BIOMAPPERS MANUAL

BIOMAPPERS

biodiversity mapping in community gardens

OBSERVE, SHARE, SUPPORT & PROTECT BIODIVERSITY

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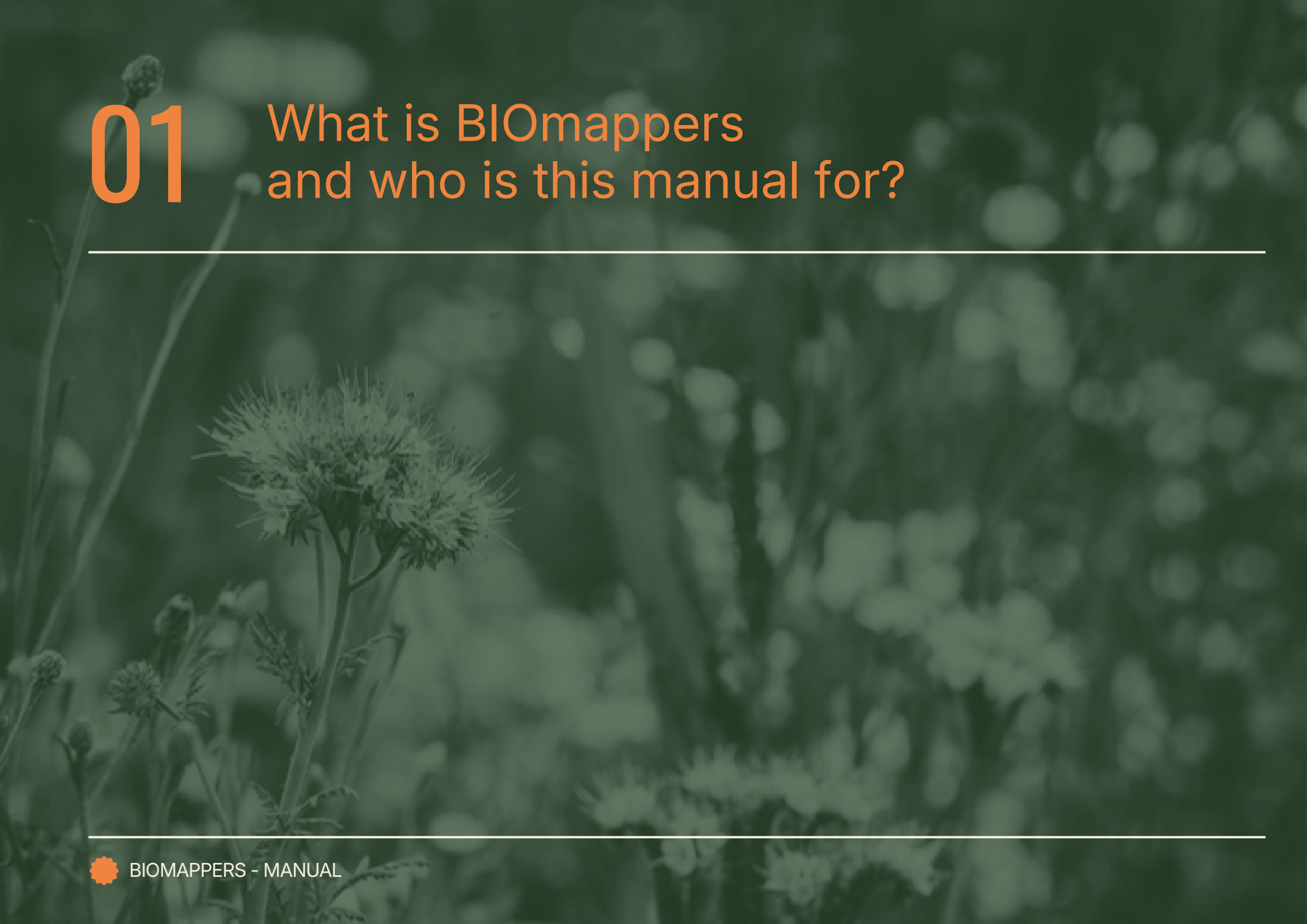
01 What is BIOmappers and who is this manual for?



1.1 What is the BIOmappers project?

BIOmappers is an Erasmus+ project that supports community gardens and other shared green spaces in observing, mapping and strengthening biodiversity. It combines environmental education, citizen science and practical garden-based learning.

The project highlights community gardens as places where people can learn about biodiversity and take action to support it. Gardens make the diversity of plants, animals, fungi and other living beings visible for gardeners, neighbours, schools, local organisations, public administration and policy makers.

BIOmappers provides workshop formats and educational materials that help people observe their garden more carefully, document species with digital tools and discuss what the results mean for garden practice.

This process can support the implementation of local, national and international biodiversity strategies, especially through awareness raising, participation and the creation of citizen science data.

The project also strengthens exchange between community gardens. If many gardens map biodiversity in a similar way, individual observations become part of a shared picture: which species are present, which habitats support them and which measures can improve conditions over time.

Community gardens are not only growing spaces. They can become learning places for biodiversity, citizen science and practical action.

1.2 Who is this manual for?

This manual is mainly designed for community gardeners, garden coordinators and facilitators who want to start mapping biodiversity in their gardens and share the process with others.

It is also useful for:

- **organisations working with community gardens, environmental education, citizen science or local participation;**
- **schools and educators who want to use gardens as outdoor learning spaces;**
- **neighbourhood initiatives interested in local nature;**
- **local authorities and institutions that want to better understand the ecological and educational value of community gardens.**

1.3 What this manual enables you to do?

The manual gives the background content for the BIOmappers workshop slides (link in Chapter 11). The slides are compact, visual and easy to use; the manual provides the explanations and facilitation notes behind them.

With this manual you can:

- **explain basics about biodiversity and biodiversity loss;**
- **show why community gardens can play an important role for biodiversity;**
- **introduce digital biodiversity mapping with iNaturalist;**
- **help participants create useful observations with photos, sounds, date and location;**
- **set up or use garden projects and umbrella projects on iNaturalist;**
- **run a BIOmappers workshop using the shared slides;**
- **reflect with participants on what the garden already offers for biodiversity;**
- **identify realistic next steps for biodiversity support in the garden;**
- **adapt BIOmappers activities for neighbours, schools and other groups.**

1.4 The BIOmappers materials and how to use them.

The BIOmappers materials are designed to work together. A garden can start with only one material, but the strongest effect comes from combining them in a workshop or garden activity.

Garden sign

An editable A4 sign for gardens that already map biodiversity or want to start. It informs gardeners, visitors and neighbours about the mapping activity.

The sign includes two QR codes: one leading to the garden's iNaturalist project and one leading to the BIOmappers video. An A3 version includes short texts about the project and the garden's biodiversity activities.

Video

A short introduction to biodiversity mapping in community gardens.

It can be shown at the start of a workshop, used to invite people to take part, shared online or linked through the garden sign. It should open a conversation, not replace facilitation.

Workshop slides & Manual

The central tool for running a BIOmappers workshop.

The slides are a compact summary. This manual provides the content behind the slides, so facilitators can explain the topic clearly and adapt the workshop to different groups.

All the materials are available in English, Italian, Hungarian & German.

Links in the last chapter

02 Biodiversity(loss) and why it matters

2.1 Biodiversity: what does it mean?

Biodiversity means the variety of life. It includes the variety within species, the variety of different species and the variety of habitats and living systems. It is not only a list of species. **Biodiversity also includes the relationships between living beings: plants, animals, fungi, microorganisms, soil, water, light and climate all influence each other.**

In a garden, these relationships can be observed directly. Flowering plants provide food for insects. Insects pollinate plants and become food for birds and other animals. Dead leaves and plant remains are broken down by fungi, bacteria and soil animals. This creates humus and releases nutrients that support new plant growth. A garden is therefore not only a collection of beds and plants, but a living system of cycles and dependencies.

BIOmappers uses this idea as a starting point: when people begin to observe carefully, they start to see more than the cultivated plants. They notice pollinators, spiders, birds, soil life, wild plants, fungi, traces and seasonal changes. Mapping makes this living diversity visible and easier to discuss.

Opening question for a workshop

Looking at our garden, what comes to your mind when thinking of biodiversity?

2.2 Definition: the three levels of biodiversity

Biodiversity is usually described on three levels. These levels are connected and can all be found in and around community gardens.

Genetic diversity

Genetic diversity is the variety of characteristics within the same species. A simple example form the garden is the cultivation of different tomato varieties. They may differ in shape, colour, taste, growth form and resistance to dry periods or disease. This internal variety helps species adapt to changing conditions.

Species diversity

Species diversity refers to the number and variety of plant, animal, fungal and other species present in a place. In a community garden this includes cultivated plants, wild plants, pollinating insects, birds, spiders, beetles, worms, fungi and many other organisms. A greater variety of species can help a living system recover from disturbances, especially when habitats and food sources are available across the year.

Ecosystem diversity

Ecosystem diversity refers to the variety of different habitats and living systems. In a strict scientific sense, a small garden may not contain many separate ecosystems. But it can contain many microhabitats: sunny dry areas, damp corners, compost heaps, hedges, dead wood, ponds, open soil, meadow patches or shaded places. These different conditions support different forms of life and increase habitat variety within the garden.

2.3 Why biodiversity is important?

Biodiversity is the basis for many processes that make life possible: pollination, soil formation, nutrient cycles, natural pest regulation, clean water, climate adaptation, medicinal use, food production and many functions we don't know yet.
It also shapes the places where people live, learn, recover and build relationships with nature.

In community gardens, these benefits become concrete. Pollinators can improve fruit and seed production. Soil organisms help turn organic material into fertile soil. Diverse plant structures create shade, moisture and shelter. Birds, insects and small animals make the garden a richer learning space. For people, biodiversity can support well-being, curiosity and a stronger sense of care for the place they share.

Biodiversity is therefore not an extra decoration.
It is part of how living systems function.

Losing biodiversity means losing relationships, processes and capacities that are difficult or impossible to replace later.

2.4 Why biodiversity is under pressure

Many species and habitats are under pressure.

The main reasons include the loss and fragmentation of habitats, soil sealing, intensive land use, pesticide use, pollution, climate change, invasive alien species. When landscapes and gardens become too uniform, there are fewer places to feed, hide, nest, reproduce and move between habitats.

2.5 Connecting BIOmappers to biodiversity strategies

Biodiversity strategies at global, national and local level usually aim to protect existing habitats, restore damaged areas, reduce harmful influences, improve monitoring and increase public awareness. Education and participation are an important part of this work, because biodiversity cannot be protected through expert knowledge or policy documents alone. Public understanding and support also make it easier for political and administrative actors to introduce and sustain effective conservation measures.

BIOmappers connects directly to this educational and participatory approach to biodiversity action. It helps people observe biodiversity in their own garden, collect data, discuss the results and plan practical improvements.

03 Community gardens and biodiversity

3.1 Community gardens are more than growing spaces.

Community gardens are much more than places where people grow vegetables, herbs or flowers. They can provide food and shelter for many species and create opportunities for people to learn about biodiversity through direct experience.

Community gardens often contain a mix of cultivated plants, wild plants, compost areas, hedges, fruit trees, flowering corners, water points, open soil and small structures. Compared to many simplified green spaces, they can offer a greater variety of habitats and food sources. Their value depends on how they are managed: less maintenance, mixed planting, fewer radical interventions, no pesticide use and a stronger ecological awareness among gardeners can all improve conditions for biodiversity.

In densely built areas or species-poor surroundings, community gardens can act as small stepping-stone habitats. They may offer resting places, feeding opportunities and movement corridors for insects, birds and other animals. At the same time, they are social places: people meet, exchange knowledge, learn together and test practical changes in the garden.

This double role is important for BIOmappers. Community gardens can support biodiversity directly through garden practice, and they can support biodiversity indirectly by becoming places of environmental learning and local action.

Evidence box

A study of 18 community gardens in Berlin documented 404 plant taxa (excluding grasses), including 194 cultivated and 184 spontaneously growing wild species. On average, each garden contained about 84 plant species. This shows that community gardens can combine food production with habitats for wild plants.

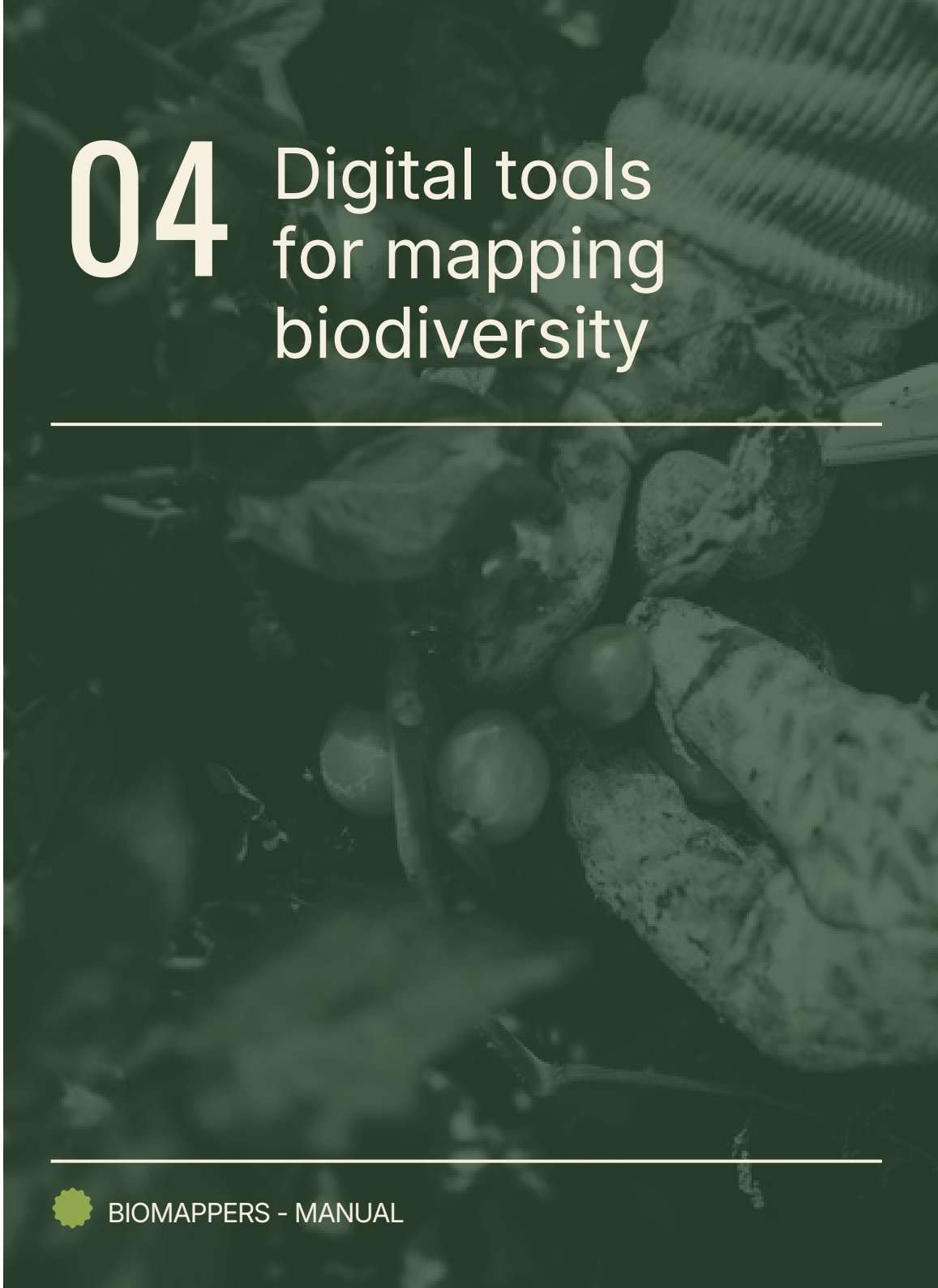
A research in Vienna reports more than 110 wild bee species in community gardens, around one third of all wild bee species ever documented in Vienna.

Gemeinschaftsgärten als Orte der Biodiversität in der Stadt, Monika Egerer & Ulrike Sturm, 2024, S. 270; Wildbienen in städtischen Gemeinschaftsgärten, Felix Gaulhofer & Julia Lanner, 2020, S. 2.

3.2 What a garden can concretely do for biodiversity?

A community garden can support biodiversity through many small and simple actions. Not every garden can do everything, and not every measure fits every site. The best starting point is to observe what is already present, identify missing habitats or food sources and agree on changes that the garden group can maintain over time. Concrete recommendations and examples of biodiversity-friendly measures are provided in the final section of this manual.

04 Digital tools for mapping biodiversity



4.1 Why digital mapping is useful?

Many digital tools have been developed to help people identify and document species.
For community gardens, digital mapping is useful because it turns individual observations into information that can be stored, found again, compared and shared.

Digital mapping can help a garden to:

- **record plants, animals, fungi and traces with photos or sound recordings;**
- **build a visible species list for the garden;**
- **compare observations between seasons or after changes in garden management;**
- **make the ecological value of the garden visible for gardeners, neighbours and local institutions;**
- **contribute to citizen science data that can be useful for research, education and green space management;**
- **create communication materials such as maps, species lists, "species of the month" posts or guided walk content.**

4.2 Why is iNaturalist suitable for BIOmappers?

BIOmappers uses iNaturalist because it combines simple observation tools with a global citizen science platform and makes it possible to create dedicated projects for community gardens. Users can upload photos or sound recordings, receive suggestions for identification and share their observations with a wider community of users, including experienced iNaturalist users & experts.

For community gardens, iNaturalist is especially useful because it allows you to:

- **document many groups of organisms, including plants, animals, fungi and traces;**
- **use AI-assisted identification as a first suggestion, followed by review from the iNaturalist community;**
- **create projects for a specific garden or area;**
- **connect several garden projects through umbrella projects;**
- **show observations on maps and species lists;**
- **help participants create useful observations with photos, sounds, date and location;**
- **make biodiversity visible beyond the garden group.**

Through iNaturalist a single observation can become part of a garden project, a city-wide garden network or a larger citizen science data set. This is the key added value: local observation becomes connected knowledge.

4.3 What do you need to use iNaturalist?

To use iNaturalist in a community garden or workshop, you need:

- **a smartphone or tablet with a camera, or a camera with the option to upload photos later**
- **an internet connection during the activity, or the option to upload observations later;**
- **an iNaturalist account for each active user**
- **location information, usually through GPS, so observations are connected to the correct place.**

Smartphones allow participants to observe, photograph, record species and upload data directly in the garden. However, not all iNaturalist functions are equally practical on a mobile device. For preparation, project management and follow-up work, it is important to also use iNaturalist in a web browser.

This is especially relevant if you want to create or manage garden projects, define project areas, work with umbrella projects, review observations, filter results or download data for further analysis. In practice, a BIOmappers activity works best when smartphones are used for observing and mapping in the garden, while the computer/browser is used before and after the workshop to organize, connect and evaluate the collected observations.

05 How to use iNaturalist step by step

5.1 Basic steps.

01 Create an iNaturalist account on the website or in the app using an email address and password.

02 Log in to the app or website.

03 Tap the button to add a new observation.

04 Take a photo, record a sound or upload an existing photo from your gallery.

05 Choose or confirm an identification. The app may suggest possible species, but this is only a starting point.

06 Check date and location.

07 Add notes if useful, for example number of individuals, habitat, weather conditions or behaviour.

08 Upload the observation.

5.2 Date, location and notes

Good observations need more than a photo.
Date and location are important because they show when and where a species was observed. This makes the observation useful for the garden project and for later comparison.

- **Check that location services are active if you want the app to record the place automatically.**
- **If you upload photos later, make sure the location is still correct.**
- **Check the date, especially when using older photos.**
- **Use the notes field for information that is not visible in the picture, such as number of individuals, habitat type, weather or behaviour.**
- **Do not guess if you are unsure. It is better to upload an observation with a broad identification such as “plant” or “insect” than to confirm a wrong species name.**

5.3 Practical tips for photos and sounds

- **Take clear photos.**
- **Photograph plants from several angles: whole plant, leaves, flower, fruit, stem and details that may help identification.**
- **For insects and animals, try to capture the whole body and key details without disturbing them.**
- **Avoid very busy backgrounds if possible.**
- **Check the light. Very strong light and very low light can make identification harder.**
- **For sounds, reduce background noise as much as possible and record long enough for the sound to be recognizable.**
- **Take more than one photo if you are unsure. Several good images often lead to better identification.**

5.4 General tips for biodiversity mapping

- **Repeat observations at different times of the day and during different seasons. One mapping walk only shows part of the garden's biodiversity.**
- **Observe carefully and avoid disturbing or damaging plants, animals or habitats. Do not remove plants, nests, dead wood or other habitat structures.**
- **Group mapping is useful for learning and making biodiversity visible, but it does not replace scientific monitoring. Monitoring requires repeated and standardised data collection.**
- **Do not only map colourful or obvious species. Small, common or inconspicuous wild plants, insects, fungi and traces are also important.**
- **BIOmappers focuses mainly on wild species and spontaneous biodiversity. If cultivated plants are recorded, they should be clearly marked as cultivated.**
- **For many rare or threatened species, iNaturalist automatically obscures the exact location to protect the species.**

06 Map your garden and connect it with umbrella projects

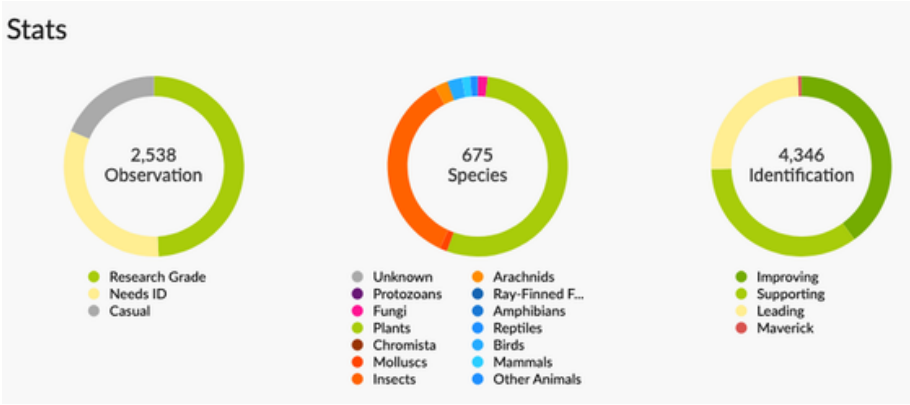
A garden project can help you to:

- **show observed species in one specific garden;**
- **make the ecological value of the garden easier to communicate;**
- **reflect on changes after new measures such as flower areas, hedges or reduced mowing;**
- **invite more people to contribute observations;**
- **create a basis for discussion with experts or local institutions.**

6.1 Garden projects on iNaturalist

One of the most useful features of iNaturalist for community gardens is the possibility to create projects and define a specific area for this project. All observations made within this area will be displayed together as the observed biodiversity of the garden.

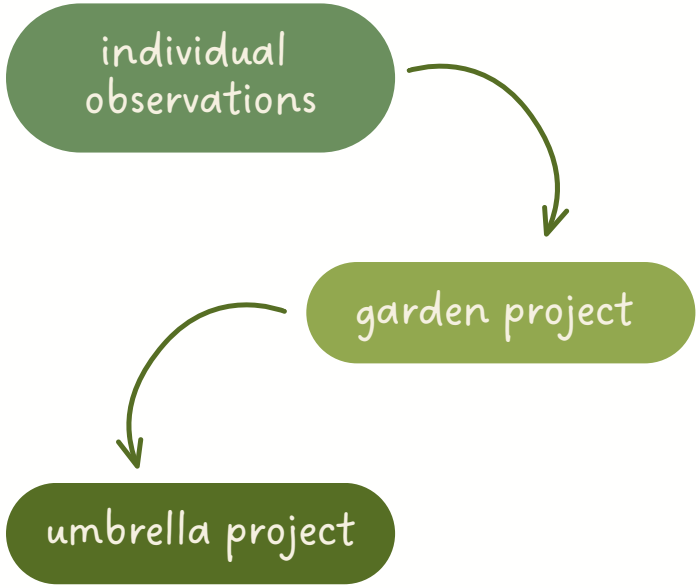
This makes the garden visible as a place of observation. With a few clicks, gardeners can see which species have been recorded, where observations are concentrated and how the list changes over time. The project can also be shared with neighbours, schools, local authorities or visitors through a QR code on the garden sign.



6.2 Umbrella projects

Umbrella projects can bring several garden projects together. For example, gardens in one city, region or country can be connected so their observations can be viewed as part of a wider network.
This is important for BIOmappers because the project is not only about isolated observations. It aims to show how much community gardens together contribute to biodiversity, learning and citizen science. An umbrella project can make this visible, support exchange between gardens and create a stronger basis for future research or education projects.

Instructions on how to create iNaturalist projects and umbrella projects are provided in the links section.



Community Gardens Umbrella Project Vienna

07 Reflection on biodiversity

7.1 Reflection on biodiversity

Mapping is not the end of a BIOmappers activity. It is the starting point for reflection. The aim is not only to collect species names, but to understand what the observations tell us about the garden and what could be improved.

Workshop method

After the observation walk, ask participants to choose one thing they noticed, one question they still have or one practical change they would like to discuss for the garden.

A long list of possible measures can be overwhelming. It is better to agree on a few realistic next steps, document them and return to them later.

Useful reflection questions includ

- **How does our garden already support biodiversity?**
- **Which microhabitats can we identify?**
- **Which species or groups did we observe often?**
- **Which species or groups did we expect but not find?**
- **Where are food sources available across the season, and where are gaps?**
- **Which areas are disturbed often, and which areas can remain calmer?**
- **Are there places for nesting, shelter, water and overwintering?**
- **Which measures would be realistic for our garden group?**
- **Who would take care of these measures over time?**
- **How can we share our findings with neighbours, schools or local institutions — and invite them to take part in mapping biodiversity and become BIOmappers themselves?**

08 Examples of biodiversity support

8.1 Examples of biodiversity support

The following examples can be used in the workshop to move from observation to action. They should be adapted to local conditions, garden rules, available time and the capacity of the garden group.

MEASURE	WHY IT HELPS	FIRST STEP
Extend food supply for insects	Pollinators need food across the season from early-flowering to late-flowering species.	**Identify gaps in the flowering calendar and add suitable plants.**
Use local and heritage plants	Locally adapted plants can support local insects and preserve plant diversity.	**Create a small bed or seed exchange focused on local or heritage varieties.**
Create wild areas	Undisturbed corners can provide shelter, nesting places and overwintering sites.	**Mark one small area that will not be cut or cleaned too often.**
Provide habitat structures	Dead wood, stones, hedges, hollow stems and small water points support different species.	**Start with one safe and easy structure, such as a dead wood corner.**
Reduce maintenance intensity	Less frequent cutting, clearing or digging can reduce disturbance.	**Agree on which areas need regular care and which can be managed less intensively.**

TIP: **ask the group to only choose on or two measures for the next season. A small action that is maintained is more valuable than a long wish list that nobody can follow up.**

MEASURE	WHY IT HELPS	FIRST STEP
Protect soil life	Compost, mulch and careful soil work support worms, fungi, bacteria and plant health.	**Avoid leaving all soil bare and add organic material where suitable.**
Create wild fruit hedges	Hedges offer flowers, fruits, shelter and nesting opportunities.	**Plant a mixed hedge if space and garden rules allow.**
Keep some open soil	Many wild bees nest in the ground and need sunny, open soil patches.	**Leave a small sunny patch without mulch or dense vegetation.**
Avoid pesticides and insecticides	Chemical control can harm beneficial insects and other organisms.	**Use prevention, mixed planting and manual control where possible.**
Provide safe water sources	Small water sources can support birds, insects and other animals, especially during hot and dry periods.	**Use shallow bowls or dishes with stones, branches or floating material so insects can land safely and do not drown. Change the water regularly to keep it clean and prevent mosquito breeding.**

09 How to organise a BIOmappers activity in your garden

9.1 Before the workshop

Define the target group: gardeners, neighbours, children, adults, school class, mixed group or local organisations.

Choose the area of the garden to observe. For a first workshop, a smaller area is often better.

Check whether there is already an iNaturalist project for the garden. If not, create a project for your garden. Check further if you can connect it to an umbrella project.

Check how you want to use the BIOmappers slides, video and garden sign.

Check Wi-Fi or mobile internet. If the connection is weak, plan to upload observations later.

Ask participants to bring smartphones if appropriate, but also plan for people without devices.

Decide who will support participants during the observation walk and upload phase.

STEP	PURPOSE
01 Welcome and aim	Explain that the workshop is about observing biodiversity, learning how to map it and discussing what the garden can do next.
02 Introduction to BIOmappers	Use the first slides to introduce the project, the materials and the idea of community gardens as learning places for biodiversity.
03 Short biodiversity input	Explain biodiversity, the three levels and why biodiversity is under pressure. Keep this short and connect it to the garden.
04 Community gardens and biodiversity	Discuss why gardens can matter: habitat variety, food sources, soil life, reduced disturbance and learning opportunities.
05 Video or visual introduction	Show the BIOmappers video as an accessible entry point.

STEP	PURPOSE
06 iNaturalist demonstration	Show how to add an observation, check date and location and upload it. Do not spend too long on technical details before people observe.
07 Observation walk	Invite participants to walk slowly through the garden, observe plants, insects, birds, fungi, traces and microhabitats, and document observations.
08 Upload and review	Look together at selected observations. Discuss identification suggestions and what makes an observation useful.
09 Reflection	Ask what the observations tell us about the garden and what could be improved.
10 Next steps	Agree on follow-up: continued mapping, one or two biodiversity measures, sharing the project link, or organising another activity.

9.3 Possible time formats

60 minutes

Very short introduction, one observation walk, a few uploads and quick reflection. Good for open garden days.

90 minutes

Basic introduction, app demonstration, observation walk, upload and group discussion. Suitable for most community garden workshops.

2-3 hours

Allows more time for biodiversity background, guided observation, upload support and planning of garden measures.

Half day

Suitable for schools, training sessions or groups that want to combine mapping with practical biodiversity work in the garden.

9.4 After the workshop

01 Send participants the garden project link and relevant materials.

02 Check observations and support identification where possible.

03 Choose one or two biodiversity measures to discuss or implement.

04 Plan a follow-up mapping activity in another season.

05 Use the garden sign to invite further BIOmappers!.

10 Ideas for the involvement of further target groups

10 Ideas for the involvement of further target groups

BIOmappers activities can be adapted for different groups. be aware to include the abilities and needs of different groups.

TARGET GROUP / FORMAT	HOW TO INVOLVE THEM
BioBlitz	A BioBlitz is a short, focused event where participants try to observe as many species as possible in a defined area and time. It can create energy and visibility, but it needs good preparation, clear instructions and support for uploading observations. It could also be part of a garden meeting or party.
Schools	**Schools can use BIOmappers as outdoor learning. Activities can connect biology, geography, climate education, digital skills and local participation. For younger pupils, facilitators should simplify the app work and focus on observation, drawing, photo walks and discussion.**
Neighbours	Neighbourhood activities can open up the garden and invite people to notice biodiversity close to home. A guided walk, garden sign, QR code and short video can lower the entry barrier.

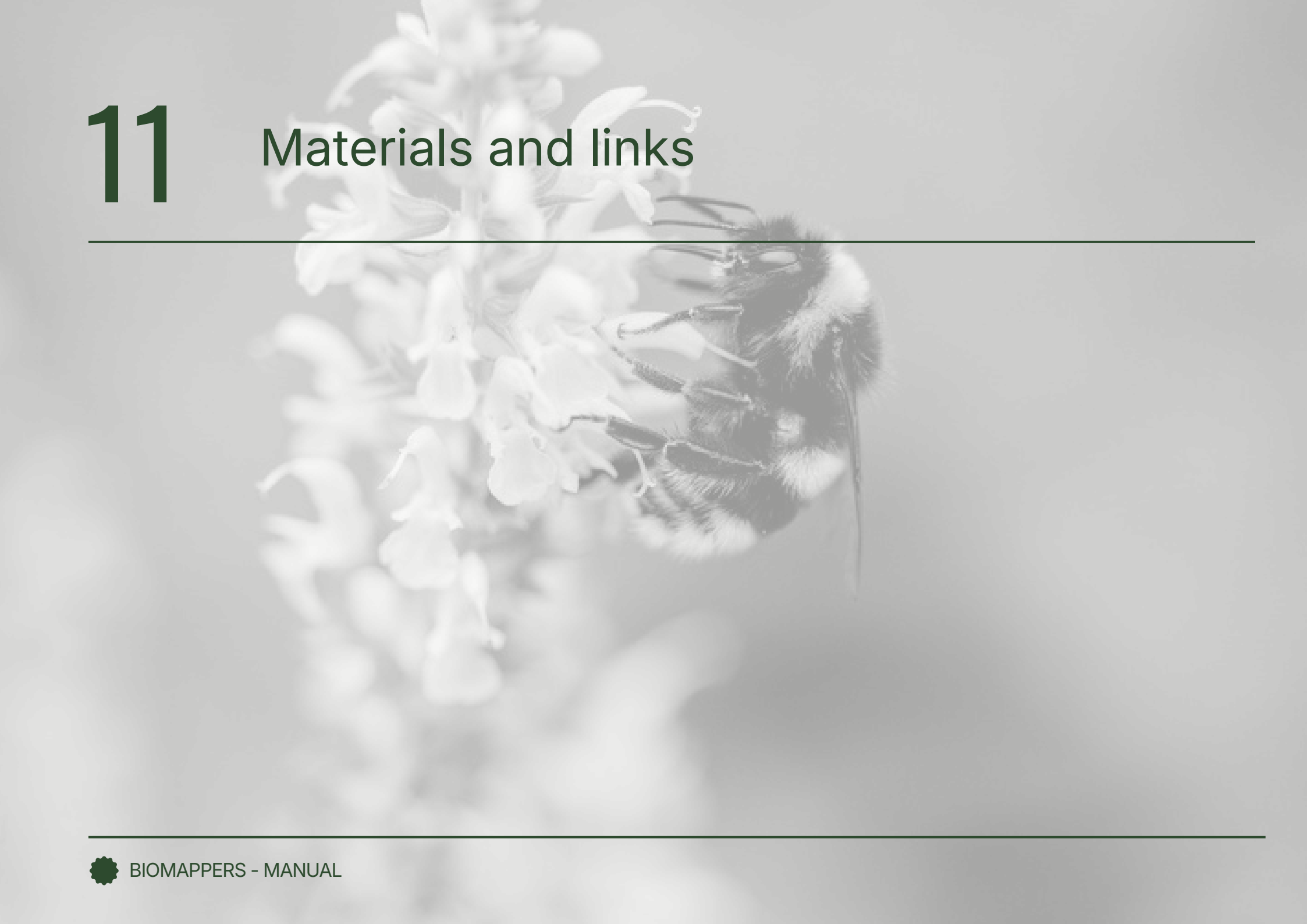
10 Ideas for the involvement of further target groups

TARGET GROUP / FORMAT	HOW TO INVOLVE THEM
Garden members	For gardeners, the focus can be on linking observations to garden practice: What do we already do well? What should we change? Which measures fit our garden culture and available time?
Local organisations and institutions	**Local organisations, environmental groups or public authorities may be interested in the data, learning process and practical measures. Share clear results and avoid overclaiming what the data can prove.**
Experts and naturalists	Experts can help identify species, explain habitats and reflect on measures. Their role should support participation rather than turn the activity into a lecture.

Communication idea

Use simple outputs after each activity: a short species list, one surprising finding, one photo, one question and one next step. This is often more effective than a long report.

11 Materials and links



11 Materials and links

Here you will find all the links to the BIOmappers resources. Further language versions are available at: www.gartenpolylog.org/biomappers

Garden sign A4	**LINK**
Garden sign A3	**LINK**
BIOmappers video	Watch the video
Workshop slides	**Download**

11.2 iNaturalist resources

- Inaturalist - First Steps
- Inaturalist - Video Tutorials
- Inaturalist - Collection / Umbrella Projects
- Inaturalist - How to make a Place

Links may change over time. If a link no longer works, try searching for the title or organisation to find the updated resource.

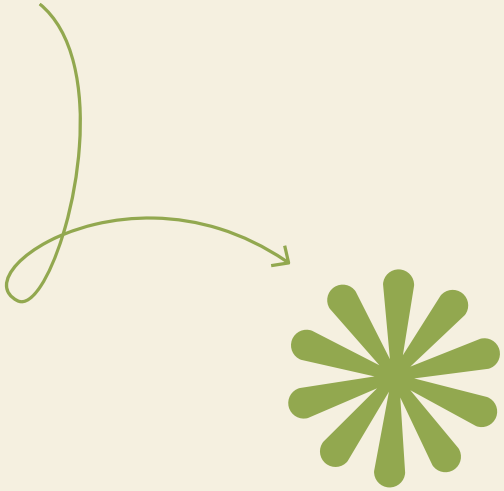
11.3 How to support biodiversity

- Managing community spaces for Pollinators
- Gardening for Biodiversity (Juanita Browne 2020)
- Wildlife Gardening
- Guide on Co Creating Biodiversity

11.4 literature/research on community gardens and biodiversity

- Urban Gardens as hotspots for plant diversity in cities
- Species Richness in Urban Gardens

Would you like to start mapping biodiversity in your community garden, but still have questions?



Please contact Gartenpolylog, Replay Network or KÉK. We are happy to help you use the BIOmappers materials and can also offer a workshop directly in your garden.

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KORTÁRS ÉPÍTÉSZETI KÖZPONT

REPLAY NETWORK
ASSOCIAZIONE DI PROMOZIONE SOCIALE

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