Can small-scale urban farming contribute to both food security and biodiversity conservation?

Dave Goulson, University of Sussex, School of Life Sciences, Elizabeth Nicholls, University of Sussex, School of Life Sciences, Adrian Ely, SPRU, University of Sussex Business School, Helena Howe, University of Sussex, School of Law, Politics & Sociology, Pedram Rowhani, University of Sussex, School of Global Studies, Parthib Basu, University of Calcutta, Centre for Pollination Studies

BACKGROUND

In a world of increasing urbanisation, producing food in and around cities has the potential to improve both nutritional and health outcomes (SDG2, 3), alleviate poverty (SDG1) and provide habitat for wildlife (SDG15). Currently few data exist regarding the productivity of urban growing, and the unregulated use of agro-chemicals has potential implications for human and environmental health. As an inter-disciplinary team of researchers with expertise in ecology, remote-sensing, science policy and environmental law, our aim was to develop a citizen-science methodology which could be used to examine the potential for urban growing to contribute to sustainable food production in two geographically distinct areas; allotments and gardens in Brighton & Hove, UK and urban and peri-urban farms in Kolkata, India.

METHODS

Urban farming is typically small-scale and poorly regulated, therefore engaging farmers in data collection was hypothesised to be an effective approach where access to farms and formal records is limited. Methods were first piloted in Brighton & Hove. 185 growers were provided with training to collect the following data from their allotment or garden:

1) Insect visits to flowering crops
2) Weight of produce harvested from insect-pollinated crops
3) Frequency and severity of pests and diseases and control methods used

A ‘world café’ and online questionnaire were deployed to learn more about growers’ motivations and attitudes towards the environment.

FINDINGS

On average, growers harvested 70 kg (range 2-259 kg) of fresh produce from their growing space, equating to a yield of 1 kg per m² (10 tonne/ha), with some growers producing up to 9.7 kg/m² (97 tonne/ha). This compared favourably with conventional crop yields (Oilseed rape =3.6 tons/ha, Wheat= 9 tons/ha). Limited pesticides were used (<4% used non-organic insecticide sprays), barring slug pellets which were deployed by 58% of growers. Urban growing in the UK context is therefore likely to be beneficial to life on land (SDG 15) both by providing habitat and reduced environmental damage compared to conventional farming, SDG11 calls for sustainable human settlement planning and management, and there is a substantial role for urban farming to provide this, for example via improved access to green space and flood resilience.

Converting yields into the cost of buying organic produce from a supermarket, the maximum reported value of an annual harvest was £2300, with urban growers producing, on average, £550 worth of fresh fruit and vegetables per year (note this is likely an under-estimate as it considers insect-pollinated crops only). £380 worth of produce was directly ‘owed’ to insect pollination, per grower, per year, confirming that pollination is as vital to urban agriculture as it is to conventional farming.

The main rationale people gave for urban growing was relaxation and the satisfaction of growing their own food, corroborating previous suggestions of additional health benefits aside from nutrition (SDG3).

CONCLUSIONS

We are some of the first to quantify the potential for urban growing spaces to contribute to food security (SDG2, 3), alleviate poverty (SDG1) and provide habitat for wildlife (SDG15). Our methods for involving growers in the collection of data could easily be adapted for other countries, and are currently being implemented in Kolkata. Still to be analysed are data which will determine whether current urban pollinator populations provide adequate pollination to maximise crop yields.