How to Monitor, Contribute, and Connect

Citizen Scientist Handbook (05)

February 2026 | Version 1.1 |

Erdpuls Citizen Scientist Handbook

How to Monitor, Contribute, and Connect

For Adult Citizen Scientists and Community Observers

Institution: Erdpuls Müllrose - Center for Sustainability Literacy, Citizen Science and Reciprocal Economics
Location: Müllrose, Brandenburg, Germany

Version: 1.1
Date: February 2026
Status: Draft v1.1 — OER Publication Ready (EN)
Translation Status: [DE] — *pending Phase 3* | [PL] — *pending Phase 3*

Changelog

Version	Date	Changes
1.1	February 2026	Initial generation for OER publication; institution name and license applied
1.0	—	Not released

Welcome

You are holding — or reading on a screen — a handbook for people who want to participate in one of the most important scientific endeavors of our time: understanding how the living world is changing, at the local level, with enough precision and consistency to be genuinely useful to the global understanding of environmental change.

The phrase "citizen science" sometimes suggests a watered-down version of the real thing — amateurs dabbling at the edges of professional research. This handbook operates from the opposite premise. The professional research network monitoring global environmental change has enormous gaps. These gaps are not gaps of knowledge or method — they are gaps of presence. There are not enough professional researchers, in enough places, observing with enough continuity, to fill in the picture. Citizen scientists fill those gaps. They are not supplements to professional science; they are constitutive parts of it.

This handbook explains how to participate in that network effectively — from making your first observation, to building your own monitoring station, to understanding where your data goes and what it means.

Chapter 1 — Understanding the Global Environmental Monitoring Network

Why a Global Network?

The climate system, the soil biology of a continent, the migration routes of a bird population, the spread of an invasive species — none of these phenomena can be understood from a single location. They require data from thousands, and ideally millions, of locations, recorded consistently over time.

The professional environmental monitoring infrastructure — weather stations, satellite imagery, research plots — provides some of this. But it is patchy. Germany has approximately 1,800 official weather stations for an area of 357,000 km² — roughly one station per 200 km². The soil temperature at your back garden is not represented in that network. The first time a specific bee species appeared at a specific hedge this spring is not in any professional database. The moment a particular stream bank began to erode after a land use change — that observation exists nowhere, unless you recorded it.

Citizen science platforms exist to aggregate these hyperlocal observations into datasets that are scientifically meaningful. The major platforms relevant to Erdpuls participants are:

openSenseMap (opensensemap.org)

The sensor data network operated by the senseBox team at the University of Münster. Any senseBox MCU sensor station you build and register contributes automatically to this network. Data is openly accessible to anyone, anywhere, indefinitely.

What it measures: Primarily physical and chemical environmental parameters: temperature, humidity, air pressure, UV radiation, fine particulate matter (PM2.5, PM10), CO_2, soil moisture, luminosity.

Who uses the data: Researchers studying urban heat islands, air quality gradients, climate patterns at fine spatial scale; urban planners; school curriculum developers; journalists; anyone curious about environmental conditions at a specific location.

The Erdpuls contribution: The Erdpuls campus has active sensor stations on openSenseMap. When you take a workshop here, or when you build a home station, your data joins this existing record and extends it.

iNaturalist (inaturalist.org / naturalist.de)

The global biodiversity observation platform. Any species observation — a plant, an insect, a bird, a fungus — that you photograph and upload to iNaturalist becomes part of the Global Biodiversity Information Facility (GBIF), the largest aggregated biodiversity database in the world.

What it records: Species observations with GPS coordinates, date, time, photograph, and observer ID. The platform's AI identification system plus community expert review provides species identification to varying degrees of certainty.

Who uses the data: Conservation biologists, invasion ecologists, phenology researchers (tracking when species appear in different seasons and how those patterns shift with climate), national park managers, policy advisors on endangered species.

The Erdpuls contribution: Every species observation made during an Erdpuls workshop — even "small orange dot, probably a mite" that can only be resolved to order level — enters this record. A single day of observations at the Erdpuls campus can add 20–50 data points to the local biodiversity record.

openSenseMap vs. iNaturalist: What's the Difference?

	openSenseMap	iNaturalist
What you record	Physical/chemical measurements from sensors	Species observations (photographs + location)
How you contribute	Sensor station (automatic, continuous)	Observations (manual, when you choose)
Data type	Time-series numbers	Point observations with images
Best for	Understanding environmental conditions	Understanding what lives where
Erdpuls connection	senseBox workshops; home station building	All field workshops; any species observation

Other Relevant Networks

eBird (ebird.org): Bird observation database operated by Cornell Lab of Ornithology. If you observe birds, every sighting with location, date, and count is a scientific contribution to one of the world's most important migratory and population datasets.

Phänologischer Beobachtungsgarten (DWD): The German Weather Service's phenological observation network. Citizens can register to observe specific plant events (first flower, first ripe fruit, first leaf fall) at consistent intervals — contributing to long-term phenological records that are direct evidence of seasonal shifts associated with climate change.

Mitmach-Wissenschaft platforms (BürGEr schaffen WISSen, buergerschaffenwissen.de): The German national platform listing citizen science projects across all scientific disciplines. If you want to find a project specifically relevant to your local ecosystem, species of interest, or skills, this is the directory.

Chapter 2 — How to Contribute Meaningful Observations

The difference between a casual observation and a scientifically meaningful one is not expertise — it is **consistency, completeness, and honesty about uncertainty**.

The Three Rules of Meaningful Observation

Rule 1: Record what you actually see, not what you think you should see.

If you cannot identify the species of a small brown beetle, the observation "small brown beetle, approximately 5mm, found under bark of fallen oak log, 14:30, 15 March 2026, coordinates [X,Y]" is more scientifically useful than a confident but incorrect species identification. Experts can sometimes work with a good photograph and ecological context to narrow down the identification. They cannot recover from wrong information.

Rule 2: Record the conditions along with the observation.

An observation that says "found 3 earthworms" is a data point. An observation that says "found 3 earthworms in a 30×30 cm quadrat, depth 0–10 cm, soil moisture high (recent rain 2 days ago), soil temperature approx 12°C (warm to touch), in compost-enriched garden bed, 14:30, 12 April 2026" is a useful ecological data point that future researchers can interpret in context.

Rule 3: Repeat your observations consistently.

A single observation tells you something happened once. Repeated observations at the same location, at consistent time intervals, across seasons and years, tell you about patterns — how conditions change, how biodiversity responds, what is stable and what is variable. The most valuable citizen science contribution is not a dramatic one-time sighting; it is the boring consistency of recording the same soil temperature at the same location every other week for three years.

The Erdpuls Observation Protocol for Home Gardeners

If you have access to a garden, backyard, balcony planter, or any patch of outdoor ground, you can conduct Erdpuls-aligned observations at home. Use this protocol:

Monthly soil observation (30 minutes, any patch of ground):

1. Choose a fixed 30×30 cm patch and mark its corners with small stones or stakes. Do not move these markers. This is your permanent observation patch.
2. Record: - Date, time, current weather conditions - Soil surface color (compare to last month if possible) - Soil smell (stronger/weaker/different than last month?) - Soil temperature to touch (warmer/cooler/same as air above it?) - Number of visible organisms in 2-minute Life Count (white tray method: gently place 200g of surface soil on a white plastic tray; count and describe every moving organism) - Water infiltration time (pour 100ml of water on undisturbed adjacent surface; count seconds to absorption)
3. Upload any visible species to iNaturalist with a photograph
4. If you have a senseBox soil probe: record the measured soil moisture and temperature alongside your body readings

Compare month-over-month. The differences across seasons are the data. After a year of monthly observations, you have a complete phenological record of your patch that did not exist before you started.

Chapter 3 — Reading and Interpreting Environmental Data

What the Numbers Mean

If you look at a sensor dashboard — whether the Erdpuls openSenseMap station, a weather service website, or your own home sensor — you will encounter numbers. Here is how to read the most common ones in the Erdpuls context:

Temperature (°C): The temperature of the air at the sensor's height, at the moment of measurement. Important: soil temperature (measured with a probe in the ground) and air temperature (measured 2 meters above ground, in shade) can differ by 5–10°C on a sunny day. When comparing sensor readings, always check: *where* was the sensor, and *at what height?*

Relative Humidity (%): The amount of water vapor in the air expressed as a percentage of the maximum possible at that temperature. 100% humidity does not mean it is raining; it means the air cannot hold any more water vapor. Humidity above 80% combined with moderate temperatures is ideal for many fungi and soil organisms. Humidity below 30% for extended periods stresses most garden plants.

Soil Moisture (%, Volumetric Water Content): The proportion of the soil volume that is water. Most garden plants thrive between 25–60%. Below 15% triggers drought stress in most species. Above 80% indicates waterlogging, which starves roots of oxygen. The senseBox soil moisture probe measures this as a percentage (some probes express it as a raw number that requires calibration — refer to the senseBox documentation for your specific probe model).

PM2.5 and PM10 (μg/m³): Fine particulate matter — tiny solid and liquid particles suspended in air. PM2.5 particles are 2.5 micrometers or smaller (about 30× smaller than a human hair). PM10 particles are 10 micrometers or smaller. Both can penetrate deep into lungs. The WHO air quality guideline is a 24-hour average below 15 μg/m³ for PM2.5. Urban values often range from 10–50 μg/m³; values above 100 μg/m³ indicate serious pollution events.

Understanding Time-Series Data

A single sensor reading tells you what conditions were like at one moment. The value of continuous sensor monitoring is the **time-series** — hundreds or thousands of readings that show how conditions change over time.

When reading a time-series graph:

- **Look for patterns:** Does temperature follow a predictable daily cycle (cool at dawn, warm in mid-afternoon, cooling at evening)? Does soil moisture drop steadily between rain events and spike with each rainfall?
- **Look for anomalies:** A sudden spike or drop that doesn't fit the pattern. What caused it? An open window near the sensor? A heat wave? Someone watering the garden at an unusual time?
- **Look for trends:** Across weeks and months, is the baseline temperature gradually rising or falling? Is the average moisture level changing? Trends are where climate science lives.

Comparing Your Data to the Regional Network

Once you have a few months of data from your own station or regular observations, compare it to the Erdpuls campus station data and to the nearest official weather station:

- **If your readings are consistently higher or lower than official data:** This is not an error — it is a real difference. Your location may be a warmer microclimate (urban heat island, south-facing wall), a cooler one (shade, water proximity), or drier/wetter than the official station's location. This difference is itself scientifically interesting.
- **If your biodiversity observations differ from regional iNaturalist data:** You may have a microhabitat that supports species not commonly recorded in your area. Or you may be observing at a different season or time of day than most contributors. Either way, your data adds to the picture.

Chapter 4 — Blockchain Basics for Non-Technical Users

What the Erdpuls Token Economy Uses — and Why

The UBECrc (United Basic Exchange Currency, reciprocal) token system used at Erdpuls employs a blockchain ledger to record token transactions. You do not need to understand blockchain technology to participate in the token economy. But you may be curious about why a blockchain is used here rather than a simple spreadsheet.

What Blockchain Actually Is (Simply)

A blockchain is a **shared, append-only record book** maintained simultaneously on many computers. "Append-only" means that records can be added but not deleted or altered — every entry is permanent. "Shared" means that no single person or organization controls the record.

The key property that matters for the token economy: No central authority decides what is recorded. When you earn a Cooperation token at an Erdpuls workshop, that transaction is recorded on the ledger not by Erdpuls alone but by the distributed network. Neither Erdpuls, nor any government, nor any bank can alter or delete that record. The token is yours.

The analogy that helps most people: Think of a public village noticeboard where anyone can post, but nobody can take anything down. Every exchange, every contribution, every token earned is posted permanently. The blockchain is a digital version of that noticeboard that cannot be physically torn down.

What Blockchain Is Not

- **Not a cryptocurrency in the speculative sense.** UBECrc tokens are not investments. Their value is not set by markets. They recognize contributions to the community and can unlock community resources — but they are not intended to be traded for money.
- **Not energy-intensive by default.** The Erdpuls token system uses a proof-of-stake or similar low-energy consensus mechanism — not the energy-intensive "mining" associated with Bitcoin. The blockchain dimension adds a very small energy cost.
- **Not anonymous.** Participation in the Erdpuls token economy requires an account linked to your participation. Transparency — knowing who contributed what — is a feature, not a bug.

Do You Need a Wallet or Technical Setup?

For basic workshop participation: **No.** Physical token cards are used during workshops and are recorded by Erdpuls staff. The blockchain entry happens in the background.

For ongoing participation and accumulation of tokens across multiple visits and home observations: **A basic digital account is required.** Contact Erdpuls (erdpuls@ubec.network) for account setup instructions. No cryptocurrency expertise is required; the interface is designed for non-technical participants.

The Four Elements as a Blockchain Use Case

The reason a blockchain is useful for the token economy — rather than a simple database managed by Erdpuls — is that it solves a trust problem. If Erdpuls alone maintains the ledger, participants must trust Erdpuls not to alter or delete records. If the ledger is a public blockchain, that trust is not required — the record is verifiable by anyone, independent of Erdpuls's continued operation.

This is particularly important for **Regeneration tokens** — which recognize ecological improvements that may take years to verify. A Regeneration token earned for planting a hedgerow in 2026 should still be readable in 2036, even if the software platform that issued it has changed. The blockchain record persists.

Chapter 5 — Community Science Best Practices

The Science of Showing Up

The most important factor in citizen science contribution quality is not expertise, equipment, or analytical skill. It is **consistency of presence**. A person who makes careful observations at the same location once a month for five years produces a dataset of far greater scientific value than a person who makes brilliant observations once and never returns.

This is counterintuitive in a culture that prizes novelty and dramatic discovery. The reality of ecological science is that the most important insights emerge from long time series: the gradual warming of a local climate, the slow collapse of an insect population, the incremental recovery of a restored habitat. These processes cannot be seen in a single session. They emerge only from the accumulated record of many ordinary observations over time.

The practice recommendation: Choose one location — ideally the same patch you visit or observe regularly — and commit to observing it on a consistent schedule. Monthly is ideal for most soil-based observations. Weekly is useful for biodiversity monitoring during active seasons. The schedule matters less than the consistency.

Data Quality Over Data Quantity

One precise, well-documented observation is worth more to the scientific record than ten imprecise ones. Before uploading an observation:

- Is the location recorded accurately? (GPS coordinate, not just "near the oak tree")
- Is the date and time precise?
- Is the condition of the organism or environment noted (alive/dead, flowering/dormant, disturbed/undisturbed)?

- Is the identification at least honest? ("Possible *Lumbricus terrestris*" is better than a confident wrong answer; "annelid, red-brown, 8cm" is better than guessing)
- Is there a photograph? Photographs allow expert review and species identification revision — they transform a single observation into a permanently revisable data point.

The Community Dimension

Citizen science is most powerful when it is social. An isolated observer produces data; a community of observers produces a picture.

Open Makerspace Days at Erdpuls: Held monthly, these are drop-in sessions where citizen scientists share recent observations, compare home sensor data, troubleshoot monitoring equipment, and plan collaborative observation events. Contributing your data to Open Makerspace Day discussions is a Mutualism token activity — your observations benefit the community's shared understanding.

Repair Café Integration: The Erdpuls Repair Café is a community space for fixing broken objects. It is also a site of skill exchange and knowledge sharing — both of which generate Reciprocity tokens in the UBECrc system. If you have technical skills relevant to sensor maintenance or calibration, contributing them at the Repair Café counts as a citizen science contribution.

Cross-Border Observations: The Erdpuls catchment area spans the German-Polish border region. Observations on both sides of the border feed different national datasets but the same ecological reality. If you observe near the border, note which country you are in — and consider whether a Polish neighbor might observe the same site from the other side. Two observations of the same ecosystem from two political contexts is a particularly valuable kind of data.

Ethical Principles of Community Science

Do not disturb what you observe. The observation is a visit, not an extraction. Soil cores and biological samples should only be taken with landowner permission and within quantity limits that do not damage the observed system.

Attribute uncertainty honestly. "I think this is" and "I'm not sure, possibly" are scientifically valuable qualifiers. False confidence in an identification corrupts the dataset.

Respect privacy. GPS coordinates of observations in private gardens should be shared only with the landowner's permission. On public land, open coordinates are the default.

Contribute, don't only consume. Open data platforms depend on contribution to remain viable. If you use iNaturalist or openSenseMap to view data, contribute your own observations in return. This is Reciprocity in practice.

Chapter 6 — Creating Your Own Monitoring Station

The senseBox MCU: What It Is and What It Can Do

The senseBox MCU is a microcontroller-based sensor platform developed at the University of Münster, specifically designed for citizen science environmental monitoring. It is open-source (both hardware design and software), relatively affordable (~€80–120 for a basic outdoor station), and designed to be assembled and operated by non-engineers with basic instructions.

What a basic outdoor senseBox station can measure continuously: - Air temperature (HDC1080 sensor: accuracy ±0.2°C) - Relative humidity (HDC1080: accuracy ±2%) - UV radiation index (VEML6070 sensor) - Ambient light (TSL45315 sensor) - Air pressure (BMP280 sensor: useful for local weather pattern tracking) - Fine particulate matter PM2.5 and PM10 (SDS011 sensor, with optional external positioning)

With additional sensors (available separately): - Soil moisture and temperature (capacitive probe, insert into soil at your observation patch) - CO_2 concentration (SCD30 sensor) - Water temperature (DS18B20 waterproof probe, for stream or pond monitoring) - Sound level (for acoustic ecology monitoring)

Data transmission: The senseBox connects to WiFi (indoor or outdoor with cable routing) or sends data via cellular network (LoRa or LTE-M versions available). Data uploads automatically to openSenseMap at a configurable interval (default: every 60 seconds).

Building Your Station (Overview)

Full assembly instructions are available at https://sensebox.de/en/ Erdpuls runs senseBox assembly workshops for community members — contact erdpuls@ubec.network for upcoming dates. The following overview gives you a sense of what is involved:

Step 1 — Register your station on openSenseMap before assembling the hardware. You will receive a unique station ID that you program into the device. Go to opensensemap.org, create an account, and click "New senseBox."

Step 2 — Assemble the electronics. The senseBox MCU is a plug-and-connect system — sensors attach to labeled ports with included cables. No soldering required for the basic station. The assembly takes approximately 2 hours for a first-time builder following the official guide.

Step 3 — Install the software. The senseBox Blockly interface (a visual drag-and-drop programming environment) generates the code for your specific sensor configuration and uploads it to the MCU. No prior programming knowledge is required. Advanced users can use the Arduino IDE for custom configurations.

Step 4 — Choose a mounting location. For outdoor air monitoring, the sensor housing should be: in shade (not direct sun — temperature readings will be artificially high in direct sun); at standard meteorological height of 2 meters above ground if possible; away from walls and paved surfaces that radiate heat; with the rain protection facing down and the ventilation opening clear.

Step 5 — Connect and verify. Power the station (USB power adapter or solar panel + battery). Within a few minutes, data should appear on your openSenseMap station page. Check that readings are plausible: air temperature should match the local weather service within 1–2°C; humidity should be broadly consistent with regional humidity.

Step 6 — Add your soil probe (if monitoring soil). Insert the capacitive soil moisture probe to the depth of interest (usually 10 cm for surface monitoring, 30 cm for root-zone monitoring). Connect to the senseBox soil moisture port. Run initial calibration: measure dry soil (probe in air-dry soil = low reading), then wet soil (fully saturated = high reading). These become your calibration endpoints.

Where to Position Your Station

The value of your station depends heavily on where it is placed. Consider:

- **What are you trying to measure?** Urban heat island effects → place in a dense urban location AND compare to a rural station. Soil moisture dynamics → probe at your observation patch. Air quality → position in a location representative of your neighborhood's typical air exposure.
- **Can you maintain it?** The station should be accessible for cleaning, maintenance, and firmware updates. A location requiring a ladder in all weathers is a station that will be neglected.
- **Is the data transmission reliable?** WiFi range is the most common limitation. If your outdoor location is out of WiFi range, consider a cellular version of the senseBox (LoRa or LTE-M), or route a cable.
- **Register your location accurately on openSenseMap.** The geographic coordinates and altitude of your station affect how researchers use your data. GPS coordinates from a phone at the sensor location are sufficient.

Maintenance Schedule

Task	Frequency
Clean sensor housing exterior (dust, spider webs, debris)	Monthly
Check that data is still uploading (view openSenseMap station page)	Weekly
Check WiFi connection (reset router connection if dropped)	As needed

Task	Frequency
Clean the PM sensor inlet (fine particulate sensors can clog in dusty environments)	Every 3 months
Update firmware (senseBox releases periodic updates with bug fixes)	Every 6 months
Replace soil moisture probe cable if damaged by garden tools or animals	As needed
Battery check (solar + battery systems)	Before winter; after extended cloudy periods

Chapter 7 — Connecting Local Observations to Global Patterns

How Your Data Travels

When you upload a soil temperature reading to openSenseMap, it joins a dataset that is freely accessible to every researcher in the world with an internet connection. Here is a simplified version of what can happen next:

1. A climate researcher in Leipzig downloads all German soil temperature readings from the past 5 years to study soil warming trends
2. Your specific station's data appears in that download
3. The researcher identifies a pattern: soil temperatures in the Oder River valley are warming faster than the German average
4. That finding appears in a peer-reviewed paper, which influences a Brandenburg state policy on agricultural water management

You are not told that this happened. Your name does not appear in the paper. But your observation is in the chain that led to a policy change affecting water use in the region you live in.

This is how distributed citizen science works at scale. No single observation is decisive; the aggregated record is.

Phenology: The Most Direct Climate Signal

Phenology is the study of seasonal biological events — when the first bee appears, when the cherry trees flower, when the swallows arrive, when the last leaves fall. These events are the most direct biological signal of seasonal climate change.

Phenological records going back centuries (from historical diaries, farm records, wine harvest dates, religious festival records) show that spring events have been arriving earlier across Europe at an average rate of approximately 6–8 days per decade since the mid-20th century.

Your observations can contribute to this record directly:

- **For plants:** Note the first flower of specific observable species at your monitoring location each year (dandelion, elder, linden, apple). Record date and year. Even a 3-year record has value.
- **For insects:** Note the first observation of specific species each season (first honeybee, first butterfly, first dragonfly). Record date, location, and temperature conditions.
- **For soil biology:** Track your monthly Life Count across seasons. When does the count peak? When does it drop? Does the peak date shift across years?

After 5–10 years, your records become one of the most valuable kinds of local environmental data that exists — a long-term phenological record from a fixed location.

The Schlaubetal as a Place in the Global Record

The Naturpark Schlaubetal — the landscape within which Erdpuls Müllrose is embedded — is a relatively well-preserved glacial landscape with high biodiversity value and low industrial pollution pressure. This makes it an important **reference site** for environmental monitoring: a baseline against which more disturbed landscapes can be compared.

When you observe at or near Müllrose, you are contributing to the environmental record of one of Germany's more ecologically intact sub-regions. Your observations of soil organism diversity, water infiltration rates, and species presence are not simply local curiosities — they are reference data for researchers studying how healthy soils and intact landscapes function, which informs restoration efforts in degraded areas elsewhere.

The feedback loop: As the Erdpuls citizen science record grows — more observers, more locations, more seasons — it becomes more useful to researchers. As it becomes more useful, researchers engage with it, cite it, and in some cases co-design follow-up studies with the Erdpuls community. This attracts more observers. The record becomes richer. The place becomes better understood. The understanding informs better care. The care maintains the ecological integrity that made the place worth observing.

This is the citizen science feedback loop at its best — and you are in it.

Connecting to the Erdpuls Pattern Language

Every observation you make at home or at the Erdpuls campus is potentially a candidate for a **pattern** in the Erdpuls Pattern Language of Place. A pattern is a recurring relationship — something that appears consistently enough, and is significant enough, to deserve a name.

If your monthly observations reveal that soil moisture at your patch always drops sharply seven days after rain regardless of temperature — that is the beginning of a pattern. If three other observers in the same neighborhood confirm the same thing — that is a confirmed pattern. If elder residents identify the same dynamic from memory going back thirty years — it is a deep-rooted pattern of the local landscape.

Patterns discovered by citizen observers become part of the collective knowledge of the place — named, documented, publicly accessible. They may inform land-use decisions, school curricula, restoration projects, or simply the way residents understand and relate to where they live.

To contribute an observation as a pattern candidate, contact Erdpuls or bring it to an Open Makerspace Day. The Pattern Language Assembly Guide (available at erdpuls.ubec.network) describes the full process for moving from observation to confirmed pattern.

Quick Reference: Tools and Platforms

Platform	Purpose	URL
openSenseMap	Register your senseBox station; view sensor data	opensensemap.org
iNaturalist	Upload species observations; explore local biodiversity	inaturalist.org
senseBox documentation	Assembly guides, firmware, Blockly environment	sensebox.de/en
eBird	Bird observations	ebird.org
GBIF	Access global biodiversity data	gbif.org
DWD Phänologie	Phenological observation network	dwd.de → Klima → Phänologie
Bürger schaffen Wissen	German citizen science project directory	buergerschaffenwissen.de
Erdpuls	Campus workshops, Open Makerspace Days, token economy	erdpuls.ubec.network

---

License & Attribution

This project uses the services of Claude and Anthropic PBC to inform our decisions and recommendations. This document and its translations were developed with assistance from Claude (Anthropic PBC). All strategic decisions, philosophical positions, and project commitments are those of the author.