A new participatory conservation framework built on the rise of native plant gardening

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Abstract: Global biodiversity strategies are ambitious on paper but fall short in practice. It is not strategy we lack but the capacity to translate these plans into action on the ground. Akin to the community scientists that revolutionized biodiversity monitoring, we posit that community stewards, emerging from the growing native plant gardening movement, could help scale up science-informed plant conservation. We present evidence that willingness to engage in conservation efforts is high within this community. To unlock this potential, we propose a framework that links stewards with the complementary strengths of existing institutions: the scientific expertise of botanical gardens, the legal mandates of conservation programs, the horticultural capacity of native plant producers, and the social infrastructure of gardening networks. Three case studies show how our framework could be operationalized. Activating the native plant gardening movement to bolster on-the-ground conservation may offer a promising way to narrow the knowing–doing gap in conservation.

Keywords: Participatory conservation, native plant gardening, ex-situ and in-situ conservation, botanical gardens, native plant producers, implementation gap

Main text

The "doing gap" in biodiversity conservation

Global biodiversity targets are becoming more ambitious, including targets such as protecting 30% of land by 2030, yet the link between policy goals and ecological outcomes remains weak, particularly for plants (Sharrock 2020, Corlett 2023). For example, we still know little about how effective protected areas are at conserving plant species (Heywood 2019). A recent global synthesis of protected area impact studies did not include a single assessment focused on plants (Langhammer et al. 2024). Even in countries like Germany, where more than 30% of the land is already under protection, plant diversity continues to decline, and many protected areas are in poor ecological condition (Wirth et al. 2024, Ellerbrok et al. 2025). The lesson is not new, for species do not persist simply because an area is designated as protected. Without mitigating the direct drivers of population decline and without active management, many plant species will continue to decline.

The disconnect between conservation targets and ecological outcomes reflects a broader structural imbalance. Large investments go into planning, such as Red List assessments, species recovery plans, and global policy frameworks, while comparatively little supports the on-the-ground work these plans require (Heywood 2019). Even when resources are available, many programs become mired in prolonged preparatory steps that further delay implementation (Wirth et al. 2024). This imbalance typifies the "knowing–doing gap" (Knight et al. 2008). Conservation science often identifies effective actions, yet the capacity to apply them remains limited. Long-term trends in the field reinforce this divide, with research increasingly favoring desk-based modelling and synthesis over field studies with practical application (Arlettaz et al. 2010, Ríos-Saldaña et al. 2018). The result is a growing misalignment between the production of strategies and knowledge, and the ability to implement them on the ground.

A new frontier of community stewards for conservation

Where can on-the-ground conservation capacity come from? Increasing numbers of enthusiastic non-professionals are turning into conservationists on the land they manage. We refer to these individuals as **“community stewards,”** analogous to community scientists (cf. Ellwood et al. 2023), but with an emphasis on action rather than data collection. Native plant gardening has become a rapidly expanding expression of such stewardship (Fig.1 and 2). By combining practical horticultural skills with solid botanical knowledge, native-plant gardeners represent a promising group of potential community stewards in plant conservation efforts.

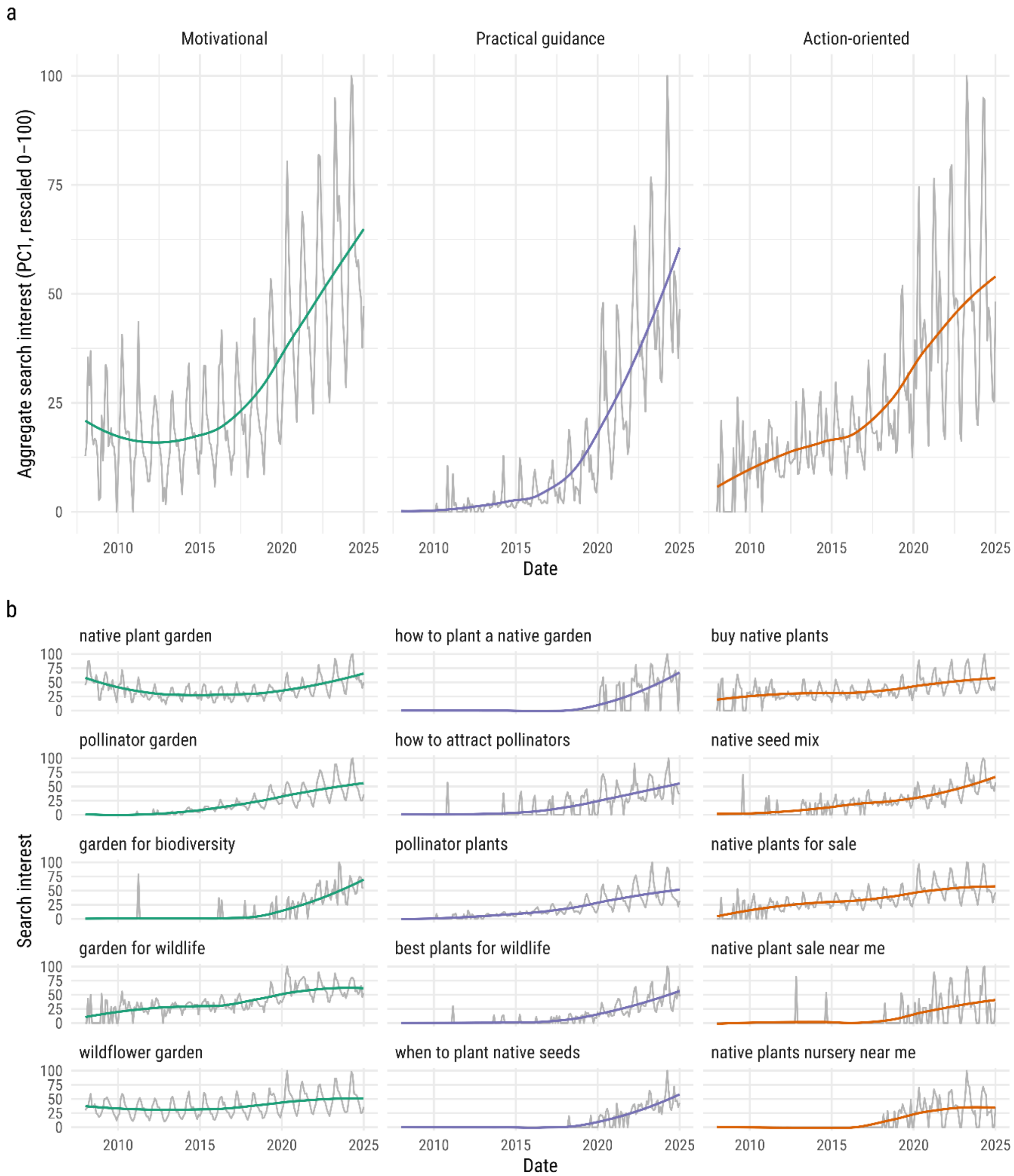

Fig. 1: **Rising public interest in native plant gardening based on Google Trends data.** (a) Aggregated search trends for three engagement levels (motivational, practical guidance, and action-oriented). For each level, a trend index was derived using a principal component analysis of five related search terms [see (b)]. (b) Search interest

for individual terms underlying the PCA in (a). Colored lines in (a) and (b) show LOESS-smoothed trends. Data are based on global English-language web searches, using the "All categories" filter in Google Trends, from 2008 to 2025. For more details see Methods S1-S2.

Google Trends data show rising interest in native plant gardening across English-speaking countries. Since 2018, three indicators representing different stages of engagement (motivation, practical guidance, and action-oriented) have increased (Fig. 1, Methods S1). Similar trend patterns are evident in Germany (e.g., for the search term "Naturgarten"; Methods S1), and market signals reinforce the same development. A leading native plant nursery (Gartenbau Strickler; pers. comm.) saw steady revenue growth from the 1990s to 2016, followed by a 25% surge after the widely publicized Krefeld insect decline study in 2017 (Hallmann et al. 2017). From 2017 to 2024, annual growth averaged 14–18%, with demand consistently outpacing supply. Individual nurseries report steady annual growth, despite growing competition from new producers entering the market post-2020. The nationwide program "Tausende Gärten Tausende Arten"[1] has further advanced the movement by building networks of actors, scaling up native plant production, and offering educational resources. Native plant gardening appears to be moving from niche to mainstream, with Germany offering a case where public interest, market growth, and policy momentum align.

Native plant gardening has been shown to foster a strong connection to nature and enhance environmental awareness (Lin et al. 2018, Beckwith et al. 2022, Hamlin and Richardson 2022, Soga and Gaston 2024). It may therefore offer a gateway to wider conservation efforts. In Germany, over 70% of native plant species are in decline, and about one-third are endangered (Metzing et al. 2018, Eichenberg et al. 2021). As a result, many native plant gardeners (often unknowingly) cultivate declining and endangered species in their gardens (Munschek et al. 2023), gaining direct experience with their ecological needs, life histories, and interactions. Native plant gardening thus not only promotes ecological literacy but already acts, in many cases, as a form of participatory *ex-situ* conservation (Segar et al. 2022, Staude 2024, Bucher et al. 2025). In some instances, these efforts have even extended into *in-situ* conservation, as illustrated in Case Studies 1–3 (see below). Yet, to our knowledge, no study has examined whether native plant gardening reflects a broader capacity or willingness to engage in more formal (*in-situ*) conservation efforts.

[1] https://www.tausende-gaerten.de/

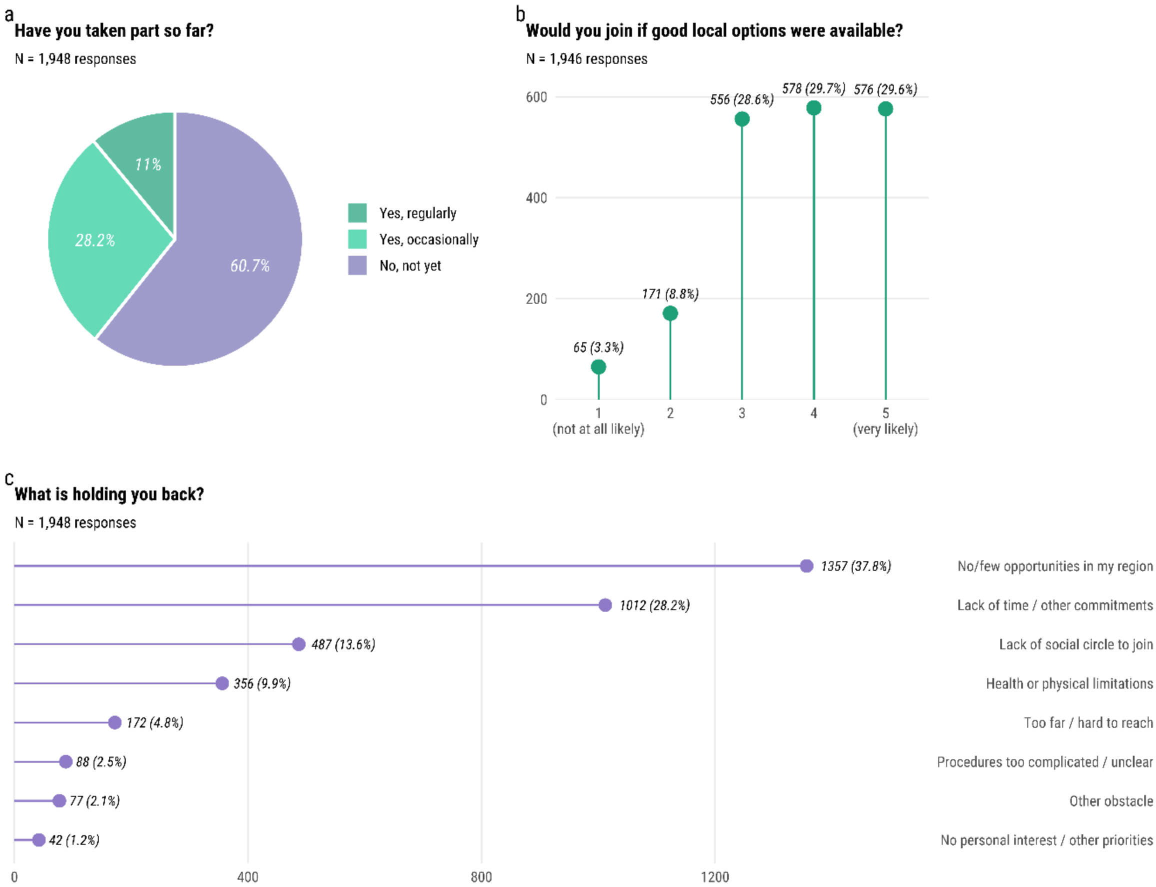

Fig. 2: **Native plant gardeners and willingness to participate in *in situ* plant conservation: potential and barriers**. Results from a questionnaire distributed via the newsletter of NaturaDB, a German native plant gardening platform, with 1,948 respondents. (a) Past participation in *in-situ* conservation activities. (b) Likelihood of joining in the next 12 months, assuming good local options were available (Likert scale 1–5). (c) Main barriers to (greater) participation in *in-situ* activities. For panels (a) and (b), respondents could select one option; for panel (c), up to three. Further details are provided in Methods S3.

We used a weekly newsletter from a major native-plant gardening platform in Germany, NaturaDB (https://www.naturadb.de/), which currently has around 38,000 subscribers, to distribute a short questionnaire gauging interest in plant conservation volunteering (Methods S3; Fig. S1-3). Responses from 1,948 native plant gardeners indicate that, while engagement in *in-situ* activities is moderate so far (Fig. 2a), about 60% would be willing to participate if opportunities were more widely available (Fig. 2b and c). Although some botanical gardens do offer plant conservation volunteering, these efforts are often restricted in scope, geographically scattered, and not widely publicized. As a result, volunteering in plant conservation is still far from a widespread societal practice (Sextus et al. 2024). The rise of native-plant gardening, together with the large share of gardeners willing to "bring boots on the ground" (well distributed in this case across Germany; Fig. S1), points to a substantial but as yet untapped potential to add more people to plant conservation.

To realize this potential, a framework is needed that offers clear, accessible ways for people to get involved while also establishing trust between conservation professionals and community stewards (Dietsch et al. 2021). Conservation professionals, especially in botanical conservation, are often cautious about involving non-professionals. Plant conservation is complex, and each species is unique in its needs, life history, threats, and solutions. The often hard-to-get information and difficult decisions behind conservation action are essential for guiding informed measures and avoiding actions that could make a bad situation worse. Thus, it requires not only adding more people to conservation but also building a system that fosters competence and trust. Community scientists have already transformed global biodiversity monitoring (Chandler et al. 2017); in the same way, a new frontier of community stewards could expand on-the-ground capacity for both *ex-situ* and *in-situ* plant conservation given the right facilitating framework.

A new framework for participatory plant collaboration

Here, we propose such a framework to strengthen collective capacity for plant conservation by linking community stewards, emerging from the native plant gardening movement, with the complementary strengths of several institutions. Botanical gardens contribute scientific expertise, species conservation programs provide a legal mandate, native plant producers add horticultural capacity, and gardening networks build social infrastructure (Fig. 3). To minimize risks, we emphasize training and certification of community stewards before they work with rare and endangered species. We draw on examples from Germany, where all elements are present but not yet systematically connected, and demonstrate through case studies that this framework is not merely conceptual but is, in part, already being implemented in practice.

Fig. 3: **Conceptual framework for scaling up plant conservation through community stewards.** The framework connects the strengths of existing institutions with the commitment of community stewards. Botanical gardens serve as hubs of conservation expertise, offering scientific knowledge and training. Conservation programs bring oversight and policy alignment. Native plant producers expand *ex-situ* capacity and supply plant material for restoration and reintroduction. Native plant gardening networks support community building and mobilization. Community stewards provide the local continuity and place-based knowledge that institutions lack. Together, these actors form a distributed network that expands conservation capacity.

Botanical gardens: Conservation competency centers

Botanical gardens are well positioned to act as central hubs connecting scientific expertise and community stewards (Linsky et al. 2024). They maintain living collections of endangered plants, hold permits to collect seeds, and employ staff with extensive technical and scientific expertise (Mounce et al. 2017). In some regions, this infrastructure already supports both *ex-situ* and *in-situ* conservation. In Germany, for example, a network of five botanical gardens (the WIPs-De II project) conserves around 120 species for which Germany bears special responsibility (Wöhrmann et al. 2020). The project generates valuable knowledge: from species distributions to practical protocols for seed collection, cultivation, and reintroduction, while also building partnerships with local authorities and landowners. Initiatives like this mark important progress in plant conservation.

Yet, given the scope of the biodiversity crisis, with thousands of endangered species and many regional or local extinctions occurring long before species appear on a Red List, such lighthouse projects, while essential, still represent a relatively limited response. This is especially true for *in-situ* conservation, where each additional site requires sustained management, and human resources need to grow along with the number of sites (Westwood et al. 2021). Reintroduction sites, in particular, demand post-planting management to ensure long-term success (Godefroid et al. 2011). Even in *ex-situ* conservation, constraints remain, as botanical gardens have limited space in their living collections to maintain genetic diversity, nursery space is limited, and seed banks suspend evolutionary processes (Ismail et al. 2021). Recent studies suggest that private gardens and community participation could complement and expand these traditionally expert-led and centralized efforts (Ismail et al. 2021, Segar et al. 2022, Munschek et al. 2023, Staude 2024, Bucher et al. 2025).

Botanical gardens possess essential know-how for practical conservation efforts. But to drive species recovery at scale, they must be supported in taking a greater role in disseminating this knowledge, providing training, and helping decentralize conservation through strategic partnerships (Westwood et al. 2021). While outreach funding exists, it often supports general environmental education rather than the practical skills required for species conservation (Ardoin et al. 2020). This is a missed opportunity. Botanical gardens are well positioned to serve as conservation competency centers, offering training for community stewards in seed collection, propagation, *ex-situ* cultivation, and *in-situ* measures, while also providing the expertise to preserve and maximize genetic diversity in these processes. A few existing *in-situ* conservation volunteer programs at botanical gardens, such as the Native Plant Trust's Volunteer Program[2], point to models that could be scaled up and duplicated. To make this possible, botanical gardens need to be supported both in additional funding for curriculum and training format creation, as well as for staff to conduct training, among other needs.

Species conservation programs: Legal mandates and regional coordination

Governmental species conservation programs are key partners in our framework, given their responsibility for *in-situ* conservation and their extensive expertise in biodiversity conservation. In Germany, they operate at the state level and focus on regional priority species, holding knowledge about their occurrences and management needs. Their legal mandate enables coordination with landowners and local authorities, providing access to sites for monitoring, management, and reintroduction. Yet their capacity is extremely limited. In some federal states a single officer may be responsible for around 1,150 populations but is able to check only about 400 per year (Anja Görger, pers. comm.). And much of this expertise rests with individuals who have dedicated decades to this work, raising concerns about continuity as they retire. Implementation is further hampered by conflicts with land managers, who may

[2] https://www.nativeplanttrust.org/conservation/plant-conservation-volunteer-program/

perceive conservation measures as restrictions, and by conservation officers being frequently diverted to politically more salient issues (e.g., wolf management). Unless new collaborative models emerge, the system will likely remain overwhelmed by the scale of conservation needs.

In this context, community stewards can make a difference by providing continuous local presence, local knowledge, and contacts. Their regular presence could allow conservation activities such as monitoring and management to become part of everyday life. Moreover, as they are familiar with the region, stewards often know potential sites for species reintroduction. Through their contacts (e.g., with private landowners or part-time farmers who may take pride in supporting rare species) they can, through dialogue on equal footing, encourage landowners to participate in conservation initiatives. Linking potential steward contributions, such as monitoring, *ex-situ* cultivation, reintroductions, and landowner engagement, with conservation programs could ensure that these activities are authorized, documented, and aligned with policy goals and scientific standards. For this to work, conservation programs need support to strengthen their capacity for oversight, delegation, and coordination.

Native plant producers: Scaling up plant propagation and distribution

Native plant producers are vastly underutilized partners in plant conservation. They possess expertise in propagating native species and have the capacity to produce seeds and young plants at relatively low cost. This makes them well suited to support both *ex-situ* conservation and broader ecological restoration. For instance, in Germany native plant producers already produce many endangered and declining plant species (a recent study estimates c. 650 regionally endangered species are already commercially available; Munschek et al. 2023). Yet most producers lack official permits to collect seeds from local wild populations of native species. As a result, the provenance of their seeds is often unclear, which undermines their ability to reinforce regional gene pools. Although they play a key role in native plant production and are the primary source of material for native plant gardeners, nurseries and seed producers remain side-lined in formal conservation efforts. This is another missed opportunity.

Many producers are eager to change this lack of integration (pers. comm. Friedhelm Strickler). In response to rising demand for regional plant material (Mainz and Wieden 2019), they are increasingly looking to collaborate with botanical gardens and conservation programs to obtain local-provenance seed and align with conservation standards. In turn, they could scale up the production of limited local-provenance plant material. Native plant producers could also take an active role in training community stewards by sharing propagation expertise and distributing seeds or young plants to stewards. This would allow stewards to build practical knowledge of specific species through direct experience in their gardens. It would also help relieve the space constraints of botanical gardens, both in their living collections and in their nursery facilities, while at the same time enhancing genetic diversity by producing larger numbers of individuals from a wider range of seed sources (Ismail et al. 2021).

To make this vision more concrete, conservation programs and botanical gardens could initiate collaborations with producers by offering conditional permits and setting standard operating procedures. Botanical gardens would supply local-provenance seeds or plant material, while native plant producers would cultivate them under agreed standards and distribute them to conservation projects and stewards, and sell them to the wider gardening market. In the initial stages, costs could be shared through existing capacities, such as space provided by producers, starter seed from botanical gardens, and permit management by conservation programs, to establish collaboration models. Over time, sustainable funding mechanisms are essential for scaling up and maintaining these networks efficiently. Part of the revenue that producers generate from selling local-provenance seeds and plant material to gardeners could flow back into the collaborative network, e.g., to support staff at botanical gardens. In this way, native plant producers could become partners in conservation supply chains.

Native plant gardening networks: Activating community stewards

In our framework, native plant gardening networks provide a starting point for recruiting community stewards, as their members already combine plant knowledge, horticultural skills, and commitment. Regional working groups within such networks provide opportunities for community building and peer-to-peer learning. Germany's NaturGarten e.V., a nationwide network of native plant gardeners, illustrates this. Over the past three decades, it has grown into a community of around 4,500 members, including both professionals (horticulturists, landscape architects) and private gardeners. Its public Facebook group, "Naturgartenforum," now has more than 88,000 members, and several regional working groups coordinate outreach, training, and practical projects to create and restore habitats. Together, such networks hold extensive botanical knowledge and a strong commitment to species conservation (Fig. S3).

Of course, there are other potential sources of community stewards. Native plant societies or volunteer programs offered by botanical gardens, where they exist, can also activate stewards, and botanical gardens themselves reach vast audiences (around a billion visitors globally each year, both in person and online; Mounce et al. 2017). Non-governmental organizations with a broad volunteer base, for example in Germany the "Naturschutzbund Deutschland (NABU)", are likewise valuable networks, although participants here often do not specifically have a botanical background. More broadly, gardening is widespread in the general population. In Germany alone, around five million people cultivate allotment gardens, which are organized through associations up to the national level and can therefore be reached with regular communication (Staude et al. 2024). The potential for diffusion effects of native plant gardening networks to spread rely on participatory conservation becoming an increasingly routine social activity (Segar et al. 2022).

To support such diffusion, methods that enhance social recognition and engagement such as certification and an interactive community platform could play an important role. Since many native plant gardeners already seek acknowledgment through certification of their gardens, this idea could be extended to the people themselves. A "Community Steward" certification could signal readiness to participate in conservation (outlined below), providing both motivation and recognition. When certified stewards share their experiences within their networks or through a community platform, peer exchange can foster the broader diffusion of conservation literacy. Ultimately, the aim would be to build a platform that both fosters community and serves as a central place to access organized conservation opportunities organized by regions, ranging from entry-level volunteering to certified stewardship roles.

Training, certification and safeguards

Scaling up science-informed participatory conservation requires not only willingness but also competency. We propose a two-tier system. At the entry level, basic stewards might engage in low-risk activities such as planting common native plants, maintaining habitats (e.g., weeding, mowing), helping with logistics and event organization, monitoring common species, or supporting outreach. These activities require only a brief orientation and are carried out under the oversight of conservation programs or certified stewards. A smaller group of stewards would progress to full certification, which authorizes them to handle rare or endangered species and to coordinate regional volunteer efforts. To reach this level, stewards must complete training that ensures they can work responsibly with such species.

Training could draw on the strengths of the different institutional partners. Botanical gardens act as central training hubs, offering instruction in seed collection, propagation, *ex-situ* cultivation, and conservation etiquette, with a focus on preserving genetic diversity. Conservation programs would provide species-specific knowledge and practical management skills, combined with site visits and field work. Native plant producers could supply plant material and cultivation expertise, enabling stewards to gain experience with target species in their own gardens. Training would also cover monitoring and documentation using agreed standards and digital tools, alongside modules on data ethics and information sensitivity to prevent misuse of occurrence data (Soroye et al. 2022). Elements of such curricula already exist. The Center for Plant Conservation offers its Rare Plant Academy[3] which provides online resources on a wide range of plant conservation practices and could be built upon.

After completing training, participants would undergo an assessment leading to certification. As part of certification, stewards would sign a code of conduct specifying their responsibilities in handling rare species and sensitive occurrence data. Certification would authorize specific responsibilities: (i) accessing sensitive occurrence information on rare and endangered species, (ii) assisting with propagation and *ex-situ* cultivation, including in their own gardens, (iii) participating in habitat management for specific species, (iv) contributing to reintroductions in coordination with conservation programs, and (v) documenting all activities, including where wild-provenance material is planted *in situ* or *ex situ*, in a system accessible to authorized partners. Certification thus ensures that participatory conservation is carried out responsibly.

Emerging roles of community stewards: evidence from three case studies

In our proposed framework, collaboration follows a clear agenda: (i) monitoring of species, with stewards contributing local observations; (ii) propagation and *ex-situ* cultivation, with nurseries scaling up plant material, botanical gardens ensuring genetic diversity and providing best practice guidelines, and stewards gaining hands-on experience through cultivation in their gardens; and (iii) reintroduction, coordinated with landowners and conservation programs, with stewards helping with landowner contacts, planting, management, and monitoring. While not yet organized at scale, elements of this framework are already visible. In Germany's Black Forest, three case studies show how native plant gardeners have begun to act as community

[3] https://saveplants.org/cpc-rare-plant-academy/

stewards: monitoring species, maintaining *ex-situ* populations in private gardens, collaborating with nurseries on propagation, and working with conservation programs on reintroductions and management (pers. comm. Ralf Engel).

Fig. 4: **Case studies illustrating how community stewards already contribute to *in-situ* (and *ex-situ*) conservation.** a–d: Silver thistle (*Carlina acaulis* ssp. *caulescens*). A relict population persists where mowing is difficult (a, b). Seeds were harvested, propagated by nursery (c), and reintroduced (d). e–i: Tufted loosestrife (*Lysimachia thyrsiflora*). Plants were successfully introduced to a suitable wetland (f-h) from an *ex-situ* private garden population (i). j–m: Bog pimpernel *(Anagallis tenella*). One of the last known occurrences is hand-managed with a scythe (j). The species is easily outcompeted and depends on moist, nutrient-poor sites (k), which are rare. It was introduced to new suitable sites (l) and also thrives in private *ex-situ* cultivation (m), representing a potential conservation reservoir.

Case 1: Silver thistle (*Carlina acaulis* ssp. *caulescens*; Fig. 4a-d) is a dry-grassland species that disappears quickly when sites are left unmanaged or converted to meadows, persisting only under a single late-season cut. Near where a community steward lives, a range-edge population is considered locally endangered. Today it persists in just two small meadow populations totaling 78 individuals, located mainly along field edges. While these populations were assumed to be stable in the short-term, consistent monitoring by the steward revealed an ongoing decline, information that would otherwise have been missed without regular on-the-ground presence. An initial steward-led propagation attempt, coordinated with the regional conservation program, failed due to premature seed collection. With guidance from a nearby native plant nursery familiar with the species' reproductive biology, the process was repeated correctly the following year. Seeds were collected from multiple individuals across the population to capture available genetic variation, propagated in the nursery, and sown in autumn, yielding 43 healthy seedlings that were reintroduced to the meadow. Only one survived. A third attempt, using older seedlings with more developed root systems, markedly improved survival in the field. This case illustrates several components of our framework. Steward-led monitoring detected a decline that would have escaped notice. Nursery involvement provided the horticultural expertise needed for successful propagation and reintroduction, and although missing in this case, early guidance from a botanical garden could have complemented these efforts and helped avoid missteps.

Case 2: Tufted loosestrife (*Lysimachia thyrsiflora*; Fig. 4e-i) had not previously been recorded in the Black Forest region until a community steward unexpectedly discovered and rescued a small population. They noticed an unusual, exotic-looking plant in a wet meadow and collected a small vegetative stem fragment with roots for identification. Rather than discarding it, they placed it in their garden pond, where it survived and eventually thrived. Meanwhile, the wild population from which it originated disappeared, leaving the garden population as the only remaining material in the region. Later, with permission from the regional conservation program, individuals from the garden population were successfully introduced into a suitable wet meadow. The steward identified the site, a former golf course, in consultation with the conservation program and secured landowner permission. This initiative prevented the regional loss of an otherwise undocumented population, with a private garden serving first as an *ex-situ* refuge and later as a source for reintroduction. Local knowledge proved essential for both site selection and landowner engagement. At the same time, the entire stock derives from a single clone, creating an extreme genetic bottleneck. This case shows why coordination among stewards, botanical gardens, conservation programs, and native-plant producers is important. Stewards can act quickly, contribute local site knowledge and relationships, and provide *ex-situ* cultivation capacity, while institutional partners can help address genetic limitations. Near-term, steward-led actions can buy time until more robust strategies are implemented to maximize genetic diversity and ensure long-term success.

Case 3: Bog pimpernel (*Anagallis tenella*; Fig. 4j-m) is on the brink of extinction in Germany. At one of only three known remaining sites, a community steward partnered with the regional conservation program to manage a wet meadow. During mowing, excised shoot fragments were redistributed across similar microhabitats (meadow swales), leading to two new stable populations over five years, both maintained through biannual management and documented in location. Supervised by a conservation program officer, the steward also experimented with small-scale soil disturbance, which appears to benefit the species. This optimized management is now planned for implementation in one of the remaining sites. The steward also maintains an *ex-situ* garden population, established under permit from wild-provenance material. This case illustrates several components of our framework. Conservation programs can expand their capacity by guiding steward-led habitat management. Collaboration also generated new ecological knowledge, in this case about disturbance regimes that improve persistence. The *ex-situ* garden population represents an additional conservation reservoir. Within our framework, botanical gardens could strengthen such efforts by verifying and recording decentralized *ex-situ* populations, assessing their genetic value, and linking them to national databases. Nurseries could further contribute by multiplying these *ex-situ* stocks, and because *A. tenella* is relatively easy to cultivate *ex situ*, garden populations, if expanded, could provide a steady supply of plant material to secure the species' future.

Way forward

The case studies highlight that native plant gardening communities include stewards with the skills, commitment, and local knowledge to contribute to conservation. The challenge now is to transform this scattered engagement into a coordinated network that supports conservation more broadly. We argue that this requires treating stewardship not as an amateur activity but as an essential part of societal infrastructure (Berkes 2004, Ganzevoort and van den Born 2023). In Germany, this could mean establishing conservation competency centers, anchored in botanical gardens, which would build skills and connect stewards with national conservation priorities. Such structures could be adapted by other countries and linked internationally. Just as the Global Biodiversity Information Facility has become a backbone for community-science infrastructure, a stewardship network could form the backbone for community-based conservation, focused on people rather than data. In this way, the efforts of stewards become an integral part of national and ultimately global conservation goals.

For such a system to succeed, continuity and structural funding are essential. Conservation ministries and biodiversity strategies could earmark funds for participatory conservation to complement traditional measures, such as protected areas. In practice, this could draw on models from agriculture, such as the farm advisory services supported under Europe's Common Agricultural Policy. These provide farmers with permanent, publicly funded support that ensures scientific knowledge is translated into on-the-ground practice. Similarly, conservation could establish structures that translate scientific knowledge into practical action and build collective capacity for biodiversity stewardship. This could transform plant conservation into a participatory, distributed system and a normal part of societal life, where knowledge expands rather than remains the preserve of experts. In doing so, such a participatory system could help close the persistent "doing gap" in biodiversity conservation.

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