

# TOWARDS A REGENERATIVE FOOD SYSTEM





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Published by the Ellen MacArthur Foundation, *A New Dynamic 2: Effective Systems In a Circular Economy* brings together 18 key thinkers, business leaders and academics who look beyond the boundaries of their respective disciplines and establish the necessary connections to re-think our current development path. This volume helps to further understand and engage in the realisation of the circular economy model.

The agricultural story of the 20th century was one of unprecedented success: due to more intensive and specialised cultivation, farmers markedly improved productivity and kept food prices low. However, this industrialisation has created problems of its own, and may – unaltered – be running out of steam. In 2010, for the first time in a century, the growth of global grain yields fell below that of the global population growth.

That is why it is time to move away from what has become a ‘linear food system’: a take, make, dispose system in which, too often, synthetic inputs go into the land; the land gets overused; and a huge proportion of the food produced is wasted and ends up in landfill. In addition, many nutrients never make it back to the field, stacking up in contaminated sludge. The goal should be to move toward a regenerative model in which land is restored as it is used and in which nutrient and material loops provide much-needed inputs, resulting in a healthier food supply.

In terms of how to get started on the circular path, there are a number of promising approaches.

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### RETAIN AND RESTORE NATURAL CAPITAL

Restoration of large, damaged ecosystems is possible and the commercial potential is already proven. One famous example is the Loess plateau in China, where 1.5 million hectares of degraded land have been restored since the mid-1990s. This project lifted more than 2.5 million people out of poverty, almost tripling their income, by replacing low-value agricultural commodities with high-value products. Per capita grain output rose 60% and the perennial vegetation cover doubled from 17% to 34%. In addition, flood control, water use, employment, biodiversity, and carbon absorption all improved.

The Savory Institute, based in Colorado, US, promotes a process that emulates nature. As the institute describes it, managers control the livestock so that conditions mimic the predator/prey relationships that were in existence when the

grasslands evolved. This involves dividing land into smaller paddocks, putting cattle in large herds, and moving them frequently across the property. The land benefits from the cycle of use and rest – the same pattern observed in grazing animals in natural grassland ecosystems. This approach has regenerated more than 2.5 million hectares.

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## **RETURN RECOVERED RESOURCES**

There is great potential to recover nutrients from various waste streams and either put them to work into new systems or return them to where they came from as inputs. That is what we mean by ‘closing the loop’ – a cycle of use and reuse.

For example, the EU has made progress in recovering phosphorus from sewage sludge, meat and bonemeal, and biodegradable solid waste; this material now accounts for almost 30% of synthetic phosphorus fertiliser use in the region.

In Sweden, two municipalities have mandated that all new toilets must separate urine from faeces; urine makes up only 1% of domestic waste water volume but contains most of the nutrients. Local farmers can collect the urine for use as liquid fertiliser.

In Italy, more than 4,000 municipalities conduct intensive separation of food and garden bio-waste. These efforts affect about 40 million inhabitants; 4.8 million tonnes of bio-waste are collected for treatment in composting or anaerobic digestion plants.

Various sustainable and regenerative agricultural practices return the recovered resources and use them in organic production systems that preserve natural capital and optimise long-term yields. Organically cultivated land area in Europe is expanding by 6% a year.

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## **PROMOTE PERI-URBAN AND URBAN FOOD PRODUCTION**

The demand for local, fresh, and relatively unprocessed food is growing. American greenhouse operator, Bright Farms, has signed a contract with supermarket chain Giant Foods to supply 450 tonnes of produce annually to 30 Washington, DC area stores from a 100,000+ square foot greenhouse located in the metro area. This is expected to be the largest urban greenhouse operation anywhere in world.

In Europe, Barcelona has announced a goal of producing half its food in the metropolitan region. Establishing shorter supply chains between farms and retailers or consumers reduces the waste associated with transport. Doing so can also help to create local jobs and strengthen rural/urban links.

On a smaller scale, urban farming is also emerging, in the form of vertical, hydroponic, and aquaponic farms. Vertical farms grow produce inside or on top of buildings. Typically, these farms use 70–90% less water and fertiliser than conventional ones because they keep unabsorbed water and nutrients in

the system.

It hardly needs to be said that cities are not going to supplant traditional farms. But given that more than half the world's population now lives in urban areas (a percentage that is growing), the idea that cities have a role to play in food production makes sense.

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## **CREATE DIGITAL SUPPLY CHAINS TO REDUCE FOOD WASTE**

20% of food gets wasted on its way from the farm to the store in developed economies. Big data and IT can help to improve inventory management and thus shrink that figure.

SAP, the German software giant, offers retailers a dynamic consumer-pricing system that changes item prices in real time, based on availability and expiration date of the product. COOP, a European food retailer, has automated its fresh-food replenishment system to manage one of the largest sources of waste. Digital solutions, such as smart refrigerators, on-demand e-commerce delivery, and wearable monitors can help consumers to buy the right quantity and quality of food at the right times. This will help to cut down the amount of food that people throw away.

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## **THE EUR 320 BILLION OPPORTUNITY**

A circular food system would combine all these approaches, while also incorporating the best of traditional agriculture, to improve both the quality of the food produced and the health of the land that produces it.

In terms of production, a circular system would use significantly less synthetic fertiliser, pesticides, energy, land, and water, while emitting fewer GHGs.

The circular scenario might also produce more jobs than otherwise, because organic farming and waste management are relatively labour-intensive activities. All told, we estimate that if Europe implemented the four approaches described above, the direct and indirect economic benefits could reach EUR 320 billion (compared to the current development path).

Nowhere else is the link between long-term economic viability of our model use and the health of the underlying assets as evident as in agriculture and soil. And nowhere have we departed so visibly from the concept of regeneration, replenishment, and circularity. Building a new food system that puts the long-term productivity of our biological systems at the centre won't be easy and it will require new policies and priorities, but the time is right to start.

Listen to the interview of Morten Rossé and Martin Stuchtey on [Ciruclatenews.org](https://www.ciruclatenews.org). This chapter excerpt is in large part based on the findings of the report Growth Within. An updated report [Achieving Growth Within](#) that highlights investment opportunities has been launched at the World Economic Forum annual meeting in Davos on January 20, 2017.