Agriculture is enjoying a renaissance in urban environments, from the reclaiming of public spaces and rooftops to the introduction of vertical gardens and aquaponics. Here, International Innovation explores the growing phenomenon of urban farming in North America, and examines the ways in which the movement can contribute to the creation of a truly sustainable agricultural system.

In late 2013, the UN Commission on Trade and Development released the Trade and Environment Review 2013: Wake up before it is too late. The report criticised more economically developed countries for focusing disproportionately on increasing yields through industrial farming, arguing that this approach fails to provide diverse, affordable and sustainable food. In light of the pressures of a growing global population and changing climate, it further highlighted the need for a paradigm shift in agricultural systems towards more resilient and sustainable models, with greater support for small-scale farmers and local consumers.

Seattle will soon be home to one of the country’s largest edible woodlands in the shape of the Beacon Food Forest (www.beaconfoodforest.org). The goal of this community-powered permaculture project is to design, plant and grow an edible urban forest garden containing both public and private allotments. The forest will contain an edible arboretum, nut grove and berry patch, as well as outreach and education facilities. It is hoped that this initiative will help unite the local community whilst also increasing access to healthy and affordable food.

Lufa Farms (www.lufa.com) has already built two rooftop gardens totalling more than 70,000 ft² in Montreal and Laval, and has plans to expand its model into the US in the near-future. According to the company, its prototype Montreal garden feeds approximately 2,000 people locally. Crops are grown hydroponically using irrigated rainwater, and temperatures can be remotely controlled using an iPad. Although the high energy costs for such projects may hamper widespread adoption, this may be countered by the savings made on space requirements. Evidence also suggests that rooftop gardens can keep buildings cool and also combat climate change by reducing carbon dioxide and air pollution levels – meaning that they are attractive in ways that go beyond mere aesthetics.

Turning an abandoned terminal into prime real estate in Manhattan would not come as a surprise, but converting it into a subterranean park just might. The Lowline (www.thelowline.org), set for completion in 2018 and funded by Kickstarter supporters, will provide a pleasant environment and respite from the crowded streets above, while remote skylights will illuminate the space with photons from the Sun. While the plans do not include edible gardens, as the climate continues to change, the prospect of public spaces below the surface becomes ever more appealing. Already, Zero Carbon Food (www.zerocarbonfood.co.uk) is growing food in a World War II bunker beneath London, so it is likely only a matter of time before this idea takes off stateside.
In 2015, Vancouver's city bylaws will dictate that 70 per cent of organic food scraps be diverted away from landfills. Crowdfunded venture Urban Stream (www.urbanstream.ca) aims to utilise this change to introduce zero-mile micro-farms to the city's kitchens. By combining vermicomposting with hydroponics and mushroom growing, micro-farms eliminate waste while enabling the growth of fresh greens and herbs right on the grower's doorstep.

Many researchers consider high-rise farming a viable option for mitigating future food shortages and driving down emissions, and one place where the practice is beginning to take off is Chicago. The city is home to the largest indoor vertical farm in the US, a 90,000 ft² converted warehouse operated by Farmed Here (www.farmedhere.com). The initiative is a pioneer for aquaponics, which combines aquaculture (raising fish) with hydroponics (growing plants in water rather than soil) to create a symbiotic, tight-knit ecosystem. The process is free from herbicides and pesticides, uses up to 97 per cent less water than conventional farming and can be built upwards rather than outwards, saving on space.

Boston's new zoning ordinance – 'Article 89' – enables urban farming to thrive by turning vacant lots into farms and promoting food localisation. So far 20,000 ft² has been designated, and there is even a proposal for a skyscraper farm. In addition to this, Boston shipping containers – which have already been used as low-cost housing for a number of years – are now being modified by Freight Farms (www.freightfarms.com) for the growth of plants in vertical towers, using a system of eco-friendly LED grow lights and drip irrigation.