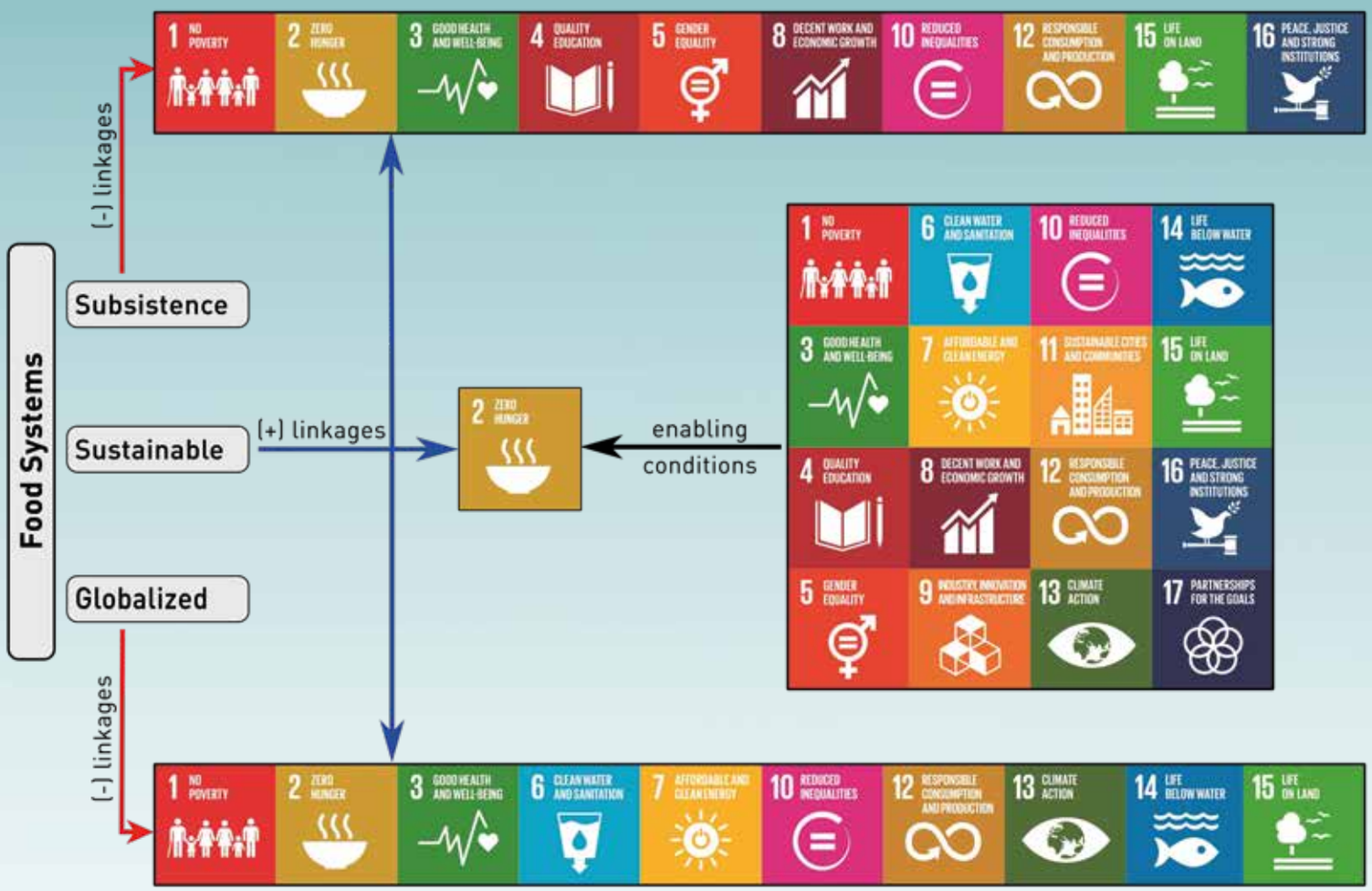

Why food systems transformation is crucial for achieving the SDGs

Our current food systems not only fail to end malnourishment, but also exhibit substantial ecological impacts. Thus they are an obstacle to achieving numerous Sustainable Development Goals (SDGs). Our authors have a look at the context and explain how these negative impacts can be converted into positive ones.

By Prajal Pradhan, Tek B. Sapkota and Juergen P. Kropp

For transforming our world, the United Nations adopted the 2030 Agenda for Sustainable Development in 2015, consisting of 17 goals and 169 targets to be met by 2030. However, achieving the SDGs remains a challenge despite progress made during the last five years. Moreover, the COVID-19 pandemic has exacerbated this challenge by negatively impacting most of the goals. Here, we highlight why transforming food systems is crucial for meeting the 2030 Agenda and how this can be reached.

Food systems can have positive and negative linkages to SDGs, depending on their characteristics (see Figure). Food systems across the globe range from traditional subsistence to globalised modern ones, with sustainable food systems lying somewhere in-between these extremes.

How food systems and SDGs are interlinked

Subsistence food systems consist of smallholder farmers with low productivity due to limited applications of agricultural inputs, mostly in low-income countries. Supply chains are relatively short with minimum food processing. Only a tiny amount of food is imported or exported. A substantial proportion of the population in developing countries is engaged in these food systems. However, many people suffer from poverty because of lower yield and limited agricultural incomes, resulting in negative linkages with SDG 1 (No Poverty) and SDG 8 (Decent Work and Economic Growth). Diets consist of staples with variations in their diversity across seasons shaped by food culture and tradition. Smallholder farmers' production might not be enough to feed themselves throughout the year, resulting in undernourishment (SDG 2). Poverty and undernourishment make ensuring Good Health and Well-being (SDG 3) and Quality Education (SDG 4) for all particular challenges. Women are primarily re-

sponsible for unpaid domestic and care work, including farm labour, with negative linkages to SDG 5 (Gender Equality). Low farm incomes also increase gaps between smallholder farmers and other professions instead of leading to Reduced Inequality (SDG 10). Inferior harvesting, processing, storage and transport infrastructures result in significant food losses targeted to be halved by SDG 12 (Responsible Consumption and Production). With only limited resources and knowledge, smallholder farmers continue to cultivate marginal land and use unsustainable practices, causing negative linkages to SDG 15 (Life on Land). These food systems are also vulnerable to environmental and economic shocks (e.g. weather extremes and price spikes), triggering conflicts within and between countries (SDG 16 – Peace, Justice and Strong Institutions).

Globalised food systems involve intensive production in certain areas, and populations in other regions depend mainly on imported food. Farms are highly productive thanks to the applications of a vast amount of agricultural inputs (e.g. feed, fertiliser and pesticides). Supply chains are relatively long, with processed and ultra-processed food. High-income countries mostly have these food systems. The need for massive investment means that marginalised farmers become less competitive. This negative linkage forces the farmers to abandon their farms and lose their livelihoods (SDG 1), resulting in inequalities within and among countries (SDG 10). Diets consist of a large share of animal-source, processed and ultra-processed food, sugar and sweeteners, mainly for low- and middle-income populations. These unhealthy diets and limited physical activities result in overweight and obesity (SDG 2) and the associated burden of non-communicable diseases (SDG 3). The intensive production and excessive use of agricultural inputs leads to air, water and soil pollutions with negative linkages to SDG 6 (Clean Water and Sanitation), SDG 13 (Climate Action), SDG 14 (Life below Water) and SDG 15. Required agricultural inputs and extended supply chains depend on fossil energy, making food systems emission-intensive, which clashes with SDG 7 (Affordable and Clean Energy) and SDG 13. However, their agricultural emission intensity could be lower than in subsistence farming. Although food losses are low owing to adequate infrastructures, excess food availability results in significant food waste on the consumer side (SDG 12). These food systems also lead to biodiversity losses because of overfishing (SDG 14) and deforestation (SDG 15) to bring cheap food to the global market.

Key action points for the transformation of food systems

1. Sustainable intensification increases food production, ensuring the long-term potential of agricultural resources (e.g. soil, water, plants and livestock) and maintaining their environmental functions. These practices include sustainable tillage, precision resources management, crop residues and cover crops for soil protection as well as cropping system diversification. However, as these practices are not adopted widely, countries should promote them.
2. Transitions to more sustainable and healthy diets, i.e. more plant-based with minimum animal-source food, reduce global mortality and agriculture-related GHG emissions. Therefore, countries need to facilitate diet changes through policy instruments and soft measures, including taxes on unhealthy foods and subsidies on healthy ones.
3. Avoiding food loss and waste saves resources used to produce food, reduces food systems' environmental impacts and enhances local, regional and global food security. Various technologies and soft measures are available to reduce food loss or waste.
4. Connecting producers with business is key to sustainable food systems. Linking young farmers to sustainable finance and private sector leaders to access needed finance and mentorship will transform these youths into competent and confident business leaders.
5. Regional and local food systems will ensure food availability during difficult times, enhance local employment, especially for women and youth, and reduce food transport emissions. Thus, countries can promote the regionalisation of food systems by implementing appropriate policies, subsidies, and carbon tax (see Box on page 12 as example).
6. Social protection and empowerment are required for vulnerable populations to ensure their food security in difficult times. Disruptions in food systems caused by climate change, weather extremes or conflicts can result in food insecurity. Social protection includes food subsidies, cash transfers, agriculture insurance, farmer's pension and employment guarantee, and universal income. Empowerment actions should focus on marginalised social groups, women and youth.
7. Urban and peri-urban agriculture can increase the resilience of regional and local systems. Urban and peri-urban agriculture contributes to food availability and accessibility, reduces poverty, improves nutrition, provides a series of ecosystem services, e.g. reducing heat stress and carbon sequestration, and fosters the circular economy.
8. Investment in research, innovation, and extension services needs to be increased, particularly in agroecological approaches, sustainable production practices, game-changing emerging technologies, locally appropriate business model development and financing mechanisms. Countries should invest in building their capacities for integrating data, analytics, and assessments, supporting evidence-based policies to ensure food security.

SDGs and food systems transformation

Transforming food systems towards more sustainable ones is crucial to converting the negative linkages of food systems with SDGs into positive ones. Sustainable food systems deliver nourishment for all with profits for the entire range of actors, broad-based benefits for society and positive or minimum ecological impacts. Being profitable for all the actors, these food systems eliminate poverty (SDG 1), foster economic growth (SDG 8), and reduce conflicts (SDG 16). Diets are more diversified, sustainable and healthier, and cause minimum greenhouse gas emissions (SDG 13). They consist of a high share of coarse grains, pulses, fruits, vegetables, nuts and seeds with a calorie threshold. Most foods are seasonal and regional, with short supply chains. Sustainable and healthy diets for all people end hunger and malnourishment in all forms (SDG 2), preventing health burdens (SDG 3), positively linked with Quality Education (SDG 4). These food systems also provide equal opportunities for all, ensuring gender balance (SDG 5) and reducing inequalities (SDG 10) thanks to fair trade and gender-sensitive approaches. Sustainable land and water management practices result in positive linkages to water quality (SDG 6), land restoration and biodiversity conservation (SDG 15) as well as soil carbon sequestration (SDG 13). These food systems have minimum ecological footprints, positive environmental impacts, and low food loss and waste (SDG 12). They also leave some land for clean energy (SDG 7) and exert less pressure on aquatic and marine lives (SDG 14).

Achieving SDGs goes hand in hand with food systems transformation by enabling required social, economic, and environmental conditions. Progress on SDGs 3–6 and 10, 16 and 17 creates social conditions for the transformation. These conditions include knowledge, technologies and resources transfer across the world based on North-South, South-South

and South-North cooperation (SDG 17 – Partnerships for the Goals). Uses of marginal land and unsustainable practices are often linked with poverty and limited livelihood opportunities. Therefore, progress in economy-related SDGs is required for transforming food systems. For example, providing social security and stable income from agriculture would encourage farmers towards sustainable land and water management (SDG 1 and 8). Besides others, proper industry, innovation, and infrastructure (SDG 9) and clean energy (SDG 7) avoid food loss and minimise GHG emissions from food value chains. Achieving Sustainable Cities and Communities (SDG 11), accounting for urban and peri-urban agriculture, will enhance the sustainability of urban food systems. Achieving SDGs 12–15 enables the required environmental conditions. For example, climate change mitigation avoids its adverse impacts and reduces future adaptation needs. Sustainable transformation is central to turning food systems from a primary threat to a solution space for achieving the SDGs. We highlight eight action points for food systems transformation in the Box on page 12.

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PROMOTING LOCAL FOOD SYSTEMS FOR SUSTAINABLE MOUNTAIN DEVELOPMENT

Traditionally, mountain people from the Hindu Kush Himalayas (HKH) region grew various local crops to satisfy their dietary, nutritional, medicinal and cultural needs. They cultivated and maintained different indigenous crops such as amaranthus, barley, millet, sorghum and buckwheat as well as a range of wild fruits, vegetables and medicinal plants (see Photo). However, with the advent of the Green Revolution, most countries in the region emphasised commodity-specific, large-scale agricultural production on a commercial scale. As their food systems moved away from subsistence to globalised ones, many mountain people abandoned agrarian occupations. Instead, they relied more and more on imported food. Farmers have become reluctant to grow the local crops because of low returns, poor markets and lack of knowledge about their nutritional and environmental value. This tendency has gradually replaced the local crops with commercial ones. Given this situation, any disturbance in the market, supply chains or prices triggers huge implications on mountain people's food security. Further, the transition from subsistence food systems and traditional diets to globalised ones with high fats, salt, sugar and processed food has increased non-communicable diseases (e.g. diabetes, obesity, heart diseases and certain types of cancer) in mountain communities.

In the HKH region, there is an urgent need to promote sustainable local food systems using traditional and indigenous knowledge. For example, many indigenous crops grown in the region have immense potential to contribute to food and nutritional security, dietary and culinary diversification, health and income generation. These locally adapted crops can grow in marginal land which otherwise remains fallow. Most of these crops are drought-resistant and can quickly adjust to harsh climatic conditions. Strengthening mountain food systems based on locally-produced food makes them resilient against supply deficit, market disturbance, price hikes and sudden changes in trade agreements among countries. However, many local crops and livestock species are currently underutilised and not a priority of national food systems for various reasons, including lack of germplasm, local technical knowledge, adequate national policy and interest among stakeholders, together with easy availability of imported food. For making mountain food systems sustainable, it is essential to increase the production and productivity of many local crops and livestock, raise public awareness of local food and emphasise research for conservation, utilisation and promotion of local foods through appropriate policy instruments and incentives.

Intercropping of finger millet with Amaranth in Hanku village, Jumla district, Nepal. Mountain people from the Hindu Kush Himalayas region used to grow these local climate-resilient crops. Currently, they are neglected and underutilised. Photo: LI-BIRD Photo Bank