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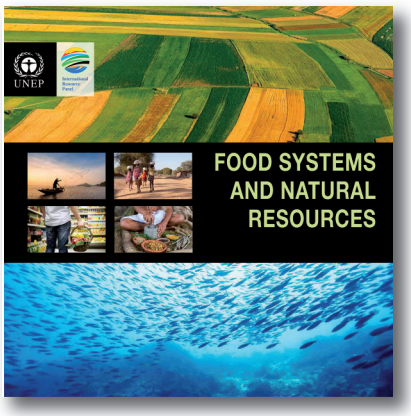
Recasting agriculture in a resource-smart food systems landscape

In 2016, the United Nations Environment Programme (UNEP) published the report "Food systems and natural resources".[1] Its main conclusion was that current food systems are exerting increasing pressure on natural resources, and that resource-smart food systems are needed to deliver on the Sustainable Development Goals. The report laid out options on how to decouple the food system from environmental degradation.

UNEP's International Resource Panel Working Group on Food Systems first report came at a time when the 2030 Agenda for Sustainable Development was fresh in the minds of governments and societies around the world (UNEP 2016a). Its main conclusion was that agriculture would benefit from being embedded in the wider context of resource-smart food systems. As Achim Steiner, then Under-Secretary General of the United Nations and UNEP Executive Director said, "A food systems lens goes beyond the classic production-centred discussions to connect all activities concerned with the food we eat … [we] need to transition to more resource-smart food systems, an imperative for the achievement of at least 12 out of the 17 Sustainable Development Goals".



The Panel had been established in 2007 by UNEP to provide independent, coherent and authoritative scientific assessments on the use of natural resources and its environmental impacts over the full life cycle and to contribute to a better understanding of how to decouple economic growth from environmental degradation. Earlier reports linked to agriculture had covered biofuels; sustainable land management; water accounting and decoupling. They all stressed the dependencies of our economies on natural resources that went far beyond any single sector. For agriculture, this meant the use of land, soil water, terrestrial and marine biodiversity, minerals and nutrients and the fossil fuels used in irrigation, energy, packaging, cooking and transport. In addition, food systems were seen to drive a number of environmental impacts such as the loss of biodiversity, soil degradation, water depletion and greenhouse gas emis-

sions. Farmers and food producers were seen as the world's largest group of natural resource managers and as such critical agents of change.

Panel members agreed that the resource use and requirements of the global food consumption called for a better understanding of the food system as a whole, and in particular its role as a node for resources such as water, land, and biotic resources on the one hand and the varied range of social practices that drive the consumption of food on the other. The thinking reflected the findings of the IAASTD report, i.e. that agriculture needed to be treated as part of the larger system of sustainable resource management (UNEP 2016a). The basic idea was that food systems needed to deliver food security and healthy diets for people and to do so sustainably from a resource perspective. The underlying premise was that food systems had to become resource-smart by improving the efficiency of production, as well as by reducing food demand through minimisation of food waste, dietary changes and reduction of resource-intensive foods. Food systems were integral to sustainable development.

Food regimes

The seeds of resource-smart-food came out of a response to the 2008 financial crisis and the rethinking of economic recovery through the Global Green New Deal (UNEP 2009), which saw food security as being radically affected by financial institutions far from the people actually producing food. It took as its point of departure the hegemony of the food regime which dealt with food and the wider politics of food (and agricultural) relations from field to plate through 'the political structuring of world capitalism, and its organization of agricultures to provision labour and/or consumers in such a way as to reduce wage costs and enhance commercial profits' (McMichael, 2013). The environment was never considered in this dialectic.

Food regimes corresponded to time specific political and economic structures, and separated crises in capitalism. The first was the **colonial-diasporic food regime** (1870–1930s) with cheap tropical products such as raw materials (i.e. cotton, timber, rubber) and commodities for direct consumption (i.e. coffee, tea, cocoa), and temperate foods (meat and grains) produced by migrant populations (diaspora) in settler colonies. The second **mercantile-industrial food regime** (1950–1970s) emerged in the wake of the Great Depression of the 1930s and World War II, in the context of government-organized capitalism, cold-war and decolonization. It was typified by a reversal of world agricultural trade flows, via the mechanism of food aid, stemming from government subsidized overproduction in the Global North and by the international expansion of agribusiness value chains through the Green Revolution (i.e. high-yielding varieties of a few cereals such as wheat, maize, rice coupled with the heavy use of subsidized fertilizers, pesticides, irrigation and machinery into the agricultural economies of the Global South). The **corporate food regime** (1980–present) came on the back of the economic and oil crises of the 1970s and the neoliberal turn in global politics. The corporate food

regime extended the global divisions of labour by an intensified conversion of large areas of land in the Global South to produce industrial inputs (e.g. animal feeds and agrofuels) for the Global North and was defined by a market hegemony imposing a set of rules institutionalizing, via the World Trade Organization, corporate power in the food system on transnational, national and local levels, from field to plate. This contributed to a shift in control over global food and agriculture from smallholder based production towards global capital.

Resource-smart food systems aim to address the delinking of global capital flows from agricultural practices and the livelihood strategies of smallholders, that were seen as constraints that needed to be overcome in the name of efficiency, development and food security and which were laid bare in the financial crisis of 2008. It sought to address the deepening of large-scale and industrial forms of agricultural production that were encroaching on nature at odds with ecological processes and the patchy success of the corporate food regime's principles and guidelines for responsible agro-investments, value-chain projects, industry self-regulation and corporate social responsibility. By bringing environmental and resource concerns into the very core of our food systems it could ask questions about outcomes related to wellbeing and the health of people and ecosystems, not just the bottom-line.

Decoupling – the driver behind resource-smart food systems

The members of the Panel saw that the main driver for establishing resource-smart food systems was decoupling (UNEP 2011). This refers to the ability for economies to grow without a corresponding increase in environmental pressures (UNEP 2011). There are two types of decoupling: resource and impact decoupling. Resource decoupling occurs when economic growth exceeds the growth rate of resource use i.e. economic productivity of resources is increasing. Impact decoupling occurs when the environmental impact of economic activities is reduced. Impact decoupling is important when the use of a resource threatens human and ecosystem health. Both are highly relevant to the food system and helped to push UN agencies and governments to rethink agriculture in terms of resource-smart approaches to land and water use, biodiversity and soil conservation, nutrition and health, climate adaptation and the carbon footprint of food production. The shift in thinking was helped by advances in the publication and uptake of environmental accounting frameworks for water and land and the growing use of resource life-cycle analysis (UNEP 2012; 2015). Together these two methodologies helped to quantify the environmental and health impacts arising during the extractive phase of food production (e.g groundwater pollution, land degradation, post-harvest wastes, health effects of pesticide spraying and emissions), and the use phase of food commodities (e.g.transport, packaging, food waste and health impacts of nutrient deficiency).

The idea of resource-smart-food systems was proposed as an umbrella term for more specific policies that were gaining traction at the time such as climate-smart

agriculture. It also covered linkages to new dominant values such as wellbeing and health. It also opened up the space for non-agricultural actors to co-design better health and environmental outcomes. For example, governmental programmes for nutritious school meals stimulating local farmer's options and crop choices.

Some of the critical shifts needed to achieve resource-smart-food systems included a reduction of food loss and waste; reorienting away from resource-intensive products such as meat, empty calories and ultra-processed food; rethinking the whole food environment to help consumers adopt more healthy and sustainable diets; reconnecting rural and urban populations through localised food supply chains; internalizing the environmental externalities into the costs and pricing of food and reinforcing this through legislation to prevent pollution, remove perverse subsidies and pay for environmental services; accounting for the flows of resources between urban and rural areas, and between crops and livestock; reinvigorating investment in rural education and training; research and innovation to decouple food production from resource use and environmental impacts; and building feedback loops between monitoring and reporting of the system effects of food production and the information and actions taken by consumers.

The UNEP report pushed the treatment of food security beyond considerations of famine or food shortage.

Coming out as it did in 2016, the UNEP report not only reflected on the combination of social, economic and environmental issues, that were subsequently brought out in the many synergies amongst the Sustainable Development Goals. Most critically, it helped to shape a deeper understanding of the interlinkages between agriculture, food, nutrition and patterns of consumption and production. For example, the use of nexus or more broadly whole systems thinking, in the UNEP report, pushed the treatment of food security beyond considerations of famine and shortages to issues of food waste, healthy diets and nutritious food, based on healthy soils and the long-term health and ecosystem effects of the pesticides and chemicals used in agriculture. It is from these ideas, that world-wide campaigns led by the United Nations on Food Waste and Healthy People, Healthy Plant, have taken off.

Resource-smart food systems within a circular bioeconomy – from niche to norm

The oldest business model in the world is the circular bioeconomy. Nothing wasted, everything used and reused, with Nature as the powerhouse (Palahí et al. 2020). Agriculture and food production are at the heart of this. The circular bioeconomy seeks instead to draw on nature-based solutions to our everyday needs. With an expanding range of innovative products from agro-forestry and biological processes, resource-smart food solutions can also power other consumer markets that are opening up to biobased solutions such a bioplastics, fuel and packaging from farm organic waste. The circular bioeconomy has the potential to solve the multiple challenges of encouraging local investment, gen-

erating livelihoods and improving health, education and food security whilst protecting ecosystem services such as clean water, biodiversity and cultural heritage.

The world has many millions of rural farmers, many barely making enough to provide food or school fees or medicine. With well-devised policies on land stewardship and well articulated product regulations, many different biobased industries could be established to the benefit of local farmers. Using the principles of agroecology and regenerative agriculture for improving soil health and productivity, all streams of organic waste from crops and vegetation can be processed through integrated composting and into the industrial production of bioplastics and lubricants. Expanding the co-production of these products and resilient crops within the setting of rural communities living in a healthy, biodiverse environment with intact ecosystem services, is another way that farmers can become key player in the circular bioeconomy.

In another step up to addressing some of the most tenacious problems of our fossil-fuel economies, farmers can produce bacteria to take the carbon emitted from agricultural infrastructure, such as grain driers and dairy production facilities and turn it into ethanol of sufficient quality to be used as transportation fuel.

Investing in resource-smart food systems to power the circular bioeconomy

Imagine a setting where virtually everything that is used in everyday life is biobased and reused or recycled. The flows through the economy would add value without creating the large scale negative externalities associated with fossil fuels and chemical pollutants. The circular bioeconomy also fundamentally shifts the risk profile of an investment. Whether it is impact development bonds, green financing or social impact bonds, the evidence is that investments in nature-based solutions and the bioeconomy are top-tier. The European Bank for Reconstruction and Development, with partner countries in northern Africa, has earmarked portfolios of green projects and social projects against which the proceeds of its Green Bonds and Social Bonds are tracked. These bonds are issued in accordance with the Green Bond and Social Bond Principles and are linked to projects such as sustainable and stress-resilient agriculture, including investments in water-efficient irrigation and sustainable forest management, reforestation, watershed management, and the prevention of deforestation and soil erosion.

In the circular bioeconomy, farmers are not only part of the resource-smart food system, they are land stewards with the potential to transform our economies (Palahí et al. 2020). As the potency of these ideas gain traction, it is useful to recall that they are a legacy of the IAASTD findings and the UNEP 2016 report which showed the world how to think about agriculture in the wider context of environment and natural resources.

Endnote

1 https://www.resourcepanel.org/sites/default/files/documents/document/media/food_systems_summary_report_-english.pdf

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