Allotments in the Future

Sarah M Ayling[1*], Sarah Bunney[1] and Neil Phillips[1]

1 Department of Geography and Environmental Management, University of the West of England, Bristol, BS16 1QY

.

EXTENDED ABSTRACT

Allotment gardening has a long history in the UK and has gone in and out of popularity over the last 250 years. Allotments were initially created in response to social unrest among rural labourers who had been left with nowhere to grow food for their families following the enclosure of common fields in the 1700 and 1800s. The importance of allotments and private gardens in producing food during both the First and Second World Wars when 1,500,000 plots produced over 20 million tons of food is well known [1]. Since the Allotment Acts of 1887, 1890, 1907 and 1908 local authorities have had an obligation to ascertain demand and provide sites for allotments. The 1925 Allotment Act stated that land purchased by councils specifically for allotments cannot be sold or converted to other uses without ministerial consent (a Section 8 Order) [2]. However, post 1960, an overall decline in the popularity of vegetable growing, combined with pressure for land within or on the outskirts of settlements for housing and business development, lead many private owners, such as the Church or England and British Rail, as well as some local authorities to sell off sites [1].

Over the last 25 years there has been resurgence in the popularity of allotments and home grown food in the UK. There are many factors behind this resurgence including concerns over the environmental costs of food transport and packaging [3] and the use of chemicals in food production, an interest in fresh home-grown produce [4] and awareness of the physical. Mental and social benefits of being out of doors [5] and desire to become part of a community [6].

In 1996, in UK, there was an average of 4 people waiting for every 100 plots but by 2012 around 87,000 people were on waiting lists for just over 152,000 statutory plots managed by principal local authorities, the equivalent of 57 people waiting for every 100 plots [7].

At a more local level, in Bristol alone there are 112 allotment sites of which 93 are owned or administered by Bristol City Council. These 93 sites comprise 3920 plots, and in March 2020 there were 521 vacant plots and 5083 people on waiting lists. Bristol City Council's Allotment Strategy mission statement (2018) [8] is 'To work towards the vision of a sustainable Bristol through maximising the participation of its citizens in allotment gardening by the improvement of allotment sites and their management, and through the promotion of the benefits and enjoyment of allotments and food growing.' It is a requirement of the Allotments Acts 1908 that an allotment authority must consider providing allotments where there are 6 people or more requesting to rent allotments [1]. However the Bristol City councils own strategy document (2018 [8]) states that 'Further surplus land is likely to be declared surplus over the next ten years unless demand increases significantly on those sites, whilst some are likely to remain as open space for the foreseeable future' , reflecting the fact that demand and supply are not always in the same location.

There are many different types / models of allotment sites and community garden. Ranging from semi-commercial scale schemes, such as the Sims Hill shared Harvest group in Bristol [9] where there is a 'farm manager' who coordinates activities on the site, and members volunteer to help in return for part of the crop with the remainder of the crop being sold, to garden squares [10] and small community flower beds that may only be a few meters square.

*Tel.: +44(0)117 328 1344.

E-mail address: sarah.ayling@uwe.ac.uk

However the traditional allotment garden usually consists of a number of 250 m^2 plots, often laid out in more or less straight rows.

Some sites have water supplied direct from the mains while others rely on incident or collected rainwater. Even when mains water is included in the rent charged for an allotment plot the amount is usually limited and there can be tensions between people who use little water and those perceived as using more than their fair share. The number of water trough or taps are usually limited and people whose plots are some distant from the tap may have difficulty carrying water to their plot. Some sites allow plot holders to put up a shed while a few have a communal hut and even fewer a toilet. The NSALG has for many years been encouraging plot holders to (predominantly) use rainwater, and many growers consider that rainwater is better for plants than tap water [11].

As part of the Drought Risk and You (DRY) project we have been speaking to members of the NSALG, allotment groups and professional horticulturalists to develop a greater understanding of water use on allotments and for growing crops. There is a great deal of published information and guidance for growers and community garden groups on which plants to grow in different situations and the most effective way to utilise available water from all of the gardening organisations in the UK and the government [7, 11]. Watering and water availability was an important concern for all the people that we spoke to. This highlights the importance of collecting, storing and using water effectively to ensure an adequate supply of water throughout the growing season

The UK climate change projections (UKCP2009 and 2018) predict that within the next twenty to thirty years the UK will experience warmer and wetter winters and hotter drier summers [12] Computer modelling for the catchment of the River Frome, conducted as part of the Drought Risk and You (DRY) project indicated that in the Bristol region by 2050 we could expect 2.8 - 3 ^oC rise in summer temperatures and a rainfall deficit of 19.8 - 20 mm compared to the 1961 - 1990 average [13]. Higher summer temperatures will increase the amount of water lost by evaporation and evapotranspiration, and is likely to increase human demand for water. The reduction in summer rainfall is likely to further increase pressure on existing water supplies not just for gardening but also for public water supply and recreation. This reinforces the importance of collecting and storing water during the winter when for the UK rainfall normally exceeds water use or during periods of high rainfall in summer.

The way in which allotment sites are traditionally arranged and managed does not always support this, because water storage and water use efficiency is a secondary concern when the sites are created. We have considered how an allotment site could be organised if water is placed at the centre of the design.

More efficient use of water in a garden or allotment can be achieved in several different and complimentary ways: rainwater collection and storage, site layout to minimise run-off and improve water infiltration, cultivation methods to improve soil water holding capacity, choosing plants that need less water, improving watering efficiency.

Rainwater Storage and collection

On most allotment sites plots are managed individually, rainwater collection is at the discretion of the individual plot holder and on some sites this may not be possible because of local rules that prevent plot holders erecting permanent structures. Members of the NSALG have shared with us many of the inventive ways they have found to collect and store water [11]. However there is a limit to the amount of water that an individual can collect and store and concerns have been raised about the environmental cost of multiple plastic water butts [11]. It is more efficient to collect water and store it on a larger scale, either as a centralised site water

*Tel.: +44(0)117 328 1344.

E-mail address: sarah.ayling@uwe.ac.uk

collection and storage facility or using a semi- distributed system where neighbouring plot holders share water. Our analysis suggested that for most allotment sites a semi-distributed rainwater collection and storage system would be the most practical because it would increase the amount of water that could be stored and minimise the distance between source of water and site of use. At the same time it would encourage neighbours to cooperate with each other and this would encourage plot holders to develop a sense of place and responsibility/ownership. Although nothing would prevent a selfish individual from using more water than their neighbours because the number of plot holders sharing a common water source is small those individuals would be easily identified. It would also mean that all plot holders were close to a source of water so that people who could not easily carry watering cans would not be disadvantaged. During the winter when rainfall normally exceeds demand for water the excess could be diverted to the lowest part of the site, perhaps to an area that typically is wetter and more prone to waterlogging to create either a small pond or bog garden that would contain a variety of flowering plants such as water mint (*Metha aquatic*) or yellow flag irises (*Iris pseudacorus*) that would help to encourage pollinating insects but that can tolerate drier conditions in the summer.

Site layout

Few allotment sites are completely flat or uniformly well drained. Regularly used paths inevitably become compacted, and water does not infiltrate into the soil easily. Ideally permanent paths should be laid out following the contours of the site. This will reduce runoff during periods of intense rainfall (rainfall intensity is predicted to increase in the near future) and encourage infiltration into the soil since the compacted area of soil under the path will act as a barrier to through-flow in the surface layers of the soil. If there is an area that tends to be wetter than others this is the ideal place to site a wildlife area with either a small pond or bog garden. An area dedicated to wildlife will help to encourage pollinators and increase biodiversity. This is also beneficial to animals such as hedgehogs, frogs and toads that eat many of the invertebrates that are considered to be pests on allotments such as slugs and snails. Just as scale offers benefits in terms of efficiency of water collection so does site delivery of compost or manure. Ideally there should be a central area where bulky material such as manure can be delivered, and if possible this should be accessible via a paved or concrete track. Not all allotment gardeners will need or want a full sized plot for many people half or even a quarter plot may be plenty and the site should have some areas with smaller plots. Similarly people with mobility problems, whether due to illness, age or young children, may not be able to easily tend a conventional plot. Natural England estimates that 42% of population have some mobility problems [14]. These people may prefer to have raised beds or planters and these should ideally be located on a path than is level or on a gentle gradient that can be used by wheelchairs, prams and preferable close to the site entrance so that they can drive to the site if needed. If there is a communal site hut, rainwater could be collected from the roof for use on these smaller areas. Few traditional allotment sites have a communal hut but those that do have shown that it can be an important social focus as a place where people can swap seeds, plants and produce [11] as well as providing a secure storage area of group equipment such as a mower or strimmer. If the communal hut is well planned it might be possible for individuals to have a locker to keep a few tools. There should also ideally be a composting toilet, again located close to the entrance and site hut, as this will make the site more attractive, particularly to people with families. A rota for maintenance and costs could be included in the site rent

Cultivation and within plot layout

E-mail address: sarah.ayling@uwe.ac.uk

Soil structure is important for drainage, water holding and mineralisation of nutrients all of which are critical for plant establishment and growth.

In recent years the 'no dig' approach [11, 15] has become popular, and if followed is very successful in controlling weeds and pests while at the same time improving soil structure. Central to the success of the no dig approach is the setting up of permanent beds surrounded by paths. Even if no dig is not followed it is a good idea to set up permanent beds so that most traffic, and associated soil compaction, is confined to specific areas and the soil structure on the growing areas improves. Permanent beds need not mean having permanent structures, with the associated maintenance and cost; in fact Charles Dowling one of UK leading proponents of 'no dig' suggests that once beds have been established it is better not to have wooden boards lining the plots as these provide hiding places for slugs and snails. Having more paths, will mean that the area available for cropping is reduced, however studies of allotments have shown that it is unusual for all the available area to be used for crops. A study of allotments in Leicester [16] found that on average cultivation of fruit and vegetables used 51% of the available area, with hard surfacing, permanent structures ,compost heaps , fruit trees and flowers bringing the used area up to 67-70% leaving around 30% of the available ground uncultivated. Thus losing a few percent of the available area to wider and better paths would have negligible effect on the area used and in fact by improving accessibility might actually increase the amount of ground under cultivation.

Planting to make optimum use of available water

Gardeners have an enormous choice of possible plants that they can grow in the UK, and the variety of crops grown by gardeners is increasing as the ethnic range of the population increases and people want to try crops that they have seen whilst visiting other countries. Whilst working on the DRY project many growers and gardening organisations shared with us their advice on the best crops to grow to make use of the available water.

In general plants that can be sown during the autumn and that develop their root system during the winter will be in the strongest position when making optimum use of available water because they will be growing and using water at the time of year when rainfall exceeds water use. Corn salad, land cress and oriental salad leaves (such as komatsuna, mibuna, mizuna, mustard and rocket).will provide leaves through the autumn, and winter if sown in early autumn while the soil is warm and covered with a cloche, cold frame or fleece.

Autumn sown broad beans, Swiss chard, kale, spring cabbage, chicory produce an early crop (late spring/early summer) when vegetables in the shops are expensive. Perennial plants, such as asparagus and rhubarb or perennial varieties of crops usually grown as annuals such as Swiss chard, kale, globe artichokes or welsh onions are also able to make use of water early in the growing season, when other vegetable crops may be in short supply and expensive.

Some varieties are more drought resistant than others. For example, Cos lettuce requires less water than cabbage lettuce (such as Iceberg or Webs Wonderful). 'Cut-and-come again' salad leaves (like Lollo Rosso) require less water than soft lettuce (such as Little Gems).

Improving efficiency of water use.

During hot dry spells watering can be a time-consuming task for gardeners however by using water in the most efficient way the time and amount of water needed can be dramatically reduced. Efficient water use is important at every stage of plant growth. When planting seeds, as many experienced gardeners will tell you, if you water the drill before putting the seeds in you are ensuring that the seeds are being paced in the optimum conditions for germination. If you water after you have planted the seeds some seeds are likely to be sheltered from water by stones or other debris in the soil. The increase in humidity in the soil compared to ~~in~~ the seed packet will trigger the seed to begin germination. The developing seedling will start to respire using up energy stored in the seed, but there must be sufficient water available to completely hydrate the seed to allow the developing cells to expand and encourage the seedling to grow. Once seedlings have germinated watering should aim to encourage the development of strong deep roots, the best way to do this is to water close to the base of the plant and rather than sprinkling every day, which encourages roots to develop at the surface where they can quickly dry out to give less frequent more thorough soakings. The practical use of trickle irrigation which provides a slow gentle supply of water to the roots is most effective. Mulching also helps to increase the efficiency of water use because it reduces the loss of water from the soil surface by evaporation while at the same time promoting the development~~s~~ of good soil structure. Grouping plants by water needs also ensures that water is used most efficiently. Thus leafy crops like spinach, lettuce, rocket, and plants very sensitive water stress such as tomatoes could be grouped together, close to the water supply and crops that will grow without much added water such as potatoes, sprouts and leeks could be further away.

CONCLUSION

We envisage an allotment site with a range of different sizes of plots, arranged in groups of 4-6 around a shared water collection point, this could be incorporated into some type of awning and bench. Excess rainwater could be led, perhaps via French drains to a boggy area or pond that formed a focus for wildlife. The plots would be separated by well-maintained paths that were wide enough to allow wheelbarrow or wheelchair movements, and which followed the contours of the site. Groups of plots would be separated by a made up paths coming from a central hardstanding. The hardstanding would be the site of a communal hut and toilet, drop off area for bulky materials like compost and also be surrounded by a mixture of raised planters and small beds suitable for wheel chair users or other with limited mobility. Some of the smaller plots could be dedicated to flowers to encourage pollinators. Also close to this central area would be an area where children could play.

This design would encourage a wide mix of different people, the grouping of facilities into things shared by a few people would help to promote neighbourliness and sense of place and deter selfish behaviours. By making the site attractive to families and disabled people it would likely be used for more of the time and this would help to deter vandalism. These benefits would be on top of the already demonstrated benefit of allotment gardening in reducing food waste, encouraging a varied diet with fruit and vegetables and improving physical and mental health.

References

*Tel.: +44(0)117 328 1344.

E-mail address: sarah.ayling@uwe.ac.uk

1 Way T. (2008) Allotments. Shire, Oxford, UK ISBN 978-0-7478-0681-3

2 Allotments Act (1925) http://www.legislation.gov.uk/ukpga/Geo5/15-16/61/section/8/enacted accessed 26 April 2020.

3 Business Insider (2019) 80% of British Food is Imported. https://www.businessinsider.com/no-deal-brexit-percentage-british-food-imported-shortages-2019-1?r=US&IR=T accessed 2 March 2020.

4 Perez-Vazquez, A., Anderson, S., Wiltshire, R., Fraser, R. (2010) Valuing non-market benefits derived from allotments in southeast England: A contingent valuation study. The International Journal of Sustainable Development and World Ecology : 103 - 112. doi.org/10.1080/13504500609469665.

5 Soga M, Gaston KJ, Yamaura Y (2016) Gardening is beneficial for health: A meta-analysis. Prev Med Rep. 5:92-99. doi:10.1016/j.pmedr.2016.11.007

6 Kingsley, J., Foenander, E. & Bailey, A. (2019) "You feel like you're part of something bigger": exploring motivations for community garden participation in Melbourne, Australia. BMC Public Health 19, 745. https://doi.org/10.1186/s12889-019-7108-3

7 Ministry for Housing, Communities & Local Government. (2012) Space for Food Growing Guidance for community groups wanting to start a food growing project.

8 Bristol City Council Allotment Strategy (2018) https://www.bristol.gov.uk/documents/20182/34316/Allotments+Strategy+final+version+Cabinet+accessible.pdf/b4e74564-b770-493c-b857-ec5760bb9f54 accessed 1 February 2020.

9 https://simshill.co.uk/

10 https://en.wikipedia.org/wiki/List_of_garden_squares_in_London

11 DRYproject (2020) Dry Utility Story Bank https://dryutility.info/category/agriculture-and-horticulture/

12 MetOffice (2018) UK Climate Change Projections .https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/index

13 Climate change scenarios for R. Frome catchment (2020) Dry Project https://dryutility.info/story-maps/sectors/agriculture-and-horticulture/frome/).

14 Natural England (2013) Facilitating Disabled Access. http://publications.naturalengland.org.uk/file/7931908 natural eng access

*Tel.: +44(0)117 328 1344.

E-mail address: sarah.ayling@uwe.ac.uk

15 Dowding C. No dig https://charlesdowding.co.uk/start-here/ accessed 1 march 2020'

16 Edmondson, J.L., Childs, D.Z., Dobson,M.C., Gaston, K.J., Warren, P.H., Leake,J.R. (2020) Feeding a city – Leicester as a case study of the importance of allotments for horticultural production in the UK. Science of The Total Environment, 135930 doi.org/10.1016/j.scitotenv.2019.135930

*Tel.: +44(0)117 328 1344.

E-mail address: sarah.ayling@uwe.ac.uk