



# Hyphen 77

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# Cities and municipalities in climate change – allotment gardens make the difference

Eva Foos

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In urban and rural areas we are facing major challenges worldwide. Especially in the richer countries, humans are living far beyond the earth's regenerative capacity. The consequences are frightening: species extinction, soil erosion, forest dieback, desertification, water scarcity and pollution, plastic waste in the soil and oceans, climate change.

The sixth assessment report of the Intergovernmental Panel on Climate Change (IPCC) shows the high urgency for reducing greenhouse gases and adapting to the consequences of climate change. From 2025 at the latest, CO<sub>2</sub> emissions worldwide must fall in order to achieve the 1.5 degree target. By 2030, they must already have fallen by 43 % compared to 2019 (!) and by 2050 the world's population would have to live in a climate-neutral manner.

**What can we do to ensure that in 100 and 1000 years the earth is still a living place with a rich biodiversity?**

*Our allotment gardens offer a multitude of positive contributions, possibilities for action and perspectives for more climate adaptation and also climate protection!*

Approaches to solutions are offered by near-natural cultivation systems, such as ecological gardening. They promote a resilient garden structure that is prepared for the adversities of wind and weather and increasing heat and drought. Climate- and environment-conscious soil care, efficient water management and climate- and site-adapted plant selection are crucial levers at the disposal of us allotment gardeners. Allotment garden organisations contribute to the communication of ecological, climate-adapted approaches, not least through gardening advice. In this way it will also be possible in the future to grow healthy food and to contribute to the protection of biodiversity.

But that is not all. Especially in urban areas, our allotment gardens are of great social importance, because allotment gardens are valuable climatic compensation areas, they cool the surrounding area, store rainwater and thus protect against flooding and at the same time provide water for the surrounding vegetation and a pleasant cooling on hot summer days. Of-

ten unrecognised but not to be underestimated, humus-rich garden soils store lots of carbon and thus contribute to climate protection. Allotment gardens and allotment garden sites do not only produce healthy food, invite people to stay, serve as places to experience nature and recreation and are places of learning and meeting, no they are also indispensable as "climate oases".

Many things are changing in society as a whole and in the allotment gardens. Our allotment garden organisations and allotment gardens have a model function and a huge potential to counteract climate change, the development of heat especially in urban areas and the loss of biodiversity. In diverse cooperations and as a strong partner of the local authorities we can use the opportunities and promote allotment garden sites even more as "green climate oases" for all.

# France: Changes due to climate change

Olivier Guérin

Association orléanaise des jardins ouvriers et familiaux (AOJOF)



The gardeners realize that the climate is changing. The proof is in the two years of spring frosts that affected the vines and orchards at the start of vegetation following a particularly mild winter.

This trend has now been confirmed and is accompanied by a generalized disruption of seasonal cycles, with visible consequences on the health of plants and the biology of animal species.

Warming, disruption, climate change: these are all terms that reflect the different facets of climatic changes that have occurred or will occur in the future.

## No more ready-made recipes

Gone are the recipes and the gardening designed as a repetition of gestures responding to a “one problem, one answer” type scheme. We must start to learn from these climatic hazards by changing our approach to gardening practices. Climate change

has the effect of unbalancing systems that were previously stable.

A change of perspective means thinking in terms of “systems”, taking into account a range of environmental considerations and parameters. This climate disruption is still far from being fully understood by climate specialists (IPCC<sup>1</sup>) and it is difficult to foresee the unforeseeable; only predictive models can inform us about the future.

## Climate change in France

In mainland France, the climate has changed since the middle of the 20th century. Between 1901 and 2017, the average annual temperature rose by 1.5 °C. This warming has become more apparent since the 1990s. The effects of climate change are visible: precipitation, heat waves, snowfall, droughts. These effects disrupt the seasonality on which the planning and management of crops in the garden are based.

## The report of the Jouzel mission 2014 (IPCC climatologist)

This report established an initial diagnosis of climate change in France. Since 1947, the frequency and duration of heat waves has increased in most regions.

On the other hand, the number of days of frost has decreased over a large part of the country, as has the duration of cold spells. The report also concludes that precipitation has decreased in winter and summer in the southern region, but also in spring in the south-east, and that rainfall has increased in the northern two-thirds of the country. The development of precipitation is thus contrasted according to region and season. The IPCC climatologists predict a future warming of between 1.5 °C and 4.5 °C by the end of the century. This warming would be linked to a doubling of the atmospheric concentration of carbon dioxide (CO<sub>2</sub>).

### Climate projections

As the evolution of all these factors is difficult to predict, the IPCC climatologists have retained four scenarios for projecting greenhouse gas emissions to predict the future of the 21st century.

### Understanding the climate (Greenhouse gases and the Gulf Stream)

#### Greenhouse gases

Human activities since the industrial era have caused an increase in the concentration of greenhouse gases (GHG). These gases (methane, carbon dioxide, nitrous oxide), through their ability to absorb and then re-emit the energy radiated by the earth's surface, are causing the earth's surface to warm up (+ 1 °C since 1880) and part of the atmosphere.

This is known as the greenhouse effect. This natural phenomenon is essential for life on earth. Without it, the temperature of our planet would be -18 °C compared to the current average of 15 °C. Carbon dioxide (CO<sub>2</sub>) is partly responsible for this climate change, accounting for 70% of emissions. This gas, while warming the planet, also has a beneficial effect on plants (photosynthesis and growth). The question scientists are being asked is what would happen if this rate were to increase? L'INRAE<sup>3</sup> researchers replied that each plant species would behave differently, e. g. by modifying their photosynthetic activity.

#### The Gulf Stream

The engine of this machine is located in the Atlantic Ocean where cold water



currents from the North and warm water currents from the South meet. This does not produce warm water, but releases enough energy to warm the air and create a mild, temperate climate over continental Europe. The scientists' fear? If the temperature rises by a few degrees, the machine could go haywire and prevent the Gulf Stream from reaching Europe.

#### Impacts on pests and plants

Global warming is most often assessed in terms of the increase in average annual air temperature. Thus, an increase in temperature in winter, spring, summer or autumn will not have the same biological impact on pests and plants.

#### Winter warming

It favours the survival and expansion of many species. Specific survival temperature thresholds exist for the winter development of certain spe-

cies and the sequence of their growth stages (eggs, larvae, adults). Even a small increase in temperature also allows the conservation of species in areas with harsh climates. For example, the pine processionary caterpillar has been migrating significantly northwards and upwards since the mid-1990s. The reduction or absence of frost favours the survival of pathogens.

#### Spring warming

Spring droughts have become frequent. These episodes accelerate the development of pests in ectothermic<sup>1</sup> organisms, as their body temperature and associated physiological processes are directly dependent on the ambient temperature. E. g.: For the pea aphid, the minimum threshold for resumption of activity and development is generally around 4 °C. Warmer weather results in earlier and more extensive mild periods, where tempera-

<i>Evolution of greenhouse gas emissions between 1980 and 2100</i>				
Temperature increase (°C)	3,2 to 5,4 °C	2,0 to 3,7 °C	1,7 to 3,2 °C	0,9 to 2,3 °C
Percentage of CO <sub>2</sub> <sup>2</sup>	> 1000 ppm	720 to 1000 ppm	580 to 720 ppm	430 to 480 ppm
Situations and consequences	Laisser-faire without regulatory policies	Intermediate development	Intermediate development	„Soberly“ in accordance with the Paris Agreement of 2015
<b>Comment:</b> There is a close correlation between the increase in temperature and the concentration of carbon dioxide (CO <sub>2</sub> ).				



tures exceed this threshold and accelerate the early appearance of adults. This is also the case for the box elder moth, where temperature favours the lifting of the winter larval diapause, facilitating adaptation to new environments. Another phenomenon, the desynchronisation between the hatching of young insect larvae and the later appearance of the nourishing foliage, creates starvation and mortality of the pests. This phenomenon has positive impacts on plant damage.

#### Summer warming

Under the influence of heat waves and hydric stress, the resistance of plants decreases and leads to an increased infestation of certain pests. E. g.: mites on cucurbits which develop in dry weather. This stress also induces an increase in the nitrogen content in the plants' elaborated sap, which favours the growth and reproduction of aphids. The geographical range of some insects can also be observed to shrink. This is the case with the pine processionary which has disappeared from southern Tunisia since 2003 due to the increase in summer and autumn temperatures.

#### Autumnal warming

Insect species with short generations could present several generations per year under favourable autumn conditions, leading to repeated damage

over time on the same plants. For example, for aphids, an increase of 2 °C would allow certain species to go from 18 to 23 generations per year in the United Kingdom.

#### Impact on plants

Rising temperatures will accelerate plant development, while changes in humidity and associated droughts may weaken plants against pests. Similarly, the predicted increase in atmospheric CO<sub>2</sub> tends to increase their rate of photosynthesis and stimulate their growth and vice versa. This increase would also alter the composition of their tissues while reducing their nutritional value and physical resistance to pests. There are questions about weed populations. Indeed,



species capable of germinating over long periods could be favoured, and the disappearance of frost periods would no longer allow the elimination of freezing species. However, these changes will not be uniform over the territory and may vary according to the flora already in place.

#### Invasive species in warm regions

Globalisation favours species from tropical or subtropical areas in Europe. Until now, their establishment was constrained by winter conditions. Thus, 400 species of insects originating from these regions were already established in Europe at the end of the 2000s. But they remained confined to their point of introduction, usually in the Mediterranean area. Warming, especially in winter, could allow their expansion into other regions, as well as the establishment of new exotic pathogens.

#### Understanding and adapting your garden

Although gardeners have always been able to adapt to climatic variations, they must now put in place strategies to cope with the climatic events that are set to multiply.

#### Possible adaptation strategies:

*Avoiding the climatic constraint:* sowing date and varietal precocity for summer crops. This means sow-



ing earlier in the spring, taking advantage of the anticipated warming of the soil in order to avoid the thermal and hydric stresses that can affect plant growth. In the longer term, the disappearance of winter frosts could make it possible to anticipate autumn sow-

ing for certain species. The advance of sowing dates and the choice of varieties reflect a possible self-adaptation. The selection of varieties tolerant to low temperatures at the beginning of the cycle is also a new direction.

#### Conserving water resources through tillage and residue management:

Capturing and storing more water in the soil and avoiding losses through evaporation is a way to strengthen the resistance of crops to water shortage. Minimal tillage and covering with living mulch and or mulches. Managing organic matter will increase infiltration and water storage while promoting the development of the root system.

#### Diversify crops within the plot (varietal mixes)

Incorporate more systematically more resistant and/or more resilient species if they are not highly productive. Try to introduce species that consume less water in the rotation (e. g. chickpea).

#### Extend cropping periods

Introducing relay crops, where the second crop is planted within the main crop.

Possible solutions are to be combined according to the situation (crops, regions). It will be necessary to find more resilient systems that are implemented step by step over a short or long term time horizon. It would be counterproductive to implement crop systems that would increase the production of greenhouse gases. The big winners of global warming are certainly the crop pests: rising temperatures increase their living range with a tendency to expand from the South to the North.

Read also the article: "Climate change and allotment gardens: what to do" published in the Trait d'union no 75 page 15.

Sources: Phytoma: La santé des végétaux (climats et santé des plantes)

1 IPCC: Intergovernmental Panel on Climate Change

2 ppm (parts per million, CO<sub>2</sub> equivalent)

3 Ectotherme: remplace le terme « à sang froid » car la température interne n'est pas à proprement parler plus basse.

# Belgium: The underestimated role of allotment gardens in improving cities' adaptation to climate change

Willy Goethals

Honorary président of the allotment gardenparc „Slotenkouter“ in Ghent



## Abstract

Urbanization results in an increasing proportion of the population living in cities. In Europe it is expected that in a not so far future around three quarters of the population will live in urban settings. Urban living limits access to nature and can increase exposure to certain environmental hazards, such as air and noise pollution. Many urban areas face increasing pressure from expanding populations, limited resources and growing impacts of climate change. These challenges must be addressed in order for cities to provide healthy and sustainable living environments.

Green infrastructure is a salient approach to address climate change adaptation in cities. However, some

green infrastructure like allotment gardens are rarely incorporated in resilience and adaptation plans. In this article we argue that allotment gardens should be a prioritized element of green infrastructure to improve adaptation to climate change. Allotment gardens can reduce urban heat islands, provide various ecosystem services and they are a health-promoting setting for all members of the urban community. From a socio-economic perspective, these gardens also build trust, facilitate participation, improve responses to environmental hazards such as air pollution or noise and food security – all vital components of effective adaptation and resilience to climate change. Yet, qualitative analysis of federal, municipal policy documents found that green infrastructure to improve climate change adap-

tation seldom acknowledge the role of allotment gardens. Furthermore, allotment gardens historically emerged in cities to respond to stressors like economic, social, and political instability. Therefore, policies that address climate change should explicitly incorporate allotment gardens.

## Opportunities for allotment gardens to contribute to climate change resilience in city policies

Plenty of cities have their own agriculture program acknowledging that allotment gardens can increase the availability of fresh local produce, develop the local economy, improve the natural environment, convert vacant lots to productive uses, provide educational opportunities and improve



community resilience. While these benefits are explicitly proclaimed, there is a disconnect in incorporating allotment gardens in large scale policies for addressing climate change resilience. Indirectly, allotment gardens can connect people to their natural environment, educate them about climate change by demonstrating how food choices can impact the climate, and foster a connection between people and their environment.

Despite the diverse benefits of allotment gardens, one has to acknowledge that they are not a panacea for socio-ecological resilience to climate change.

While the integration of allotment gardens as green infrastructure into climate action plans can benefit both social and ecological systems, this type of „agriculture“ can be socially divisive if used for the wrong purposes.

Research on urban agriculture suggests that gardens can be used as a grassroots initiative to encourage economic and food justice. Policies should therefore ensure that gardens are organic, do not develop into greenhouse gas emitters, and refrain from discriminatory or exclusionary practices. Policies can reduce barriers to establishing and maintaining allotment gardens and at the same time create incentives for their construction, provide land for gardening and support the specific needs of allotment gardens. Although allotment gardens can strategically improve resilience to ecosystem services and climate change, they are currently an underutilized resource in urban policy and planning, as cities prefer green infrastructure with relatively little management.

Unfortunately, allotment gardens can also be transitory, particularly when the host cities do not support and invest in them. The lack of government support and the ephemerality of many gardens may make it challenging to include them in policies to address



climate change in cities. Therefore, it ought to be emphasized that cities will need long-term planning and investment that may be difficult for elected government officials to operationalize given the different ideological and political approaches. Unlike the other forms of green infrastructure which are usually managed by the city governments, allotment gardens may provide a decentralized approach to building social and ecological resilience. Furthermore, it might well be that cities do not have enough resources to successfully establish and maintain urban allotment gardens. Because of these complex socio-economic and political factors, it is critically important that approaches to improve climate change adaptation are community-oriented and solicit community participation.

#### Impacts to consider

Monitoring and evaluation starts at the beginning of a project by reflecting on the indicators that should be used to document the project outcomes and impacts, and by incorporating monitoring and evaluation activities in the project timeline and budget.

#### Environmental/ ecological impacts

- What is the impact of the urban allotment garden on air quality,

noise or urban heat exposure?

- Does it support water management and reduce risk of flooding?
- Does it support contact to nature?
- Does it enhance biodiversity?

#### Lifestyle impacts

- Does the urban allotment garden increase physical activity levels?
- Does it enable active transport by foot or bike?
- Does it increase the time people spend outdoors?
- Are more people using this 'green space'?
- Does it support healthy lifestyles and active recreation?

#### Social impacts

- Does the urban allotment garden support or enhance social cohesion?
- Does it promote social interaction and exchange?
- Does the development of this 'green space' support gentrification processes leading to displacement of local residents?

#### Equity impacts

- Can all population groups make use of and benefit from this 'green space'?
- If not, who are those groups that benefit least or even face disadvantages?



- Does this 'green space' enable different functions for different user groups?

## Conclusion

Historically, allotment gardens emerged as powerful responses to economic or political crises. Today,

they are not sufficiently recognized in city policies to address climate change and are therefore underutilized in resilience planning. It is widely known that cities tend to focus on green infrastructure such as parks, playgrounds or public vegetation and that all are primarily managed by city officials and unfortunately misses an opportunity to engage the community. Nonetheless, international studies repeatedly show that community managed green infrastructure like allotment gardens have multiple socio-ecological benefits and promote the participation of community stakeholders by increasing their overall adaptive capacity for climate change. The disconnect between historical uses of gardens and today's city policies, provokes several questions.

## References

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<sup>1</sup> A grassroots initiative is one that uses the people in a given district, region or community as the basis for a political or economic movement. It uses collective action from the local level to effect change at the local, regional, national or international level. Grassroots initiatives are associated with bottom-up, rather than top-down decision making, and are sometimes considered more natural or spontaneous than more traditional power structures.

# Germany: What do our small gardens have to do with climate change?

Very much. Because many of the planetary pressures are reflected in our gardens.

**Eva Foos**

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*Soil care and protection are essential to strengthen the resilience of gardens to adversity in wind and weather and other stressors.*



*In a pond or with rain barrels, valuable rainfall can be collected and used for watering.*

The effects of climate change, which have been increasingly felt here for years, such as rising temperatures, periods of heat and drought, as well as increased heavy rain and extreme weather events, have an impact on the animal and plant world, on chemical, physical and biological processes. The growing season in Berlin, for example, is starting almost a month earlier compared to 1931. Gardeners, farmers and forest managers are affected.

People who have experience with freak weather and other challenges such as invasive species or emerging pest pressure and are directly dependent on weather and biological processes know uncertainties and are often eager to experiment. One or the other may be delighted by the new possibilities of gardening under the changing climatic conditions, such as growing previously exotic fruits like kiwi and physalis. At the same time,

the new open spaces reach their limits at the latest with late frosts, water shortages or limited irrigation capacities in dry summers.

Large parts of Germany are still suffering from the consequences of the prolonged drought of 2018 to 2020<sup>1</sup>. Groundwater levels have not yet been able to recover. Increasing heavy rainfall is also problematic, as it fails to penetrate the dry topsoil and instead

runs off and is lost to the landscape. Resources that we were used to having in seemingly unlimited supply are “suddenly” becoming scarce. Competent authorities have to ban the withdrawal of water from flowing waters, lakes or ponds for watering, as for example between 2018 and 2020 in the Altenburger Land. By then at the latest, not only gardeners will begin to ask themselves how sustainable land management can continue.

### Near-natural cultivation systems offer solutions

Near-natural cultivation systems, such as ecological gardening, permaculture, which has been popular for years at least in niches, and forest gardens, which are now also becoming better known in Germany, offer approaches to solutions. Here, the focus is on material cycles and interrelationships between the elements of the garden. Careful treatment of the soil and the supply of organic material to soil organisms promote the development of a stable humus soil structure that can absorb and store water well. Thus, well-known methods such as composting and mulching appear in a new light. The selection of site-adapted, drought-tolerant species and robust varieties, as well as the consideration of mixed cultures and crop rotations, favour healthy plant development even in adverse weather conditions. For example, student flowers eliminate rootlets and contribute to the health of tomato plants and other affected crops. If a roof area is available, simple rain barrels and ponds help to collect the valuable rainwater to make the garden less dependent on groundwater and tap water. The creation of diverse micro-biotopes, the promotion of appropriate food plants and the renunciation of chemical-synthetic pesticides and fertilisers also have a positive effect on the severely threatened biodiversity.

Of course, one needs knowledge and practical experience to understand the interrelationships in plant and animal



*The strengthening of biodiversity in the garden also promotes beneficial insects, speaking of containment of pests in the garden.*

life or soil biology and to transfer them to gardening. Plant health, nutrition, site selection and plant choice are complex topics that can raise many questions for the novice gardener. On the positive side, gardening is never boring and invites trial and error. Interested people spend their lives learning, discovering previously unknown animals and plants, and enjoying changing manifestations throughout the year. And many gardeners are happy to share their knowledge and help out. In the allotment garden movement there is also a good range of advice available from garden advisors and relevant handouts on nature-oriented gardening, for example from the Bundesverband Deutscher Gartenfreunde. The position paper on the ecological upgrading of allotment gardens<sup>2</sup>, the brochure “Nature-oriented gardening in allotment gardens”<sup>3</sup> and the documentation of the BDG seminar on the environment “Climate change also in allotment gardens”<sup>4</sup> offer many gardening tips and further information. The regional federations also campaign for the promotion and climate-conscious management and design of allotment gardens with



Thomas Wagner, BDG

*Gardens contribute to cooling on hot summer days through their evaporative cooling, shaded lounges and as part of cold air corridors.*

publications and, in the case of Berlin, with their own climate campaign.

### Gardens are more than a private hobby

But that is not all. Especially in urban areas, gardens have a social significance that goes far beyond private gardening and the garden fence.

In countries like Brazil and Kenya, gardening, in the context of urban agriculture, is essential for feeding the poorer urban population. In Germany, too, gardens, especially allotment gardens, contribute to a healthy diet and enable a certain degree of self-sufficiency and independence from food imports.

In terms of climate change, gardens represent valuable climatic compensation areas. Particularly larger contiguous green spaces of at least one hectare can form their own microclimate, as the Senate Department for Urban Development and the Environment in Berlin explained in 2016<sup>5</sup>. The often very structured allotment gardens with their hedges, trees and herbaceous plants create a cooler

climate that can have an effect several hundred metres into the neighbourhood<sup>6</sup>. This improves air quality, especially in largely sealed city centres. Gardens are an important part of green corridors with parks, cemeteries and other green spaces that enable air exchange from the cooler surrounding areas to the heated city centres and counteract the heat island effect. In addition, there are thousands of trees, in gardens, along roadsides, in parks, etc., whose shade provides welcome cooling on hot days and which are also habitats for countless animal and plant species.

In addition to the cooling effects, the unsealed garden areas are valuable (intermediate) water reservoirs. Cities like Berlin are reaching their limits with their existing sewage system, a combined sewer system in the inner city area. During heavy rainfall, overflows occur and untreated water ends up in rivers and lakes. A rethink was called for by the water companies and the senate administration. For some years now, decentralised rainwater management has been increasingly promoted. Our allotment gardens also play an important role here. There water can seep away and instead of being lost through runoff, it is available to the surrounding vegetation in hot and dry periods and cools the environment.



Gardens have an even broader significance with regard to climate change. They can help reduce greenhouse gases and thus contribute to climate protection. Who would have thought, but humus stores four times as much carbon as above-ground vegetation and more than twice as much as the atmosphere, making it the largest terrestrial store of organic carbon, according to the German Federal Ministry of Food and Agriculture in 2018. Through soil protection and conservation tillage, gardeners encourage the build-up of permanent humus<sup>7</sup>. The soils in allotment gardens are often deep humus-rich soils, so-called hortisols. This makes them, with over 14 kg/sqm, particularly worthy of protection as carbon stores in the city, surpassed only by forest areas<sup>8</sup>. The trees and shrubs in the gardens also contribute to climate protection as carbon reservoirs. It is not uncommon for allotment gardeners to spend their holidays in the garden instead of flying to distant holiday destinations. There is also potential in working without synthetic chemical fertilisers and pesticides and peaty garden soil, in testing charcoal, in reusing natural materials for planting beds, in increasing bartering and sharing of garden tools and in using electricity from renewable energy sources.



Thomas Wagner, BDG

*Soil that is covered all year round stores water and helps build a stable soil structure.*

### Together we can move a lot

Allotment gardens, and of course other forms of gardens such as community garden projects, appear at first glance to be a private hobby. But with their positive effect on health, nutrition, exercise and social interaction, they are much more. Their great social importance against the backdrop of climate change and the alarming extinction of species often only becomes apparent at second glance. The gardens are small, but there are many of them! Throughout Germany, more than 900,000 allotment gardeners and their families, organised in almost 13,500 associations, garden under the umbrella of the Federation of German Allotment Gardeners and cultivate 44,000 hectares of land. In addition there are about 200,000 other allotment gardens organised in other ways and almost 900 community garden projects throughout Germany.

These figures alone make it clear that we can move a great deal. It makes a difference that we garden and how we garden – for the garden to thrive and for the neighbourhood and environment in which we live and even beyond. Our gardens are essential

for life-friendly communities. Garden associations, garden initiatives and gardeners have a great responsibility to maintain these green oases close to nature and to allow as many people as possible to participate in various ways. In this way, people can experience what a climate- and environmentally conscious life can be.

The preservation and creation of new gardens close to home and spread throughout the city, the containment of advancing sealing and the creation of green and cold air corridors are in the hands of many institutions and people in politics, administration or urban development. It is important to work together to promote ecologically managed, structurally rich and climate-adapted allotment gardens



and other ecologically valuable garden forms and green spaces as an integrative component of the city (de-

velopment) and thus to preserve cities and communities as places worth living in.

1 <https://www.ufz.de/index.php?de=37937>

2 <https://www.kleingarten-bund.de/de/bundesverband/positionspapiere/massnahmen-zur-oekologisc/>

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# Switzerland: Gardening in transition

Climate protection begins in the garden

Christina Bösiger



**Our gardens are changing – hot summers, mild winters, heavy rains and long dry periods: All this presents gardeners with new challenges. It is time to make your own garden climate-proof!**

Reto Knutti is considered one of the world's leading climate researchers. As a professor of climate physics at ETH Zurich, he is one of the main authors of the last major report of the UN Intergovernmental Panel on Climate Change (IPCC). Recently, he said in an interview that without immediate action, a global average temperature increase of five degrees – in Switzerland probably even six or seven degrees – should be expected. Climate change presents us all with new challenges, which of course do not stop at us gardeners. When gardening, the following applies: "The right plant in the right place" and "gardening in the cycle of nature". Those who remain true to this principle should actually be able to continue to achieve a good harvest or enjoy their lush blooms in the

future. However, we will have to take into account a few gardening facts that climate change brings with it. These include longer dry periods and heavy rainfall events as well as a longer growing season and milder winters.

## Climate change and climate protection

"Everyone who actively gardens, whether in their own garden or on the balcony, is a climate protector," says book author Verena Schubert (see book tip). Trees, shrubs and perennials process carbon dioxide (CO<sub>2</sub>) and produce oxygen. On the one hand, every plant helps to break down carbon dioxide. And on the other hand, home-grown fruit and vegetables also reduce transport and thus carbon dioxide emissions. Climate protection and recreational fun in one's own garden thus form – in the truest sense of the word – a fruitful combination.

## Climate-friendly gardening

The path to a climate-friendly garden begins with the soil, whose fertility de-

pends on the nutrient cycle. A plant returns the nutrients it extracts from the soil for its growth when it dies. Harvesting interrupts this cycle – with the harvest, nutrients are withdrawn from the soil, which – as fertiliser – have to be returned if a permanent harvest is to be made. But which fertiliser is the right one? "Synthetic chemical fertilisers and pesticides cause CO<sub>2</sub> emissions in production and can also become environmental toxins," says Verena Schubert. She therefore con-



sistently relies on natural fertilisers and plant fortification: "A good supply helps plants, animals and people to be robust and have good defences." Preventive plant fortification with extracts of field horsetail and comfrey and stinging nettle are, for example, the best plant protection! They increase the resistance of fruit, vegetable and ornamental plants, drive away pests with their smell and help the seeds to grow well. A few, such as tansy and garlic, can also fight fungal diseases. According to Verena Schubert, regular use ensures strong, robust and vital flora that can better withstand frost, heat and drought. In addition, these broths enrich the soil life, which makes nutrients available to the plants, and they also contain nitrogen, phosphorus, potassium and minerals themselves. "The best and cheapest fertiliser is your own compost!" the expert knows: "All garden waste is recycled in the compost and turned into valuable humus." By the way: compost is the ideal substitute for peat, which is unfortunately still used in large quantities. But peat cutting in the peatlands, which store large amounts of carbon dioxide, not only releases the carbon that has been stored since time immemorial in the form of CO<sub>2</sub>, thereby acceler-

ating climate change, but also causes the creatures that live there to lose their habitat forever. Compost instead of peat is therefore the climate-friendly motto!

### Diversity instead of monoculture

Many different plant species, mixed in a colourful way, ensure that the soil is not depleted one-sidedly and basically needs less nutrient supply. Certain plants are good neighbours and can strengthen and protect each other. "This plays a role especially in the vegetable garden," says Verena Schubert. "Onions and leeks planted next to carrots, for example, keep the carrot fly away. Savory protects against aphids, and nasturtiums in turn attract cabbage whitefly caterpillars, aphids and other pests. Cabbage plants and celery also help each other in this way. Celery rust and the caterpillars of the cabbage white butterfly will then be a thing of the past. Lettuce, on the other hand, keeps the infestation of ground fleas on radishes at bay.

*"With effective and simple measures, we can make our green oasis fit and at the same time positively influence the climate,"* Verena Schubert is convinced. Try it out?!

### The pillars of the climate protection garden – tips from Verena Schubert

- If you garden with climate protection in mind, you do so with nature and not against it.
- Garden without the use of pesticides, synthetic chemical fertilisers and peat.
- Go for preventive plant strengthening, the right plant in the right location, plant diversity and compost management.
- Less is more: allowing and waiting are gardening virtues that make a natural garden possible in the first place.

### Gardening in Transition

In her new book "Gärtnern im Wandel" (Gardening in Transition), Verena Schubert reveals how to make a garden climate-proof. On the one hand, she shows promising methods, how to irrigate efficiently and which strategies help to keep the soil healthy. She also introduces plants that thrive in the changing climate.

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# Sweden: Boosting Biodiversity in Swedish Allotment Gardens

Ingrid Rogblad

Responsible for the Environmental certification programme Koloniträdgårdsförbundet Sweden

and in collaboration with Studieförbundet, (adult education organisation) the studies are being coached.

During the pandemic years we elaborated the possibility of distance gathering. We have hosted and broadcasted about 40 free webinars on different gardening and cultivation topics but also about ponds, hedgehogs, bats, birds, gardening, soil and lots of other topics. We reached up to 2500 participants in some webinars and all together we have reached about 10 000 persons. It has been very appreciated among our members and created more unity around our long and narrow country.

When an allotment garden organisation has reached the Environmental certification we inform the landowners, mainly the municipalities and cities, about this long-term work and to get the authorities to acknowledge the great work that is done. This is an important measure for strengthening relations and the “raison d’être”



for allotment gardens in the present competitive situation of land use in the cities.

These last two years we have been a part of the project Rikare Trädgård (Richer Garden). The purpose of this project is to spread knowledge of biodiversity. The “knowledge hub”, rikaretradgard.se, is an accessible and pedagogic site for everything a garden owner needs to know for creating and promoting biodiversity. It consists of guides, for example how to create a meadow, a pond or a bird friendly garden, for example guide to wild bees, create a pond, guide to bee hotels and bird feeding. And sometimes “Doing less is more” when it comes to these issues.

Some highlights have been “Garden bug of the year”, a way to talk about



The allotment gardens are important for promoting biodiversity, with numerous small gardens with a large variety of plants and habitats they are excellent for biodiversity.

The Swedish Allotment society, Koloniträdgårdsförbundet, has for 20 years been working with the Environmental Certification program. These last two years we have put an even stronger emphasis for measures promoting biodiversity, now one of the main criteria for this certification.

Numerous ideas and hacks as well as important scientific background are communicated to our members. Material for studies has been produced

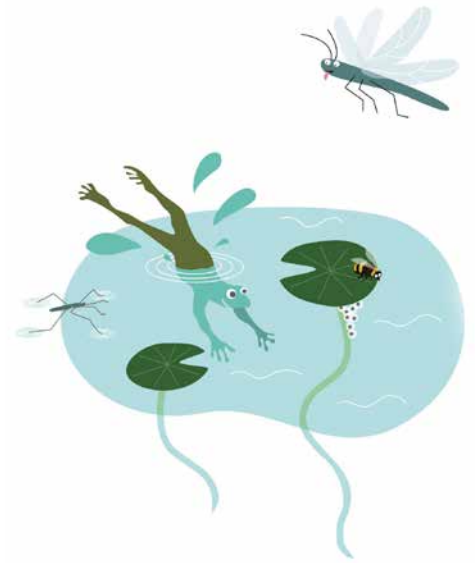


bugs and give attention to species that are contributing to the garden in some way. In 2021 “Green rose chafer” and in 2022 “Migrant Hoverfly”. There is also a yearly theme with guides and articles. In 2021: “Ponds in the garden” and in 2022 “Collect seeds from wild plants and grow them in your garden” in collaboration with the Swedish Botanical Society.



This spring we published a set of 14 different signposts with themes about biodiversity to show in their gardens, when visitors or neighbours might question some arrangements that don't correspond to traditional views on what a neat garden is. The signposts also work like “Conversation pieces” for discussion and exchange of knowledge about biodiversity.

Now, with the rapid change of climate we experience, with heat waves on a regular basis the need for green spaces in the cities is becoming an urgent issue. Our allotment gardens provide numerous ecosystem services such as local climate modification, pollination, as well as being locations for social sustainability. In short, an important greenspace feature of urban landscapes.



# Netherlands: Tips for keeping up with climate change in our allotment gardens

Ans Hobbelink

Board member of AVVN samen natuurlijk tuinieren



*Sophia built a greenhouse from recycled materials on her allotment.*

It is now well established that global warming is the result of human activity. The news for the future is that we humans can also change it for the better.

Message number one is: Take care of our planet, we only have one.

Dry summers, heat waves, mild winters and heavy showers. It will happen more and more often in the future. What does this mean for our allotments and how can we respond to these changes?

## What does AVVN samen natuurlijk tuinieren do?

In all our AVVN communication we make it clear that we can do something about it ourselves.

At our conferences we invite speak-

ers who help us with insights and expertise. In our magazine De Tuinliefhebber we have articles with expert information for our allotment holders every season.

We work with national green and garden organisations to provide information and insight to communities through meetings, papers and webinars. The attached picture shows the manifesto that we jointly brought to the attention of all Dutch municipal councillors and administrators in 2021.

And last but not least, our National Quality Mark for Natural Gardening gives the many participating garden associations a range of options for dealing with climate change.



## Government and governance

Municipalities in the Netherlands are responsible for the majority of allotment parks and collective urban gardens. Policies on trees, greenery, water and urban nature will hopefully get more priority. Our organisation puts pressure on municipal authorities to actually follow up on this. Co-operation between allotment associations and the municipality is essential for climate objectives.



*This shelter is used to collect rainwater.*



*Reuse of natural materials.*

For boards of allotment parks it is sometimes difficult to navigate between the desired climate measures for the garden society and the policy of a municipality. A multi-year policy plan for the allotment association pro-

vides support. Knowledge transfer and exchange with colleague boards are great tools to quickly learn what is needed. Of course knowledge transfer to the allotment gardeners and the people in the neighbourhood is useful and necessary.

### Tips for allotment holders

Obviously there are several factors of importance in what we briefly call the climate crisis. It is clear that we as gardeners, although we cannot prevent a downpour, can be smarter in our use of resources of all kinds.

### *Below is a summary of the tips we give to our gardeners.*

#### Soil

Provide humus-rich soil and ground covers that retain moisture by mulching and composting. Create stepping stones with space for plants instead of a continuous large stone terrace.

#### Water

Create buffers to retain rainwater. Alternate between high and low in your garden design to prevent water run-off and nutrient leaching. Dig wadis and pools to create permanent wetlands with water storage.

Collect as much rainwater as possible in tanks, barrels, ponds, buckets. Any roof or shed can be used. Use tap water sparingly and use rainwater or uncontaminated ditch water for watering your plants. Do not water during the day.

#### Health

Warming leads to heat stress, especially in the cities. Shade from trees

and shrubs in the garden has a cooling effect. Offer a welcome to people from the neighbourhood to walk in your garden park. Another reason to argue for more community gardens in the city. Protect yourself from the sun's rays. Check for tick bites.

#### Planting

In parts of the garden that dry out quickly or are wet, you should plant shrubs and plants that can withstand this. Preferably indigenous with a mix of perennials. The boundaries of native plants shift with climate change, so the assortment will change over the years. Know the type of soil, its salinity, acidity and lime content to be able to choose plantings that thrive. Use many kinds of bushes and shrubs together to make a hedge.

#### Biodiversity

Embrace permaculture and polyculture principles. Garden without pesticides to maintain variation in insect life and healthy plants. A rich biodiversity can better cope with change. As much indigenous planting as possible helps. Mow your lawn in June, plant spring bulbs and other pretty flowers in it. All this is good for soil life, animals and insects.

#### Materials

Do not throw prunings away, but make wooded banks or wood chips. Use organic or ecological fertiliser, detergent, fencing, paint, etc. Use natural building materials. Turn pieces of paving stones and bricks into walls and paths. Recycle as much "stuff" as possible, also for making a greenhouse, shed or gardenhouse.

# Austria: Climate change goes through the hedge

Klaus Wanninger



*blossom on the Cornelian cherry*

If you want to know how the climate around your own garden is changing, you can either buy expensive temperature and climate measuring devices, read meta-studies and expert reports, or you can plant an ingenious climate hedge with 10 native woody species.

As soon as the climate hedge has grown and started to flower, it can be used as a living climate meter. The 10 species of the climate hedge function as extremely sensitive measuring instruments of the atmosphere close to the ground and, with their times of flowering or fruit ripening, show year after year exactly how climate change is affecting our doorstep and when the 10 natural seasons are coming into the country. The natural year has 10 instead of 4 seasons, which are not heralded by a fixed date, but by natural phenomena such as leaf sprouting, flowering or fruit ripening. This natural development depends above all on temperature, sunshine duration and precipitation and can be precisely observed on the 10 plants

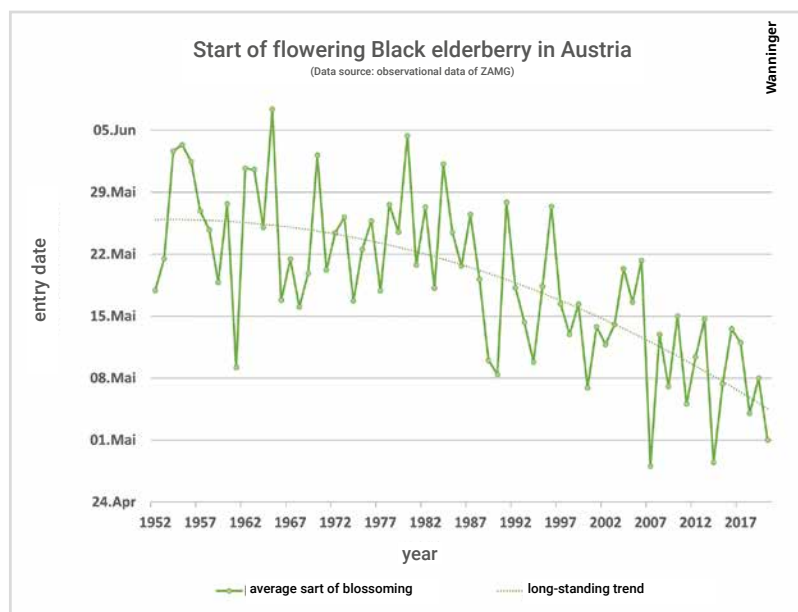


*blackcap in an elderberry bush*

of the climate hedge. Observations over several years make it easy to see how different the individual years are and how the weather and climate change. In this short article you can find out exactly how this works and why the climate hedge is a real multi-tool for the garden.

## The years are getting longer

The average annual temperature in the Alpine region has risen by about 1.8 °C over the last 100 years, twice as fast as the global average. This has an effect not only on us humans, but also on our plants and animals. Spring, for example, with the first bloss-



*Sal-willow**Blossoming blackhorn**Purple willow*

soms or the beginning of leaf shoots, comes about 7 to 10 days earlier than 30 years ago. The start of autumn foliage colouring has also been delayed by a few days in some regions. All in all, this has led to an extension of the growing season by up to two weeks.

### The phenomenal rhythm of nature

In contrast to the common date calendar, the “calendar that nature writes” varies from year to year and from region to region. But the natural year is anything but chaotic! The individual phases of natural development follow one another with consistent regularity. The flowering of the hazel bush can be delayed by over a month from year to year, but then the other early flowering

plants are also later. If you pay attention to the start of flowering of certain plant species, for example, you can divide the spring into an early spring, a first spring and a full spring. This is much more in keeping with the rhythm of nature. Of course, summer and autumn also have their fine divisions and there you have it: 10 seasons! The nature calendar can be written with the help of plants, birds or butterflies. In fact, almost all natural phenomena have a calendar component in them and tell us about the arrival of the natural seasons. This is also the origin of the name of the associated research discipline – phenology.

### Phenology – the knowledge of the phenomena

Phenology deals with the developmental phenomena of plants and animals that recur year after year depending on the weather. Plants, in particular, act as complex measuring instruments for a multitude of environmental factors such as temperature, water supply, previous year’s conditions and much more. The beauty of it is: no matter how complicated the processes in and around the “chemical factory” plant may be, the result is wonderfully simple for every child to see – it is already flowering or it is not yet flowering! It is enough to observe the species of woody plants in the climate hedge over the course of the year and to compare one’s observations with other areas. Then more and more stable images of interrelationships in nature form almost by themselves. What this can look like can be seen, for example, with the black elder in the following figure, which is based on observation data averaged for Austria from the Phenological Network of the ZAMG. The graph shows well how different the individual years are with regard to the time of flowering and what the trend in flowering development looks like. It is impressively evident that elder tends to flower earlier and earlier. Since the 1950s, black elder has been flowering up to three weeks earlier, indicating the be-

ginning of early summer. Whether and how this trend will continue to develop can best be understood with one’s own observations of the Holler of the Climate Hedge.

### The 10 species of the Climate Hedge

The Climate Hedge consists of 10 native woody species, all of which are guaranteed to be of regional origin and whose parents are at home as wild shrubs in the regions of eastern Austria. The regional origin of the plants is important in order to obtain a regionally typical natural development for one’s own climate observations. The following overview shows which indicator function the individual plants have for the arrival of which natural season.

*Blossoms of the black elder**Dog rose**Red dogwood*



Woolly Snowball



Woolly Snowball



Sloth tree

#### Early spring

The natural year begins with the flowering of the Sal willow (*Salix caprea*) and the intense yellow blossom of the Dirndl bush (*Cornus mas*). Important first food for the early risers among the bees.

#### First spring

With the beginning of sloe blossom (*Prunus spinosa*) comes all that we associate with spring: the first warm days, anemones and insect flight, the beginning of leaf growth everywhere.

#### Full spring

While the apple blossom has begun in the orchard, the purple willow (*Salix purpurea*) is showing its first ripe fruits in the climate hedge. The woolly snowball (*Viburnum lantana*) shows its lush umbels of flowers and also

the peony cap (*Euonymus europaea*) and the sloth tree (*Frangula alnus*) begin to open their flowers and attract pollinators.

#### Early summer

The bursting flowers of black elder (*Sambucus nigra*), dog rose (*Rosa canina*) and red dogwood (*Cornus sanguinea*) herald early summer. Plant growth is in full swing, the last stragglers in the leaf shoot are now working at full steam.

#### Midsummer

In midsummer, there is little new to observe in the climate hedge. The black alder is still showing some of its inconspicuous flowers, while the other shrubs are fruiting. Otherwise, it's "business as usual".

#### Late summer

The black elder shows that autumn is not nature's cornucopia. Its ripening fruit heralds late summer. The woolly snowball also joins in, turning its fruiting spikes from pink to deep black.

#### Early autumn

Now the fruits start to appear one after the other. Elder, red dogwood, dirndl, dog rose and blackthorn mark out the colour spectrum. And sometimes the hedge is even still in flower. This phenomenon of sporadic after-flowering is shown by elder, red dogwood and blackthorn from time to time.

#### Full autumn

Now our hedge shows what other colours lie behind the uniform green tones of the foliage! Depending on the weather, the hedge shines colourfully in shades of green, yellow, red and brown. The leaves of the peacock butterfly turn bright red.

#### Late autumn

The shrubs of the climate hedge are gradually losing their leaves, only the red dogwood is still resisting the leaf fall a little. The dirndl has put on eye-catching round flower buds.

#### Winter

The climate hedge seems to be quiet. But there is a lot going on in the background! The fruits of dog rose and blackthorn provide birds with welcome winter food, and the hedge plants themselves are on standby so that they can start again at any time in the coming early spring.

#### Multitool Climate Hedge

With the climate hedge, you can root a real multitool in the garden, comparable to a Swiss knife. In addition to its main function as a living measuring device for climate change in your own garden, the hedge has several other functions in store. It provides rich nectar and pollen food for our pollinator insects and ensures more pollination success and thus yields of fruit and vegetables, offers wonderfully tasty



Sloe



Rose hips



Cornelian cherry



*Black alder blossom*

dirndl, elder or sloe fruits and conjures up magical autumn colours in the garden with red dogwood or common spindle bush. Finally, the hedge offers a small but very special "tool" in the form of the alder tree. The deciduous tree is one of only two native woody species that provides food for the caterpillars of the lemon butter-



*Burning-bush*

fly. And the first sighting of a lemon butterfly is a top indicator for the beginning of early spring, which brings us back to climate observation. With the climate hedge, one's own garden becomes a research station for climate and nature development and every garden owner becomes a true phenologist.



# Finland: Allotment gardeners meet climate change

**Margit Suurnäkki**

Member of the Executive Board of the Finnish Allotment Garden Federation and member of the working group for sustainable development



Marjaniemi Allotment Garden in Helsinki was established in 1946 soon after the war. Due to food shortage and high demand for allotment garden plots, the City of Helsinki sped up the decision to establish a new allotment garden in Eastern Helsinki.

This year, we asked the gardeners of the 75-year-old Marjaniemi Allotment Garden what kind of future they dream of. One part of our survey was ded-

icated to environmental questions. The survey questionnaire was sent out to the gardeners at our 320 plots. More than 130 people participated in the survey and shared their views and ideas for the future.

Allotment gardeners in Marjaniemi want to build a good and sustainable future. They appreciate ecological farming and local food. They want to learn how to avoid pesticides, toxic chemicals, and plastic in their gardens. One gardener says, "My dream is that ecological gardening comes first. Using toxic chemicals to get rid of weeds is not sustainable."

Allotment gardeners struggle between science and old beliefs and habits. Many of them expressed a need for trustworthy information and training on ecological gardening.

## Allotment gardeners adjust to climate change

Allotment gardeners cultivate a small piece of land; however, their impact is bigger than the size of their plots. Allotment gardens are typically old, and therefore especially valuable. These old gardens have developed a rich and diverse vegetation cover and thus contribute highly to the diversity of nature in the city.

Allotment gardens have a role in carbon sequestration. Various flowering plants are beneficial for both insects and birds who eat these insects. Also, allotment gardeners enhance the circulation of biomaterial. It's in their

DNA. Composting garden waste is a natural part of allotment gardening.

Allotment gardens are also extremely valuable, because their perennial plants photosynthesize during the entire growth period, from early spring to late autumn. By increasing the vegetation, allotment gardens can contribute to reducing the negative impacts of heavy rains and flooding as well as erosion of land. Big trees, such as old apple trees, help to even the temperature during hot weather. Allotment gardens also have a big impact in managing run-off water in the built environment.



Allotment gardeners are resilient and adjust to the changing climate. They also can help slow down the impacts of climate change. Gardeners need to be prepared for extreme weather conditions, such as heat waves and heavy rains. Finnish gardeners can only dream about the “good old winters”, when snow covered and protected the plants, and cold weather helped gardeners to manage harmful pests.

### **Allotment gardens make an impact**

In our survey, several allotment gardeners said that they expect their allotment garden association to take an

active role in developing and speaking on behalf of the city environment. Allotment gardens can share the message about how important these green areas are for nature in cities and for the well-being of city people.

Allotment gardens can also serve as role models and test labs for ecological construction. Allotment gardeners in Marjaniemi have small cottages and many expressed their willingness to experiment with ecological energy solutions such as solar power.

Allotment gardens have faced many changes during their history. Many of

them have survived the wartime and all of them have seen the city grow around them, sometimes threatening their existence. Climate change sets totally new challenges for allotment gardens.

Allotment gardeners live a long life cultivating their plots, keeping the future generations in mind. They want to keep the best parts from history and build a good sustainable future. As one survey respondent summed up, “I dream about protecting old apple trees and, when I don’t have the strength to do it anymore, I hope to find someone to continue my work”.

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