food systems also in terms of health outcomes. The relationship between health and food needs furthermore to be broadly conceptualised within the SDG 2030 Agenda.

More specifically, taking a food systems lens, health resilience building policies should take into consideration that:

1. **Food is a primary component of human health;** therefore production, trade and distribution of food cannot be driven merely by a profit logic. The modern agri-food sector relies on an intensive production model and massive processing, marketing, and distribution networks at the expense of farmers, agricultural workers and consumers. This has cascading implications for the health of the society at large. In order to preserve public health, *national governments* and *supranational entities* should enforce regulatory mechanisms to **avert the impoverishment of the single components of the food chain.** They should **induce changes in international trade regimes so as to reflect social, environmental and economic sustainability based on alternative production models with positive impacts on health,** i.e. *use trade-related policies, such as quotas and tariffs, to discriminate in favor of more sustainable production methods; in trade, give priority to sustainably produced food and adopt*

a 'proximity principle' so that the most local source of a product should be used to supply people's needs. They should **promote economic subsidiarity and return control of food production to farmers and local communities so they can ensure food security at the local level, tackle unfair trading practices and enable producers to strengthen their bargaining power and obtain fair prices for their products** *(OECD 2018; UN 2011).* They also should **prevent the formation and consolidation of monopolies, oligopolies and cartels in food and agricultural systems.** *In that, private companies can play a critical role by adopting and promoting ethical and sustainable practices in food supply chains also promoting CSR policy in food company.*

2. **Human health requires a healthy, fresh, varied diet** in opposition to the lack of nutrients of **highly processed food**. Long food chain and food preservation are key requisites of industrial food production but are dysfunctional to human health and produce high cost for national health systems. In line with agroecology's recommendations, **food chains that are limited in length and complexity and possibly based locally or nationally** should be supported. Reliance on exportations for the procurement of key ingredients for the humans' and livestocks' nutrition should be reduced. There is the need to **move away from privatization and concentration processes (i.e., in seeds and land) toward processes of re-localisation of food production and distribution, respecting the rights that farmers have to save, use and exchange farm-saved seed/propagating material**. This would strengthen social and territorial dimensions of agriculture and reduce susceptibility of food chains to disruptions through external events. *Governments should enact incentive schemes and public policies to ensure the economic viability for farmers and producers to adopt production approaches based on agroecological principles.*
3. Health resilience policies cannot leave food security out of consideration (HLPE 2020). They should encourage **the production of healthy food and its distribution throughout the population's strata**, paying specific attention to the most vulnerable groups and communities. Practical instruments can involve: incentives for the food waste reduction and commercialisation of healthy ingredients, food banks and school meals, especially in deprived areas. *National governments and public and private economy players should support this recommendation through the development of joint food strategies and policies* (e.g., see the experience of food councils).
4. **Positive or negative eating behaviors are introjected in childhood. Food educational campaigns should be supported** through the provision of balanced and culturally appropriate

diets (such as the Mediterranean diets high in vegetables, fruits, legumes, nuts, beans, cereals, grains, fish, and unsaturated fats such as olive oil) in schools' and hospitals' canteens, and the promotion of healthy lifestyles especially in areas (e.g. marginal and rural areas and economically disadvantaged urban areas) where the consumption of healthy food is limited due to high costs and low formal education. *Adequate policy aiming at changing unhealthy behaviours*, particularly those related to diet quality, caloric intake, and physical activity – with related evaluation –, *should receive attention. Funding for public health and behavioural research should be allocated to build up an evidence base in support of national and international decision making bodies (IHME 2020).*

5. **Consumption of sugar-based and ultra-processed food have shown to have a major negative impact on health and should therefore be discouraged.** Conversely, **consumption of agroecological and quality food** can be encouraged through specific taxation. **Public procurement** can also play a key role to **promote agroecology** in food systems (including the support to local farmers and short distances distribution chain of fresh and quality foods) such as school feeding schemes, public canteens and restaurants, and in **food policies** that **address vulnerable groups** (WHO 2021)**.** *National governments, regional authorities, municipalities are key implementers of this recommendation. Policies should support producers and consumers to make more informed choices and access local markets more rapidly and efficiently by promoting lower cost, comprehensive, supply chain transparency and traceability mechanisms.*
6. Reduction of foodborne diseases can be achieved by the means of **standardised food processing, handling and storage differentiated by type of production** (e.g., large-scale and intensive productions aimed at distribution retails vs small-medium scale farming and peasant agriculture) and the **imposition of limitations on the production of genetically transformed organisms and ultra-processed foods** that are linked to the emergence of some **diseases**. **The precautionary principle** should be assumed as a guiding principle in the introduction of new varieties**.** *This recommendation should be supported by national government and supranational entities governing trade, agriculture development and public and private research.*
7. Health resilience building interventions should also **discourage environmental contamination and degradation resulting from chemical-intensive and large-scale agriculture and intensive livestock production systems,** supporting agroecology in farming production, reducing the stocking density of animal production and making less convenient CAFO (Concentrated animal feeding operations). Interventions should aim to **increase biodiversity and soil fertility, reduce**

erosion and contamination of soils, water and air, support adaptation to climate change and minimise energy consumption. They should also recognise the importance of traditionally and locally adapted seed varieties in building sustainable and healthy food systems and the role played by peasants and farmers in managing agricultural biodiversity**.** The compounding effects of environmental contamination and degradation on health need to be carefully addressed, bearing in mind the relationship between social and environmental factors (e.g., disadvantaged individuals are more exposed to environmental hazards and the deriving health risks). *Action towards this recommendation should be supported primarily by national governments.*

8. **Working and living conditions of the agricultural and food chain labour force** have a direct and immediate impact on their health. Conditionalities to funding provision to farmers based on respect for labour rights, developed with the participation of affected parties, should be introduced. Given that migrants represent a significant share of the food workforce, **migration that is informed, voluntary and within safe and regular migratory channels should be promoted,** and **social protection measures (including access to basic health services) should be extended also to migrant people.** This can be facilitated by their **regularization** and **long-term social and economic inclusion pathways. Also, policies must be gender-sensitive to respond to the specific needs and challenges of the female workforce (**FAO, 2018**).** *On this recommendation main responsibilities are on national governments and international organisations (e.g. ILO) including migration governance entities. Private stakeholders should support this recommendation by implementing effective labour complaints, monitoring and reporting mechanisms for all workers, and providing employers with guidance on health and safety measures for workers as well as promoting and managing worker-driven social responsibility mechanisms.*