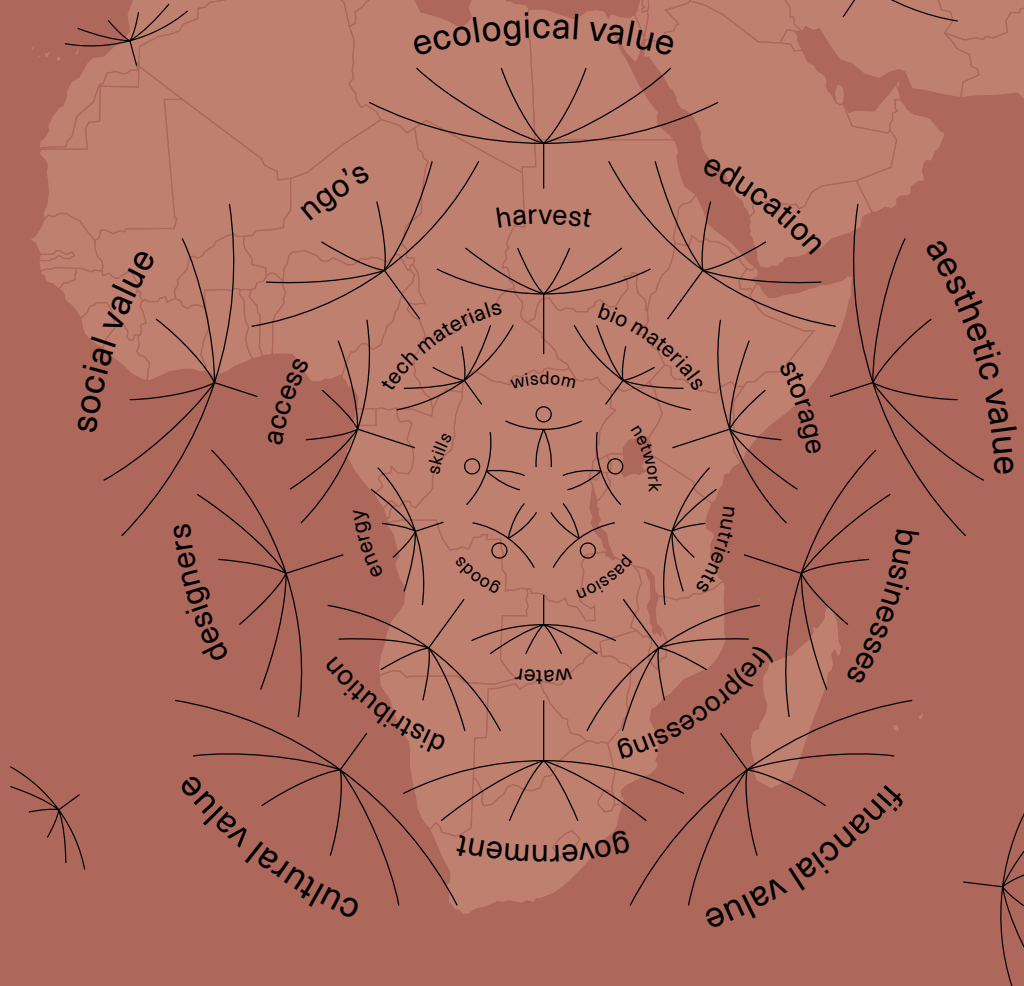


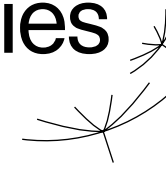
Circular Communities

Learning from Global Practices
Using the Circular Value Flower



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Using the Circular Value Flower



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Foreword

I am writing this from Nairobi, a city where the gap between official plans and daily life is wide, but where communities are closing that gap every day. Over the past two years I have had the privilege of working alongside the authors of this book and the communities whose practices fill its pages. What I saw confirmed something I have long held to be true. The transition to a sustainable and just society will not be handed down from above. Instead it is built street by street, by people who organise themselves around shared resources and shared responsibility.

There is a word for this where I come from. *Ubuntu*: I am because we are. This means that a person is because of others, that wellbeing is relational rather than individual, and that what we have, we hold in common. In many communities, this is still a working logic for closing resource loops, sharing risk and maintaining value inside the community.

The dominant economic model struggles to see communities as serious actors. It rewards extraction and treats the neighbourhood as too small to matter. This book argues the opposite. The Circular Value Flower (CVF) method provides a tool for this perspective, making visible the layered values, be they ecological, social, cultural and economic, that community-led practices generate and that conventional formal capitalistic systems ignore.

Global learning communities matter because no single place holds all the answers. When practitioners in Nairobi, the Galápagos, Indonesia and the Netherlands learn from one another, each keeps its own roots while widening its view. That is the quiet promise of this book. I am honoured to have walked part of this road with them.

Elsie Onsongo, Director, Nuvoni Centre for Innovation Research, Kenya

In an unpredictable world riddled with unprecedented disruptions, communities play a crucial role in maintaining resilience. Compared to global policies that feel too distant and individual actions that feel too small, a community that has the perfect size to make real change happen. It is large enough to pool resources and build local infrastructure, yet small enough to maintain personal trust and accountability. Communities are essential in circularity, which thrives on proximity; they can easily close resource loops by setting up, sharing and running local collective facilities. Such community initiatives require respectable leadership and clear strategies in order to achieve shared purposes. These phenomena come in different models, depending on the characteristics of the communities and their places of actions, also their local potentials and ecosystems. It is therefore timely to have the Circular Values Flower (CVF) model explored and discussed, since this encourages identification of roles, shared values, and objectives. It allows communities to actively and regeneratively practice sovereignty within their living spaces.

Dr. Dwinita Larasati, Head of Master in Design Program, Institut Teknologi Bandung. Co-founder, Bandung Creative City Forum & Indonesia Creative Cities Network

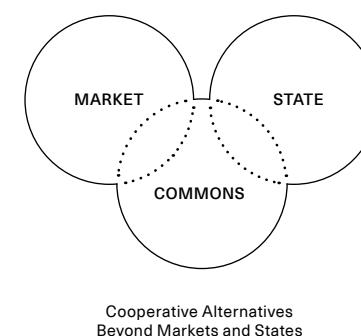
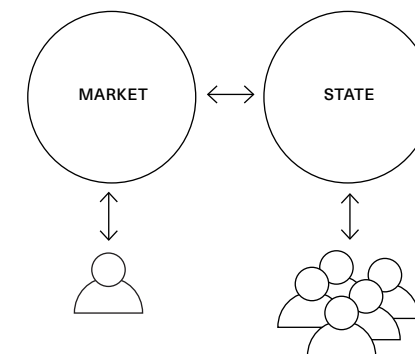
Introduction

Why This Book?

It has been five years since we began our learning journey into circular community practices, rooted in closing and maintaining resource cycles at local level, the connection these have to land and the generation of integrated values. We developed a model – the Circular Value Flower model – and an associated method to demonstrate and communicate the complexity, connectivity and relational character of these community-led practices. In recent years the climate crisis, biodiversity loss and social injustice have all deepened, and the call for collective action from scientists, practitioners and activists has become louder, stressing the growing urgency of these issues; unfortunately, however, a global collaborative response through effective policies and measures appears increasingly difficult to achieve.¹ Global circular practices have actually declined from 9.1% in 2018 to 7.2% in 2023,² underscoring the gap that persists between circular ambition and material outcomes as the current value regime still rewards an extractive linear production and consumption model. Meanwhile, the planet is heating up, resources are becoming scarce and polluted, and consequences more difficult to mitigate – and we still lack the collective will, means and power to avert this human-induced catastrophe.³

In the first volume of *Circular Communities*, the potential of community-led practices as seeds for sustainable change was discussed using the Circular Value Flower method to analyse seven circular practices in the Netherlands. If anything, the examples cited there showed that citizens are more than capable of organizing themselves, entering into meaningful collaborations and achieving added value for their communities in their living environment. In this way, they contributed to the overarching national and international objectives of transitioning towards a sustainable and just global society, in harmony with planet Earth and with one another. However, experiences with the Dutch initiatives also revealed the struggles, barriers and challenges these community members faced. These cases demonstrated how neighbourhood scales and the collective lives of communities remain largely invisible within the dominant Western state/market dichotomy. The transitions (in energy, resources, etc.) needed to avert planetary disasters are discussed and developed mainly through centrally organized, top-down implementation. In these policies, people bear responsibility for their individual behaviour and are encouraged to be good citizens, for example by flying less and collecting rainwater, rather than building on the power of collective action.

We believe, however, that a systemic approach at neighbourhood level is essential to accelerate these transitions, with local communities in a prime position to take on responsibility and stewardship of resources. Examples seen in the previous volume of *Circular Communities* and numerous other (Indigenous) communities around the world – both present and past – show that an alternative economic model, based on cooperation rather than competition and on circularity rather than creating surpluses and scarcity, is not only feasible but essential as the current economic model leads to depletion of the planet's resources. Communities – still all-too-frequently overlooked as serious actors within dominant state/market/individual relations – have the ideal scale for collective action and transformation of deeply rooted systemic patterns.⁴ We, in the Netherlands – but this is applicable to most of the Western world – must therefore re-learn how to operate, value and facilitate community-led practices.



In this new volume of *Circular Communities*, we have extended our research to other countries – the Galápagos Islands, Indonesia and Kenya – to shift our Western perspective towards a wider view of communities worldwide. We collaborated with local circular communities to collectively learn and cultivate a shared understanding of different narratives on how circular and regenerative entrepreneurial practices can be re-imagined and re-learned.

In our long-term collaborations and partnerships with communities across the globe, we have sought to work from what is often referred to as a 'Two-Eyed Seeing' perspective, or *Etuaptmuk*. A concept articulated by Mi'kmaq elder Albert Marshall, *Etuaptmuk* invites different knowledge systems to combine: learning to see through one eye with the strengths of Indigenous ways of knowing, and through the other with the strengths of Western scientific views, thereby using both together for the benefit of all. Such Two-Eyed Seeing proposes a relational, ethical practice that recognizes the distinctiveness, integrity and responsibilities of different epistemologies, while fostering respectful coexistence and dialogue between these.⁵

1 Guenther, COP 30, *The Guardian*, 2025
2 Fraser et al., 2024
3 IPPC, 2022

4 Bacq, et al., 2022
5 Sylliboy, 2025

At the same time, we are conscious that we, as Western researchers, do not embody *Etuaptmumk*. We therefore approach this as an ethical orientation; one that calls on us to remain attentive to plurality, relational accountability and epistemic humility, and to continually unsettle the dominance of Western knowledge systems. In our work, we seek to create space for the wisdom of local communities, while remaining reflexive about the limits of our own ways of seeing – particularly Western, technocentric narratives that so often frame circular economy models.

We listened to local Indigenous knowledge systems (for example *Buen Vivir*, *Ubuntu*, *Tri Hita Karana*, etc.) to learn how these relate to nature and our other-than-human relatives, how they incorporate complex ecological, political, social and cultural knowledge systems and spirituality and lived experiences into their activities, and how they organize and govern their communities in order to honour their wider, complex perspective on value creation. We learned how, for millennia, these communities have woven their relationships with land and other human beings into their daily practices. As a result, these communities hold an important, central position within the lives and activities of women in particular. They foster flexible yet stable networks and relationships that serve as the basis for collective action.

In this second volume of *Circular Communities*, we share what we have learned from circular resource initiatives around the world, and how the Circular Value Flower method has demonstrated its use as a design tool facilitating circular communities in achieving regenerative practices based on equality, justice and citizens' agency. Simultaneously, the method provides an alternative approach to our current extractive economic model and perceives bottom-up practices as crucial elements in our cultural transition towards a sustainable, just society. This book is written for all ambitious citizens, collectives and communities who share the passion and urgency to inherently, deeply change our perspective on current affairs; for civil servants, NGOs and businesses engaged in regenerating material cycles at neighbourhood level, and for design professionals with a particular interest in co-designing and collaborating with circular communities to allow these to grow, flourish and achieve a broader scale.

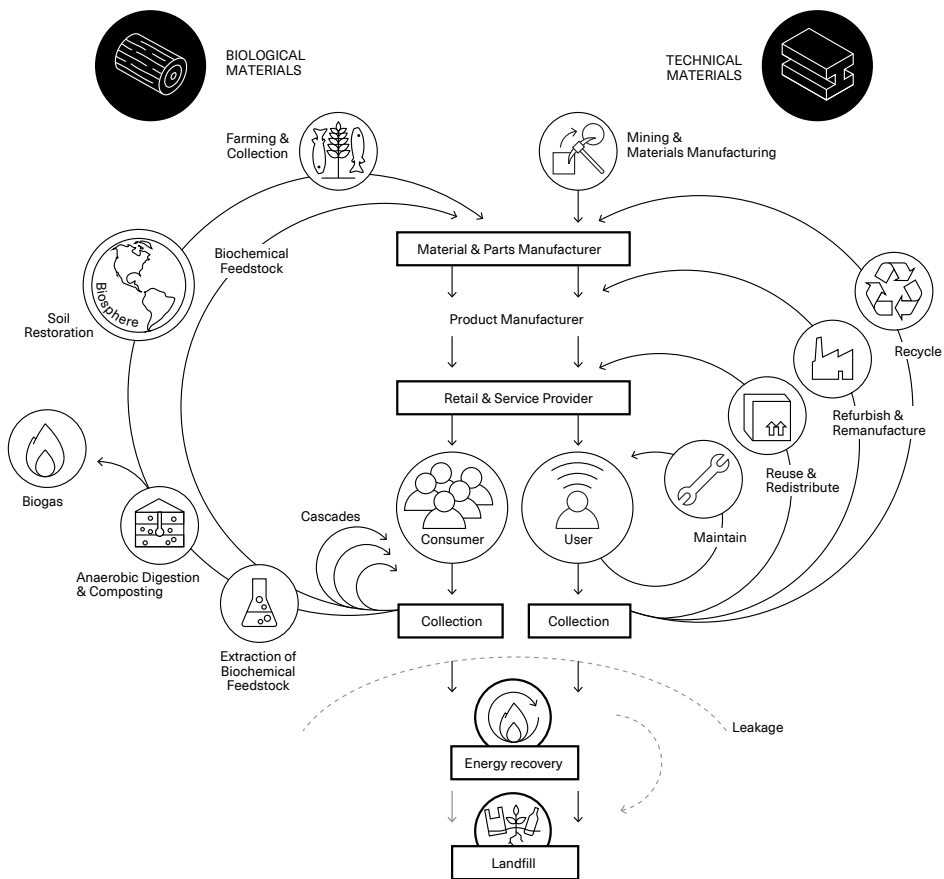
The Transition to Circular Practices

The call to transform our current linear, degenerative economic model – which has weakened the planet's regenerative capacity – into a circular economy is echoed in many official policy documents at national, regional and local levels.⁶ This means we need to convert the current linear production chains of 'raw-material use → product → waste' into closed cycles in which waste and unnecessary use of raw materials are prevented. A turning point was reached in 2020: from that year, the amount of man-made products (concrete, glass, plastic) exceeded global biomass for the first time.⁷ Although our current economic activities are based on these outputs and the necessary resources to compile them, these levels 'are completely unsustainable'.⁸

This growing material imbalance not only signals ecological overshoot, but also reflects a deeper crisis of how economies relate to land, ecosystems, and living systems more broadly.

The process of closing resource flows distinguishes between cycles of bio-based regenerative materials such as wood and natural fibres, which can eventually be reabsorbed by the natural ecosystem, and cycles of finite technical materials such as oil products (plastics), cement and steel, which can be reused through circular design strategies and consequently circulate endlessly in the production system. The Ellen MacArthur Foundation, originator of the concept of the Circular Economy, defines this as 'a system that is restorative and regenerative by design: materials never become waste, and nature is regenerated'.⁹

The butterfly diagram (based on Ellen MacArthur 2012)

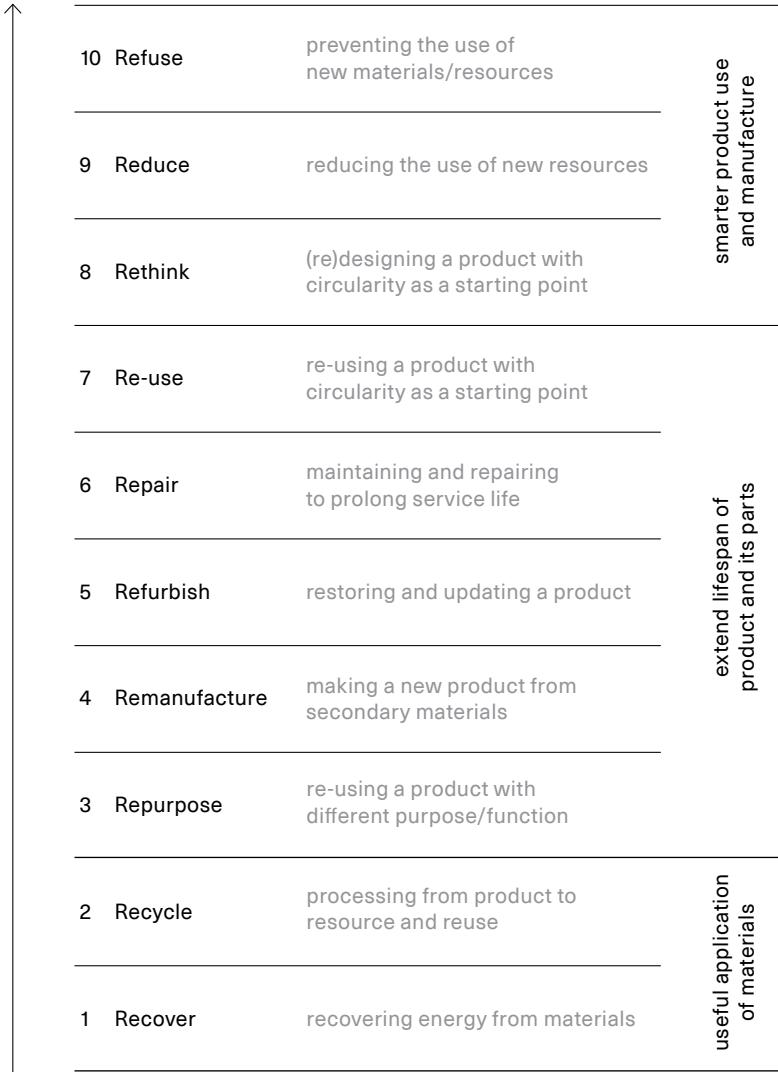


6 Dasgupta, 2021; Ellen MacArthur Foundation, 2021
7 Fraser et al, 2024
8 Elhacham, 2020
9 EMF, 2021

An ‘R-ladder’ – a cascading system of circular strategies for non renewable materials or products – is often used as a guiding model for the necessary steps towards circularity, including design strategies. The higher a strategy is up the R-Ladder, the more circular it is. The R-ladder can be summarized in the three steps ‘reduce, re-use and recycle’:

- Reduce – At the top of the ladder is reducing consumption and production and making and using products in a smarter way.
- Re-use – In the middle is extending the life of products and components.
- Recycle – At the bottom is the useful recovery of materials that would otherwise go to landfill.

Circular economy



Linear economy

The R-ladder (based on Netherlands Environmental Assessment Agency 2019)

Whilst circularity aims to close material cycles and minimize resource extraction, the concept of a regenerative economy focuses on restoring and strengthening ecological and societal well-being, striving towards a society in balance with its natural environment.¹⁰ Rather than positioning regeneration as a technical add-on, regenerative approaches emphasize living systems, relational accountability, and the active restoration of socio-ecological conditions. Regenerative practices include, in addition to the various ‘solid’ material flows in the bio-based and technical cycles of the circular economy, ‘flowing’ operational resource cycles of water, nutrients and energy. These cycles are often referred to by scientists as a ‘nexus’, and are crucial to (human) life. Particularly in relation to community development, there is a growing awareness of the need for a circular approach ‘that enables local interactions between water, food and energy cycles, taking into account the synergies and trade-offs that arise from managing these three resources’.¹¹ Community-led initiatives often engage these nexuses as lived territorial relations connecting livelihoods, food practices, ecological stewardship and cultural continuity.

Regenerative businesses thus propose a narrative that not only focuses on closing resource loops or balancing economic and ecological factors, but also seeks to redefine relationships between humans and nature by adding a layer of individual purpose, leadership and the rights of nature.¹² From a community perspective, regeneration further involves collective governance, place-based responsibility, and the re-embedding of economic activities within local ecologies and social fabrics.¹³

Regenerativity as a form of circularity may well be a concept that originated in Western thought, but its principles stem from centuries-old Indigenous worldviews. Indigenous peoples have profoundly different relationships with the land, seeing this as a living force deserving of care rather than as an asset from which value can be extracted,¹⁴ as well as with other members of their communities. In this view, land and sea are not ‘resources’ but living territories that sustain identity, governance, and economic possibilities. Based on this Indigenous wisdom, we can relate regenerativity to the following five principles:

- | | | | |
|---------------|--|---------------|--|
| 1 Reciprocate | to ensure mutual benefit between humans and nature in all anthropogenic activities. | 4 Resonate | to relate to the biorhythms of the specific location, such as the seasons, weather patterns or breeding seasons. |
| 2 Restore | to rehabilitate damaged land in order to rejuvenate natural resources that are self-regulating. | 5 Re-localize | to re-establish something within and relate this to the specificity of a context. ¹⁵ |
| 3 Recognize | to acknowledge or (re)connect with the existence of something and show appreciation to a person or group for contributions made. | | |

10 Konietzko et al., 2023
 11 Reinhard et al., 2017, p.13
 12 Konietzko et al., 2023
 13 Buijsman, 2025
 14 Arjaliès & Banerjee, 2024
 15 Buijsman, 2025

We do not see circularity as an end in itself, but rather as a means of achieving a sustainable living environment. 'Sustainability is a state of a complex, dynamic system. In this state, a system can continue to flourish resiliently, in harmony, without requiring inputs from outside the system boundaries'.¹⁶ In a sustainable economic system, all economic activities remain within the limits set by planet Earth, while contributing to the provision of sufficient shelter, food and well-being for all. Raworth (2017) calls this economic zone the 'doughnut', where the ecological ceiling and the social foundation represent the limits of the economic system and provide an indication of how to stay within the support capacity of Earth's ecosystems. The small scale of neighbourhoods, districts and villages seems a good basis for circular initiatives. The system boundaries of, for example, a closed water or material cycle and the associated responsibilities for its development and maintenance are manageable and tangible for the people who live within the locality. In addition, the impact of circular initiatives translates very directly into visible value for the neighbourhood, as the examples presented in this book will demonstrate.

The circular transition is often presented as a technological task consisting of decoupling economic growth and resource extraction, relying on specific technical expertise and knowledge.¹⁷ This approach ignores the fact that a circular economy requires a fundamental, systemic change to the current modus operandi; a technocratic approach can only achieve incremental optimization of the current system. A true transition towards a circular, regenerative economy is inherently political, cultural and social and involves reconfiguring relationships between communities, land and land ownership, institutions, and economies.

It is precisely this lack of a holistic perspective that raises many questions concerning design processes, the scales to which these transitions are best suited, and who has the necessary knowledge and skills, the responsibility, and how tasks should be allocated. Closing and maintaining the various resource cycles at a local scale has the potential to add significant value to the natural and built environment, but this depends on a systemic approach; the design and implementation of circular practices demands integration of various system dimensions and is inherently a collaborative effort, in the same way as within a natural ecosystem.

Multiple Value Creation: Towards a Balanced Economy

Critics of the concept of circular economy state that both the current incorporation of this concept into policy development and the shift in business activities towards circular practices follow a highly techno-optimistic path suggesting that, by decoupling economic growth from resource extraction, we as a global society can continue our current way of living within the current system of production and consumption. This technological approach tends to marginalize uncertainty, societal values, complexity, and stakeholder collaboration, and also fails to incorporate biodiversity loss, wildlife decline, and climate injustice.¹⁸ If we take the transition to a circular, regenerative economy seriously, we must question the concept of economic growth in itself along with its dominant indicator, Gross Domestic Product (GDP). It is precisely this critique of growth as the predominant objective of an economy that is becoming more widespread amongst activists and economists advocating for degrowth, post-growth, or arrival economics.

From the research we have undertaken over the past years into circular communities, we have observed that Indigenous and grassroots initiatives use circular concepts as means to achieve a broader multiple value creation goal. The concept of multiple value creation embraces ecological, social, cultural and aesthetic value as a core entrepreneurial objective alongside financial value. Whereas in Western terminology circularity and regenerativity mainly refer to resources, technology and socio-economic elements, the non-material layer of liveability, spiritual and cultural values is often overlooked.¹⁹

Many Indigenous communities have long centred this non-material layer within their ways of organizing social, ecological and economic life. Rooted in ancestral Andean and Amazonian worldviews, *Buen Vivir* (*Sumak Kawsay*) offers an orientation that fundamentally reframes what value, economy and development mean. Rather than conceiving human beings as isolated economic actors, *Buen Vivir* understands life as a web of reciprocal relations among humans, other-than-human beings, and territories, where collective wellbeing emerges from balance, care, and responsibility.²⁰ This relational understanding resonates with a wider constellation of Indigenous and place-based philosophies that decentre the individual economic actor in favour of communal and ecological reciprocity. The southern African philosophy of Ubuntu, captured in the Nguni maxim *umuntu ngumuntu ngabantu*, 'to be human is to affirm one's humanity by recognizing the humanity of others', frames wellbeing as inseparable from mutual care, intergenerational responsibility, and respect for the land that sustains the community.²¹ The Balinese cosmology of *Tri Hita Karana*, in turn, articulates harmony as the simultaneous balancing of three relationships—*Parahyangan* (the spiritual),

¹⁶ Bosschaert, 2022

¹⁷ Hobson, 2016

¹⁸ Kovacic et al., 2020

¹⁹ Sands et al., 2023

²⁰ Acosta, 2012; Vanhulst & Beling, 2014

²¹ Davids & Waghid, 2024; Boogaard & van Norren, 2022

Pawongan (the social), and *Palemahan* (the environmental)—and is enacted through everyday practices such as *Subak* irrigation governance and *Ngayah* voluntary community service.²² Across these cosmovisions, knowledge, technology, and governance are understood as ethical relational practices rather than instruments of control.

In this sense, *Buen Vivir* does not simply add a cultural layer to circular or regenerative models; it challenges their underlying assumptions by shifting attention from growth to relational restoration, coexistence and the flourishing of living systems. Recent Indigenous scholarship similarly emphasizes that contemporary crises are relational: they arise from processes of severance that disconnect people from land, water, ancestors, and one another, and that transform territories and knowledge into extractable resources.²³ Indigenous and community-led practices in land stewardship, fisheries and the reawakening of ancestral technologies demonstrate that regeneration is enacted through restoring relationships, embedding values into socio-technical practices, and reaffirming community authority over how knowledge, resources, and innovations are mobilized.²⁴ For circular communities, this perspective centres multiple value creation as a lived process in which ecological stewardship, cultural continuity, social cohesion and financial viability emerge simultaneously. It is precisely this understanding that informs our collaborations across Ecuador, Colombia, India, Indonesia, Kenya and Argentina, where circular community initiatives unfold as territorial processes grounded in collective care for land and water, giving rise to locally rooted forms of regenerative entrepreneurship. In this way, *Buen Vivir* and related Indigenous cosmovisions, such as *Ubuntu* in Africa and *Tri Hita Karana* on Bali, help us understand circular communities as practices where alternative economic logics take root through collective land stewardship. From this perspective, multiple value creation becomes a collective practice, concretely expressed through collaborative entrepreneurial models based on relationships, shared responsibilities, ownership and reciprocity.

The centrality of land is the foundation of well-being, knowledge, and economic life through an understanding that land is a living relational system, a source of identity, law, spirituality, sustenance, and responsibility.²⁵ Wellbeing, seen in this way, is an ancestral condition arising from the health of relationships among human and more-than-human beings. Indigenous knowledge systems like those mentioned above situate food systems, fisheries and resource management as reciprocal practices, where technological innovation is guided by attentiveness, care and long-term stewardship, rather than merely extraction.²⁶ This is why land operates not only as an ecological base, but as a pedagogical and political space where economic practices, governance arrangements and cultural meanings are continuously formed.

The place-based initiatives in this book regenerate local economies precisely because they are embedded in territorial histories, social bonds, and ecological specificities.²⁷ Land, then, is positioned as the ecological, cultural, spiritual and relational anchor of regenerative entrepreneurship, whereby community-led circular practices derive their capacity for creating multiple values to restore land-based relationships, mobilize situated knowledges, and cultivate collective commitments to care, continuity, and co-existence.

Circular Communities

Successful examples of circular economic practices typically draw on a capacity to create collaborative patterns of knowledge exchange based on multiple value creation and a collective purpose which goes beyond just resource management.²⁸ Community-led initiatives, with their inherent relational approach rooted in intrinsic motivation, passion and focus on incorporating a localized context and accommodating shared interests and values therefore have the ability to co-facilitate the transition to a sustainable society.²⁹

All over the world, citizens are already demanding authority, involvement and responsibility in relation to the development and management of activities in their own neighbourhoods or districts. This offers significant opportunities for jointly closing resource cycles. In non-Western countries, practices such as self-building homes using second-hand construction materials and cooking on biogas from organic waste collected in the neighbourhood are often driven by an existing culture of community life, the absence of an engaged government and economic necessity. The context of Western practices is different, as governments tend to have a stronger influence on the living environment, and facilities are often centrally organized; here too, however, initiatives frequently arise from a desire for stronger community life. In many cases, citizens act out of idealism to jointly realize sustainable, nature-inclusive or alternative ways of living and working. Current crises, such as in housing, food and energy, further fuel enthusiasm for collective forms and/or local organization.

The renewed focus on the local as a solution to global problems – think global, act local³⁰ – can be traced back, on the one hand, to the activation of empowered citizens who are able to organize themselves more easily thanks in part to opportunities offered by digital technology. On the other hand, emerging trends of globalization, larger social networks, better infrastructural connections, the arrival of large-scale commercial parties (liberalization) and the rise of the welfare state have also contributed to the weakening of ties between citizens and their communities and neighbourhoods.

22 Sudama, 2020

23 Martinez et al., 2023; Scobie, 2025

24 Denny et al., 2025; Cheok et al., 2025; Horwedel et al., 2025

25 Arjaliès & Banerjee, 2024

26 Denny et al., 2025

27 Rayner & Bonnici, 2025; Ludwig & El-Hani, 2025

28 Ghisellini et al., 2016; Slaveikova Nikolova & Ness, 2022

29 Marletto & Sillig, 2019

30 Klein, 1999

The gradual decline of Western welfare systems is increasingly resulting in the outsourcing to citizens of social tasks previously carried out by the state. This is often based around a rhetoric that emphasizes 'we', 'together' and 'local': for instance the 'participation society' in the Netherlands or 'Big Localism' in the UK.

In the light of the transition to a sustainable society, the development of technical and spatial solutions at the collective scale of the neighbourhood or district is increasingly perceived as an important link between central and individual systems.³¹ Across a growing number of domains, hierarchical – often vertical – structures are giving way to more horizontal connections, and the dynamics between these relationships have become more networked. Empowered citizens are organizing and finding one another in temporary or more permanent alliances around specific themes. Within these alliances, participants negotiate directions and measures to be taken, and initiate – often innovative – local projects and experiments.³²

These temporary or permanent alliances at local level, which we refer to in this book as circular communities, draw parallels with the concept of the commons, as documented by Elinor Ostrom (1990).³³ She conceptualizes the commons as the collective management and stewardship of one or more shared resources by the users, who co-govern these according to their own established rules and norms, without depleting these resources, as this would be against their own interests, both individual and collective. The commons can be understood as a form of self-governance: a democratic mode of self-organization that Indigenous and other communities have practiced for hundreds, or even thousands, of years. Commoners hold certain rights to particular resources, and with these rights come responsibilities, both to other people and to the land itself. For the commons to function, Ostrom discovered that several principles had to be in place, such as setting boundaries, contextualized rules, monitoring, use of sanctioning and the flexibility to change the existing rules. Through her research, Ostrom refuted the prevailing theory of the 'tragedy of the commons',³⁴ which regarded people as purely self-interested and therefore assumed that resources could only be managed by the state or through privatization. This pessimistic view of the capacity of human beings to act in the collective interest has been used by politicians, governments and private businesses to dismiss self-organization in relation to resource stewardship.³⁵

Circular communities follow the core principles of the commons, contextualized at neighbourhood scale, and move beyond the challenge of merely closing resource cycles in order to foster relationships between people and nature, build social and financial capital, and promote civic participation based on trust and reciprocity. Through their locally networked structure of engaged community members who are actively involved within their neighbourhood, circular community initiatives contribute – as a form of local direct democracy – to broader governance structures. These forms of local democracy are not intended to replace representative democracy, but rather to strengthen it.³⁶

These community-led initiatives are rooted in strong ties among community members, while also partnering with government bodies, businesses, foundations and knowledge institutions to implement co-developed ideas and plans. Partnerships and high levels of collaboration between these actors are considered essential in providing integrated responses to current challenges. Achieving such fruitful collaboration, however, requires not only active citizens but also sustained efforts on the part of government. As has been argued, 'conditions must be created, space made, rules bent, or existing blocking institutions dismantled'.³⁷ The question, of course, is whether a changing playing field will also lead to a level playing field on which all parties can participate on an equal footing. In practice, this remains doubtful, as governments tend to 'monopolize or market the public good rather than invest in active citizenship in the public domain'.³⁸

31 Hughes & Hoffmann, 2020

32 Evans et al., 2016

33 Ostrom, 1990

34 Hardin, 1968

35 Ostrom et al., 1999

36 Van Reybrouck, 2016

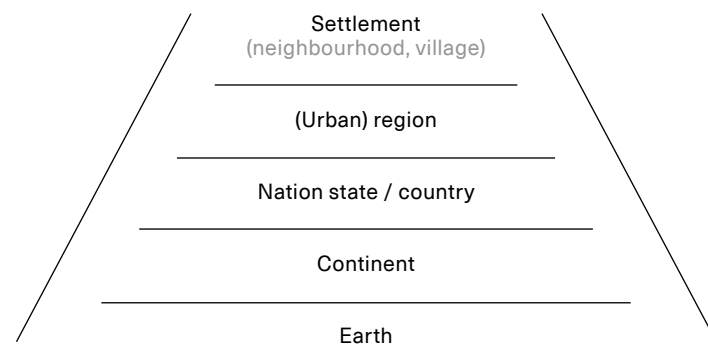
37 Van der Schot, 2016; ORR, 2025

38 Soeterbroek, 2015, p. 32

Working Through the Scales – an Ecosystem Approach

In our first Circular Communities book, we focused on circular community initiatives at neighbourhood scale. For this edition, we are further developing the Circular Value Flower method as a broadly applicable design and development model for valuable community-based resource systems at different scales, rooted in community-led practices. Our goal is to provide an understanding of the trans-scalar character of a collective resource system, explaining its ability to operate and interact across multiple scales from local neighbourhoods to global ecosystems, while remaining adaptive and context-specific.

Scale levels of collective resource systems:



Central to every scale level is the role of the urban or rural landscape as an eco-systemic base for local resource systems, regionally defined by territory, morphology and soil type(s). Regional networks are a hybrid scale: these combine resource management with governance, bridging different systems and higher-level rules. Global and national scales are indirect and more legislative – framing what regional and local systems can or must do. If community-led practices are not formally recognized by higher levels of government, it is difficult for them to enforce the established rules and norms.³⁹ On the other hand, these legislative frameworks must provide flexibility and autonomy for local practices to adapt their collectively administered rules. ‘Successful commons governance requires that rules evolve’.⁴⁰

Slowing and Scaling Down

Under the current economic system, the production and use of both biological and technical materials is strongly connected to mass consumption, driven by a global market economy in which we, as consumers, are often ignorant of where the materials for our products come from, how they are

produced, and where they end up at the end of their life-cycle. Materials are sourced from all over the world and then distributed for product assembly to maximize cost-efficiency, rather than using locally sourced materials and labour. For instance, 75 per cent of reed roof thatch – a traditional, local, biobased building material in the Netherlands – now comes from Eastern Europe or Asia.⁴¹ Dutch reed value chains – growing, harvesting and processing reed into bundles – cannot compete with value chains in other countries in terms of low wages, speed, and fossil-fuelled transportation.

The transition to a circular economy forms an opportunity to break with these production mechanisms, which deplete the planet and exploit labour – however, this demands that we change our habits, insourcing labour and production and reconnecting regeneratively with the local (urban) landscape. What if we re-build many smaller local resource systems to produce our food, the raw materials for buildings and consumer products, fuelled by locally distributed renewable energy cooperatives?

In Western countries, mostly large-scale utility companies manage and distribute operational resources which are typically disconnected from natural ecosystems. For example, relatively clean rainwater is transported in large quantities directly into the sewers, where it mixes with grey and black waste water. Valuable nutrients in black waste water, which could easily be recovered locally and used to nourish people, animals, plants and trees, travel long distances to central waste-water treatment plants.

With regard to energy production and supply, geopolitical tensions are causing rising prices and stagnation in renewable energy production. Compared to centralized systems, which dominate our current fossil-fuel-based economy, decentralized resource systems can make the built environment function as a resilient, regenerative ecosystem – starting from the local scale and landscape. As both Schumacher⁴² and Kimmerer⁴³ argue, resource systems function best at scales that are manageable, adaptable and integrated within local contexts. This is exactly the sweet spot for which we have developed the Circular Value Flower method.

Resource Systems as a Social-Ecological-Technical Framework

The work of Elinor Ostrom⁴⁴ approaches the complexity of a resource system as a social ecological system (‘SES framework’) composed of multiple subsystems that interact through the various scales, as shown in Figure 22. Ostrom’s emphasis on the interconnectedness of human activities and ecological systems, adaptive governance and the cultural importance of local context – which makes such systems inherently complex – has enriched our own approach.

³⁹ Ostrom et al., 1999

⁴⁰ Dietz et al., 2003

⁴¹ Vakfederatie Rietdekkers

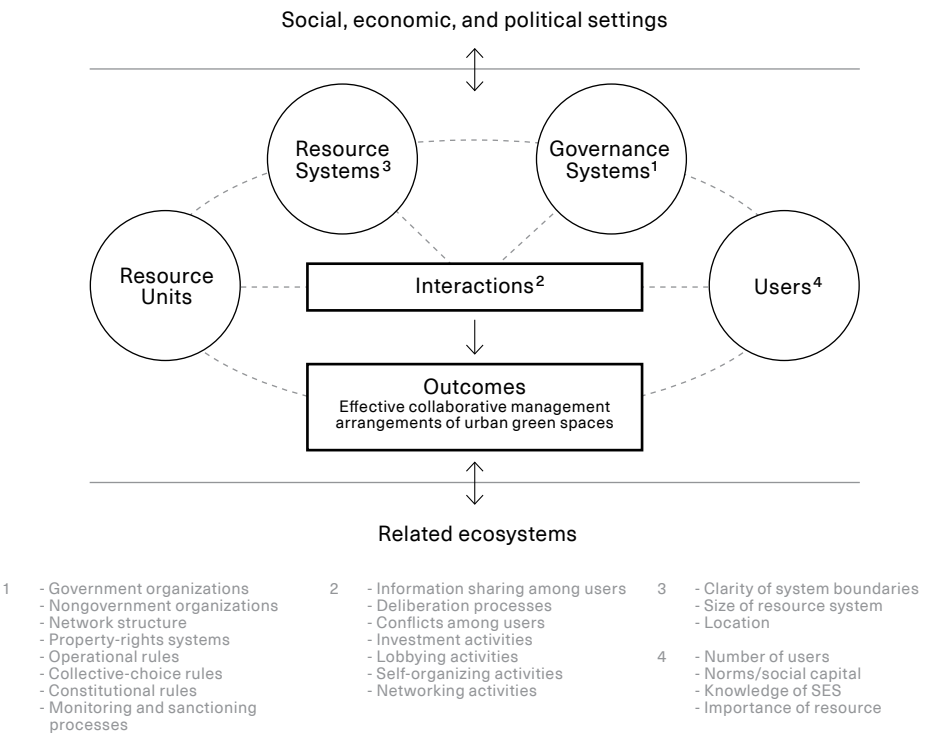
⁴² Schumacher, 1973

⁴³ Kimmerer, 2024

⁴⁴ Ostrom, 1990, 2009

The SES framework shows that each resource system is grounded in an eco-systemic foundation – such as a forest or watershed – from which resource units (such as timber volumes or lobsters) are generated. This includes the ecological processes that regeneratively sustain productivity over time. Importantly, Ostrom does not treat resource productivity in isolation; rather, this is embedded within broader biophysical and social system dynamics, explicitly incorporating the human activities and interactions that shape long-term resilience and the sustainability of social-ecological systems.⁴⁵

Successful decentralized and locally managed resource systems are nested within wider, overlapping systems that are inherently polycentric and interconnected with social, ecological and political systems.⁴⁶ A healthy resource system comprises components and processes operating at multiple scales. While these systems are always context-specific – shaped by geographical, economic and cultural factors – they adhere to universal principles.⁴⁷



Subsequently, socio-ecological systems have been broadened within the academic discourse into socio-ecological-technological systems, to avoid separate solutions for social, ecological and technical challenges.⁴⁸

Where Ostrom embeds technology implicitly within governance and action situations, different scholars have more recently proposed including technology as a third domain with the framework, resulting in a Social-Ecological-Technical Systems (SETS) framework.⁴⁹ Physical – but also technological – infrastructure is an important element of a SETS framework, as this determines the degree to which resource systems can be made operational and effective, and monitored.⁵⁰ We recognize the added value of integrating technology within the resource system framework, since the appropriateness of technology strongly impacts the performance of the system in terms of productivity, accessibility and sustainability. Learning from the field of Appropriate Technology, we ask: what is the simplest level of technology that can effectively achieve the intended purpose at a given location?

Based on Ostrom’s multidimensional understanding of a resource system as a social-ecological-technical system (SETS), we developed the following diagram to trace the trajectory of resource units across the system as an integrated circular value chain. The diagram provides an overview of the physical and technical dimensions and requirements of a circular resource system, serving as a practical instrument for communities in designing and developing resource systems of all kinds – water, energy, nutrients and materials – across multiple scales.

In the Circular Value Flower chapter, we detail how we integrated these system components as a layer into the Circular Value Flower model. We also applied this new layer as a means of describing the circular resource systems of the case studies included.

Reader’s Guide

An explanation of the Circular Value Flower method follows this introduction, in Chapter 2. This method provides a framework for analysing the practical examples discussed in Chapter 3. Chapter 4 then discusses the insights gained from analysis of the cases we believe are important in accelerating the transition to a regenerative, circular living environment.

45 Ostrom, 2009
 46 *ibid.*
 47 Raworth, 2017
 48 Wolfram and Frantzeskaki, 2016; McPhearson et al., 2016

49 McPhearson et al., 2016-2022
 50 Dietz et al., 2003



The Circular Value Flower



The Circular Value Flower

We initially developed the Circular Value Flower method as an analytical tool to provide insight into the complex process of collaboratively closing resource cycles at neighbourhood level. Subsequently, we began using and testing the method as a co-creative, participatory design instrument to explore new regenerative and circular practices, as well as their relational connections across scales. The Circular Value Flower method supports systemic development of circular initiatives by illuminating, across multiple layers, how closing resource cycles at the local scale can result in multiple forms of value. The method unravels the interdependencies between human needs and activities, the relationships of these with land, and the interconnected relationships between all parties involved. A framework or method in which all the potentially relevant variables can be identified is useful in holistically understanding and appreciating the complexity and interdependency of the various dimensions and components of community-led initiatives aimed at generating and sustaining value across multiple domains.⁵¹

Slowly, but increasingly, the progress of our societies and businesses is no longer expressed solely in financial terms; broader societal values, ecological limits and wellbeing-oriented measures are becoming part of the parameters against which progress is assessed. In the Netherlands, alongside Gross Domestic Product as a measure of economic development, aspects such as wellbeing and the quality of the living environment are now included in assessments of the state of the country. Iceland has gone a step further, measuring national progress through 39 indicators, of which Gross Domestic Product is only one. The others include, for example, CO₂ emissions, education, and housing.⁵²

The call for valuing our society in ways other than in purely financial terms is fuelled, among other factors, by the climate crisis. The levels of production and consumption on which economies currently depend are depleting the Earth and, consequently, our living environment, while externalities such as CO₂ emissions, eco-system destruction and human labour exploitation are left out of the equation. A circular economy, as discussed in Chapter 1, operates within the boundaries of planetary ecosystems. Driven by stricter environmental standards, future economic activities will increasingly focus on multiple value creation, in which economic, ecological and social values are brought into balance.

Business models will increasingly consist of a combination of different forms of value, in which long-term profit, reciprocity and ecologically responsible and socially just aspects are placed on an equal footing. In such a situation, all stakeholders – including planet Earth – benefit.⁵³ The transition to a ‘well-being economy’ requires not only a different attitude toward production and consumption, but also a different organizational framework.

Above all, this transition represents a cultural shift, in which the hierarchical structure through which we currently perceive life – with humans at the top of the chain – is replaced by an awareness that human beings are intrinsically part of nature's ecosystems. Central to this worldview are circular systems that operate in conjunction across multiple scales, ranging from the local to the global. Urban policy, design and governance play a crucial role in enabling multiple value creation, particularly at the scale of the neighbourhood.

The challenge is that some values – such as economic and ecological ones – are easier to translate into numbers than other values relating to ‘softer’ aspects, such as wellbeing and liveability. Income, employment or CO₂ and nitrogen emissions, for example, can be readily quantified, whereas cultural and aesthetic values cannot. To make informed decisions in policymaking or design processes, a transparent, balanced consideration of different values is crucial. Numerous methodologies have already been developed to achieve such balance. These methods juxtapose quantitative and qualitative values, serving as tools for analysis, reporting or vision development.

A number of these methodologies – the *Waardenbenadering Leefomgeving* (Living Environment Values Approach), Doughnut model, Thriving City Index, The Just City Index, the Nature Futures Framework, the IIRC reporting model, and ESG reporting⁵⁴ – have been reviewed for their usefulness in analysing circular community initiatives and identifying links between resource cycles, spatial impact and multiple value creation. These methodologies provide qualitative (Waardenbenadering, The Just City Index and Nature Futures Framework) or quantitative (Doughnut model, Thriving City Index, IIRC and ESG models) insights into value creation at the local scale (and in the case of the Doughnut model, on a global scale as well). Alongside financial values, they explicitly address social, cultural, and ecological values.

Theoretically, the outcome of an integrated values approach to urban development should be increased wellbeing and liveability in the neighbourhood, village or district. Liveability is a difficult concept to define, and is prone to subjective interpretation; however, it is generally described as a multiplicity of values and everyday experiences within a given spatial context (a place) that affect both individuals and the community.⁵⁵ Or, in a nutshell, liveability can be understood as the quality of the relationship between people and their spatial environment.

The models mentioned above show that, beyond financial value, social, ecological, aesthetic, and cultural values are also essential for developing sustainable and equitable neighbourhoods, cities and regions. The CVF method therefore holistically integrates the dimensions of a resource system, including its stakeholder relations, spatial components and multiple value creation in a visual way, making the inherent complexity of such systems understandable for all involved – from *kampung* dwellers to academics.

51 Ostrom, 2009

52 OECD, 2020

53 e.g. Eisenstein, 2021; Trebeck & Williams, 2019; Raworth, 2017

54 www.waardenbenadering.nl; www.doughnuteconomics.org; www.thrivingcitiesindex.org; www.designforthejustcity.org; www.naturaconnect.eu/nature-futures-framework-faq/; www.ifrs.org/issued-standards/integrated-reporting/, UN report Who Cares Wins, 2004

55 Lloyd et al., 2016

Layers of the Circular Value Flower

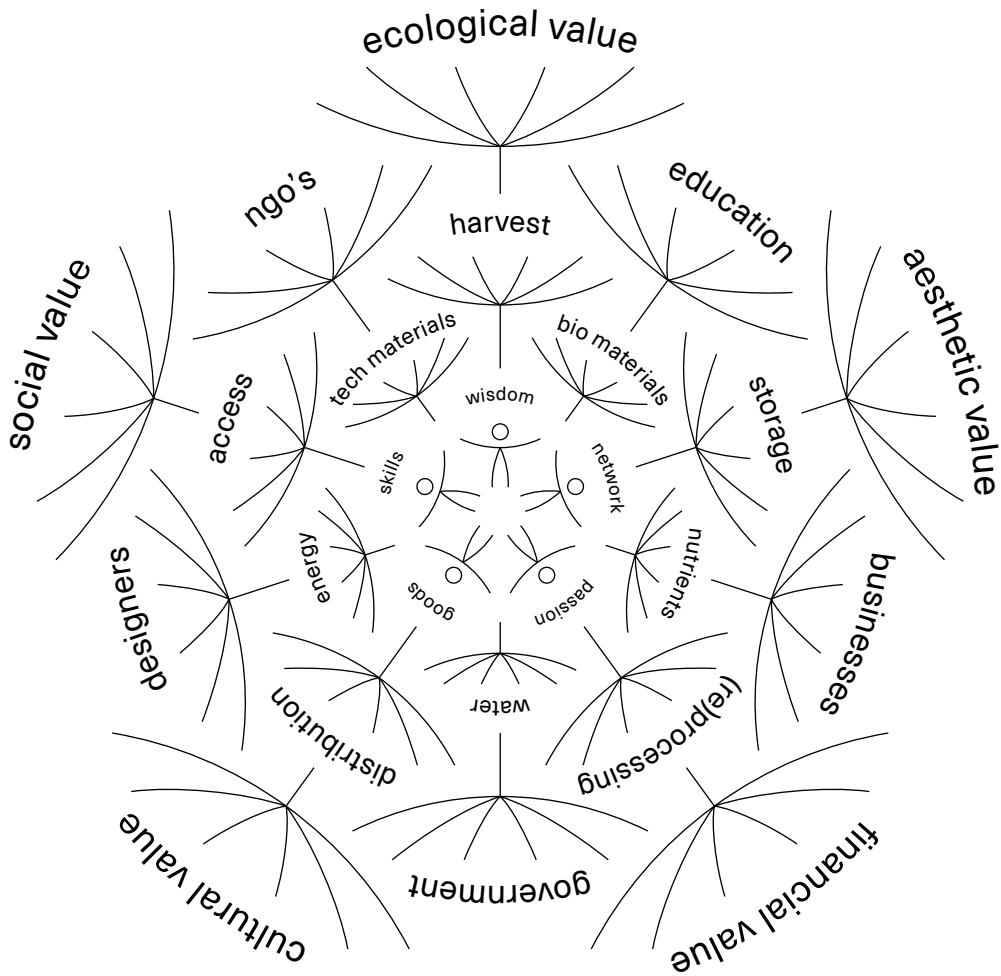
The Circular Value Flower is constructed as a layered diagram showcasing how multiple values are created through the interdependencies between relations, resources and land. It is composed of five layers, where the (potential) circular community occupies a central position in the graphic representation of the model. The first layer shows the enabling capital – translated into five enablers: the goods, networks, skills, wisdom and passion – of a community in relation to managing a resource or resources in a circular way, followed by the various resource types in the second layer: water, energy, nutrients, and biological and technical materials. The third layer features the various components of the value chain as a circular system and process, how these are formed by activities and how they relate to the spatial context: harvest, (re) processing, storage, distribution and access to new customers. The fourth layer focuses on the possible parties with which the community can collaborate to realize its circular resource system: public bodies, private businesses, civil society (NGOs, interest groups), designers and knowledge institutes. The outer layer is formed by the multidimensional set of values discussed above: social, economic, ecological, aesthetic and cultural values.

The Circular Value Flower with its five layers provides the framework for analysis of the cases and for the design of new pathways or opportunities. For each case study discussed in the next chapter, we first describe what the communities' ambition was with regard to implementing or closing a resource cycle, what the enabling capital they needed was, how the system components and related activities were part of the spatial context, with whom they collaborated, and what values these circular systems generated for the neighbourhood and its residents. Secondly, we discuss how the Circular Value Flower method is used, in cooperation with community-led initiatives, to design new interventions or pathways to progress the communities' ambitions.

Community Purpose and Enabling Capital

The community purpose underlies the mission behind the initiators' ideas and plans. This purpose is often specific to the project and context, but can generally be categorized under a number of overarching themes, such as 'sustainability' (restoring and reproducing ways of dealing with life and the living environment), 'democratic' (transparency, broad support and high level of participation), 'wellbeing' (a healthy, safe and pleasant community and living environment), and 'equality' (equal opportunities for all).

The extent to which enabling capital is available within the community is important in achieving the communities' circular mission and staying close to its purpose, as is having knowledge of resources cycles and the system (of governance) through which these are processed and produced.



The Circular Value Flower

Knowledge is part of the broader concept of 'wisdom', which encompasses inter-generational knowledge, embodied knowledge and lived experiences, and is shaped by different worldviews. By extension, skills such as communication, craftsmanship, organization and perseverance are needed to turn formulated ambitions into actual implementation of solutions. Being able to tap into the social fabric of the neighbourhood is also indispensable, as are assets, financial and otherwise. Lastly, passion combined with a sense of urgency forms the basis for the motivation behind launching initiatives aimed at realizing added value in the neighbourhood.

<u>Goods</u>	Available resources, facilities and machines
<u>Networks</u>	Social connections and collaborations
<u>Wisdom</u>	(Local) knowledge, expertise and values
<u>Skills</u>	Practical abilities and craftsmanship
<u>Passion</u>	Intrinsic motivation and commitment

Resources

The method distinguishes the following resources: water, energy, nutrients, biological and technical materials. In a circular economy, these resources flow through ecosystems, and are constantly transformed or regenerated, never wasted.⁵⁶ It should be mentioned that, compared to physical resources, energy behaves differently and – according to the second law of thermodynamics – cannot cycle: it transfers linearly, driving the cycles of materials and beings. Energy must be constantly fuelled and renewed. Since energy is essential for circular practices and the transition to renewable energy use is a pillar of a sustainable society, energy is included as one of the resources within the resource layer of the Circular Value Flower.

Collaboration

The circular resource initiatives selected as case studies in this book are community-led and all aim to improve the local livelihood and landscape through collective resource stewardship activities. However, these community initiatives are deeply embedded in collaborative relationships with other actors, including local government, businesses and knowledge institutions, within which power dynamics and differing levels of decision-making authority play an important role. Within a co-production process, insight into the differing interests and values of the various actors is essential to arrive at a shared understanding based on mutual respect and trust. Because the integration of circular resource systems within a local context can be done in many ways, (spatial) design is key to how such systems can be planned in an appropriate way.

Within a co-production process, insight into the diverse interests and values of different actors is essential in arriving at a shared understanding grounded in mutual respect and trust. Within this layer of the CVF, the role of the designer or expert therefore deserves explicit consideration, as these designers or experts will often act as facilitators and mediators – a role distinct from that in more traditional, commissioned projects. In this xpanded role, designers help translate between different knowledge systems, making tacit assumptions and underlying motivations visible and discussable. They support the structuring of dialogue, ensure inclusivity of participation, and help navigate conflict or disagreement in constructive ways. Rather than imposing solutions, they guide iterative processes of exploration, reflection, and adaptation. This requires sensitivity to context, awareness of power relations, and the ability to work across disciplinary and institutional boundaries, enabling more equitable and collaborative forms of decision-making, which are essential in developing innovative regenerative and circular business models.

56 Wall Kimmerer, 2024

System

Building on the evaluation of the Circular Value Flower (CVF) in our first publication, here we have integrated a circular system component layer into the CVF. This addition enables an overview of the value chain components, activities and spatial requirements of a circular resource system. The new layer – comprising harvest, store, process, distribute and access/(re)use – replaces the previous layer focused on loose physical elements (e.g., buildings, public spaces, gardens, urban objects, and infrastructure elements). While the physical elements of the original layer were tied to the neighbourhood scale, the updated version, with circular system components, transforms the CVF into an instrument for circular communities at all scales. As previously explained in the Working Across Scales chapter, the updated CVF fills the gap of having a comprehensive overview of the activities and spaces that shape a circular resource system.

Values

In our current economic system, value often refers only to financial value; but this is too narrow a definition in the discussion of collective resource systems and community-led regenerative entrepreneurship as an alternative economic model rooted in cooperation, reciprocity and resource stewardship. This is why we have included the following five values in the outer layer of the Circular Value Flower: ecological, social, cultural, financial and aesthetic. These values all contribute to the conditions for life, both human and other-than-human. Ideally, a circular resource system developed by a community yields and sustains all five values in harmony over a long period. Only then we can consider this to be a valuable, healthy resource system.

Cultural value

Building on roots, heritage, traditions, values, wisdom and identity as drivers for new circular practices and new narratives of change, attributing new meaning, and connection to spirituality.

Financial value

Financial benefits for individuals and community, including cost-savings, revenue generation, and job creation.

Ecological value

Positive environmental impacts such as biodiversity improvements, reduction of emissions and waste, and resource replenishment.

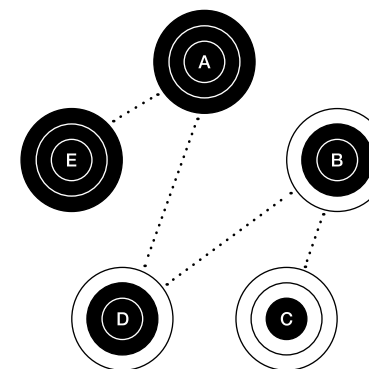
Social value

Social cohesion and connection, community wellbeing, social equity, inclusiveness, justice.

Aesthetic value

Liveability, beauty and design of spaces and systems supporting mental health and creating emotional connections.

Layered onion diagram



For three of the five layers of the Circular Value Flower – parties, resource cycles and values – the results of the analysis are shown in a separate layered onion diagram. These diagrams indicate the extent to which a particular party, resource or value occurs with a qualitative indication, visually represented by colouring the rings of a sphere, where an open sphere represents 'nothing' or 'none', one ring represents 'to a limited extent' and two rings means 'to a large extent'. In addition, the dotted lines show the interconnections or relationships between the different elements.

The Value Flower Field Map

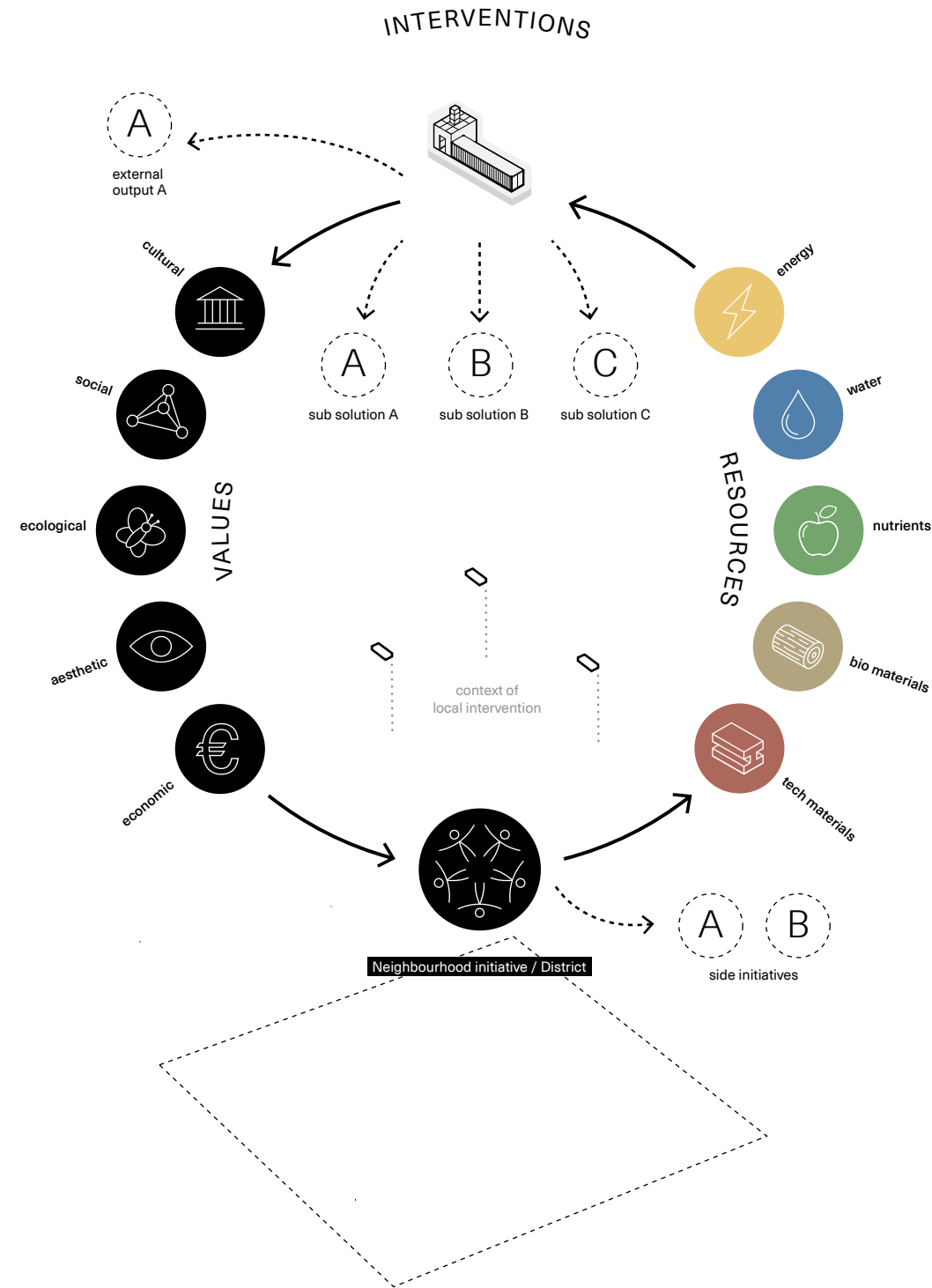
The research into the various neighbourhood initiatives was based first on documentation available on the various projects, neighbourhoods and initiatives. These documents consisted of websites, policy documents, newspaper articles, vision statements and design plans, and reports. For a full list of documents consulted by case, see p. 155-157.

As a second approach, interviews were conducted with stakeholders, according to a semi-structured questionnaire based on the layers of the Circular Value Flower. This allowed the case studies to be analysed following the same pattern each time, while also leaving room for sharing more informal facts that bring the context of a case study to life. For each case, one or more initiators and designers (where present) were interviewed, in some cases multiple times over longer periods of time. A number of students gave their time to support collaboration and research with the initiatives, meaning that our involvement was transformed from a project-based relationship into a long-term, sustainable one.

The cases are expressed in words and images, based on the layers of the Circular Value Flower. Two types of diagrams were developed for the purpose of mapping the existing complex interdependencies. The first diagram is an interpretation of the Circular Value Flower as a whole in a Value Flower Field Map. Here, the various layers of the Circular Value Flower and their interrelationships are depicted in a single visual overview. The map shows physical developments on the central vertical axis, with the spatial context of the neighbourhood at the bottom and spatial interventions above. In addition, the process from initiative to value creation is represented as a cyclical process through the use of different icons that correspond to the layers of the Circular Value Flower.

The second diagram shows the quality of the elements of a specific case by layer. For three of the five layers of the Circular Value Flower – collaborative actors, resource cycles, and values – the results of the analysis are shown in a separate, layered onion diagram. These diagrams indicate the extent to which a particular actor, resource or value occurs with a qualitative indication, visually represented by colouring the rings of a sphere, where an open sphere represents ‘nothing’ or ‘none’, one ring represents ‘to a limited extent’ and two rings means ‘to a large extent’ (see Figure on p. 35). In addition, the dotted lines show the relational character between the different elements.

The Value Flower Field Map, a representation of value development (or desired value development) in the neighbourhood



CVF as a Participative Design Tool

As stated in the previous paragraph, in addition to an analysis method, the Circular Value Flower (CVF) also functions as a design instrument aimed at fostering circular practices within communities by emphasizing sustainability, community engagement, and the redesign of resource flow systems. Assessing the elements within each layer helps to evaluate the current position of a circular community initiative and provides insight into potential opportunities for further development. Taken as a whole, the mapping offers an overview of the interdependencies, relationships, and integrality of the initiative, as well as how it contributes to the community.

The CVF method as a design instrument is used to conceptualize new ideas for further closing of (new) resource cycles. It explicitly fosters a participatory co-creation process, in which knowledge and ideas that are often already present within a community are activated. The role of the CVF method is thus to facilitate the uncovering and harnessing of these existing ideas by leveraging local wisdom and collective thinking. Rooted in this community-centric approach, new interventions respond to the specific needs and context of the community.

Overall, the CVF method is a flexible framework that can be applied to both analysis and design, incorporating principles of participatory action research. In our work, we have explored co-creative methods such as interactive workshops, constellations and a game, to invite participants to collectively think about new ideas and solutions. For these co-creative methods to materialize, we pass through three phases:

1. In the preparation phase, the CVF workshop materials are adapted to reflect the specific context of the community and time and effort are invested, together with community members, in identifying and inviting relevant stakeholders.
2. During the collaborative session, participants discuss, debate, and brainstorm following the steps of the CVF method across its different layers, with the aim of co-creating new interventions. This phase supports the articulation of shared urgencies, goals and the identification of pathways to achieve these.
3. Following the collaborative session(s), ownership and enabling capital – such as networks, financing, permits, and (technological) knowledge for further development – are mobilized to move one or more interventions forward.

Throughout the co-creative sessions, participants gain insight into different aspects of the community-led initiatives, including their networks, the ways in which activities are operationalized, and the multiple values they generate. This mapping not only helps initiatives themselves identify their strengths and uncover new opportunities, but also enables other stakeholders – such as government bodies, private businesses, and NGOs – to recognize how community value creation can support their own objectives, and where potential collaborations may emerge.

Workshop

A collaborative workshop as we understand it is a structured, facilitated process in which diverse stakeholders come together to share knowledge, generate a collective vision, and co-create interventions that will bring their community a step further in becoming regenerative. We emphasize constructive dialogue; the integration of multiple perspectives through interactive activities addressing the different layers of the CVF which are then translated into easily usable templates.



The CVF templates follow a series of discussion rounds, including sharing hopes and fears, values and urgencies, defining a shared urgency, mapping the stakeholders involved and mapping the resource cycles used. Subsequently, templates guide a collective brainstorming session toward generating new interventions, either by opening up new directions or by strengthening existing practices of closing resource cycles. The workshop culminates in an action plan for the preferred intervention, identifying the required enabling capital, relevant stakeholders, and the multiple values expected to emerge. Structuring the workshop around the layers of the CVF supports the participants in making complex socio-ecological challenges understandable and discussable across different forms of knowledge.

Constellation

We also use the concept of a 'constellation' for a more dynamic way to become familiar with the CVF method and its possible contributions. We create a 'living' CVF in the room, and place participants around the different elements of the CVF, starting with the community initiative in the centre, a circle of different stakeholders, and the values in an outer circle. The session begins with a shared purpose on which all the participants, from their respective positions, must reflect and contribute. The result is a dynamic process shaped by interactions, the various different roles and interdependencies.



Game

We have also developed the CVF as a board game, which functions in a similar way to the constellation exercise but is more suitable for smaller groups. It is designed as a structured activity guided by the rules embedded in the CVF layers, and aims to stimulate interaction, learning, and exploration among participants.



Choices Made

For the purposes of this book, we have limited ourselves to the selection made.

The Cases Collaborated With (as a Form of Action Research)

The small number of practical examples described in this book can be cited as a limitation, although fortunately many interesting and successful community-led circular examples can be found around the globe. We see the publication of this second volume as a continuation of our collaborative action research into initiatives and we support connecting community-led circular initiatives through our platform, which can be found at www.circularcommunity.org. On this platform, we aim to share and connect circular community initiatives to provide inspiration and share knowledge. Our workshop materials can be downloaded here as well. If you would like to share your initiative or project with our online community, please contact us at info@circularcommunity.org.

The Interviews Held

The choice was made in this research to analyse the case studies from the perspective of the initiators, i.e. from the perspective of citizens (generally operating in an organized form). Interviews were therefore mainly conducted with them and with designers involved in the process or processes. So, although the cases studied have provided a wealth of information, the voices of other parties such as council officials or businesses is only present in the background. If anything, the representation of these initiatives might provide a somewhat one-sided picture.

Definitions Used

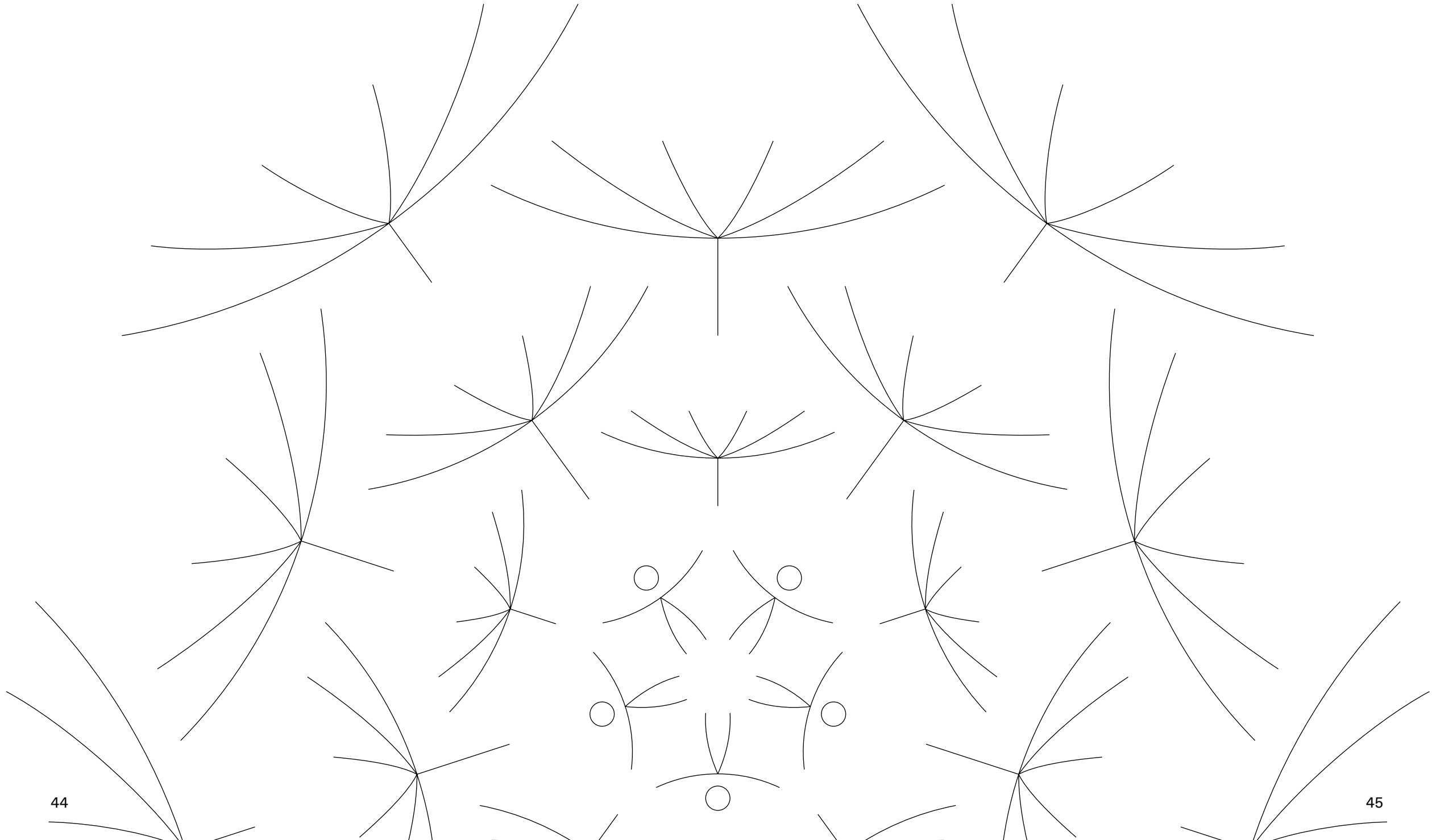
In the theoretical section – Chapters 1 and 2 – we make extensive use of definitions and views formulated by scientists, policy-makers and experts working from a particular theoretical context or worldview. However, academic discourse and policies also flow, are debated and undergo iterations based on evolving understandings. We have tried to balance these perspectives by showing different points of view, or using the most common definitions, but we also made a subjective selection in choosing the definitions that support our mission: demonstrating the value of circular communities as essential enablers in accelerating the transition to a sustainable and just society.

Missing Links within the Closed Resource Cycles

When can a neighbourhood-level solution actually be called circular? The initiatives described in this book are not necessarily fully circular, i.e. links are missing that would fully close a cycle at the neighbourhood or district level. However, we have nonetheless included these examples in the book because each small step can help us learn how to achieve a fully circular environment, in deep connection to nature and other human beings.



Practical Examples



Project Locations

Rotterdam, the Netherlands
Afrikaanderwijk Cooperative

Gooi en Vechtstreek, the Netherlands
Bioregional Construction Programme

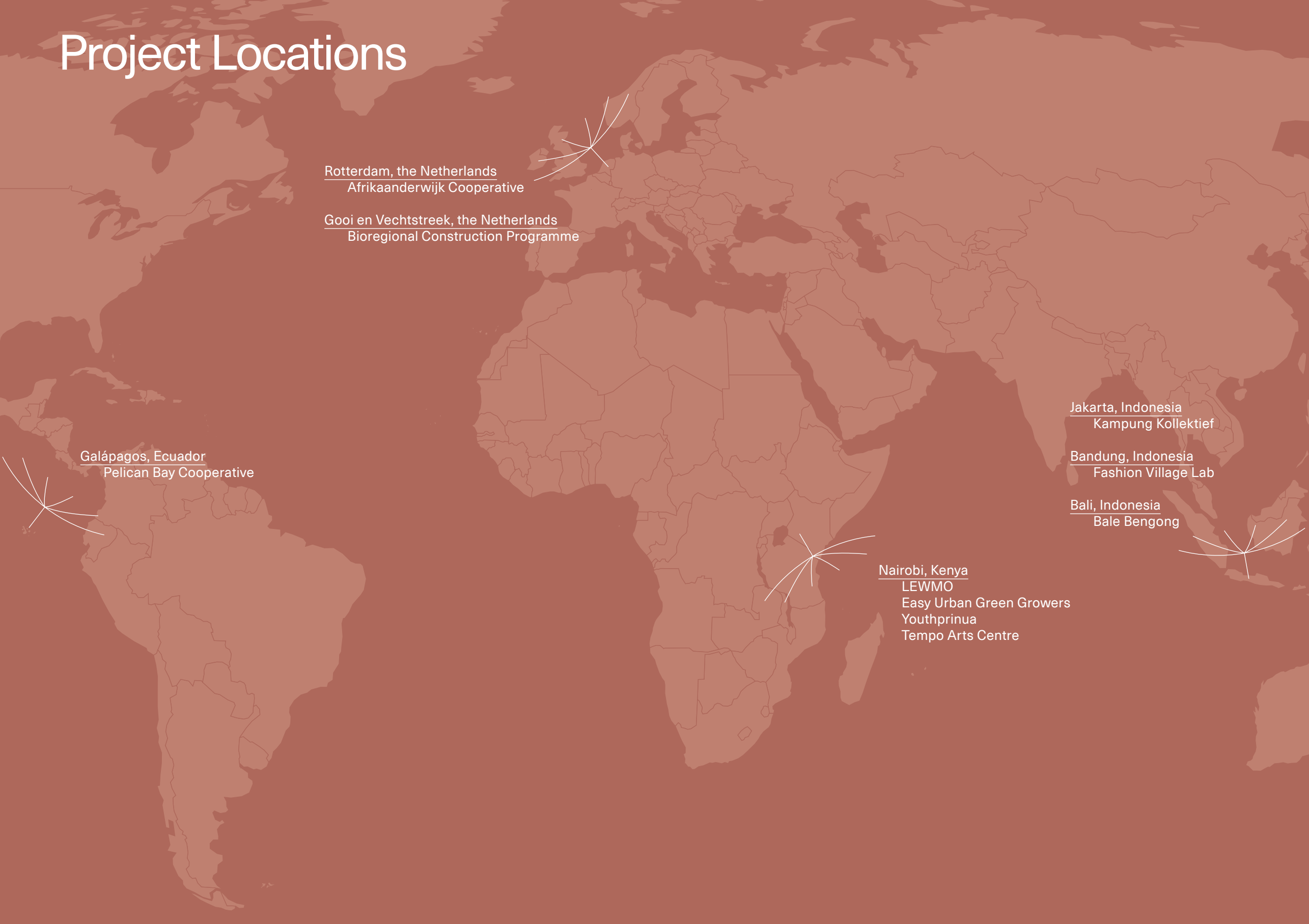
Galápagos, Ecuador
Pelican Bay Cooperative

Nairobi, Kenya
LEWMO
Easy Urban Green Growers
Youthprinua
Tempo Arts Centre

Jakarta, Indonesia
Kampung Kollektief

Bandung, Indonesia
Fashion Village Lab

Bali, Indonesia
Bale Bengong



Pelican Bay Cooperative

✦ Puerto Ayora, Galápagos Islands, Ecuador

The Pelican Bay Cooperative is a collective of small-scale fishers in Puerto Ayora, the main city of the Galápagos Islands. Their practices are deeply rooted in generational knowledge, kinship relations, and long-standing relationships with the ocean. Rather than positioning the cooperative as a technical intervention in waste management, this initiative emerged from the fishers' own concerns about declining incomes, increasing regulatory pressure, and the ecological consequences of current fish-waste practices. On Santa Cruz Island alone, prior local assessments estimate that around 2.25 tonnes of fish waste are discarded weekly – more than 117 tonnes a year, turning a daily by-product stream into an ecological hazard and a missed economic opportunity.⁶⁵

Together with fishers, chefs, restaurant owners, researchers, students, and local institutions, the cooperative began exploring how fish waste, often treated as a problem or externality, could become a shared resource for locally grounded circular and regenerative entrepreneurship. Quantitative measurements of fish-waste streams were combined with qualitative methods such as direct observation, storytelling interviews, and participatory workshops. These methods allowed fishers' lived experience, tacit knowledge, and cultural values to guide the identification of circular opportunities.

This work also sits alongside a closely related pathway of fisher-led innovation that emerged from within the cooperative itself. INNOVAPESCA is a social enterprise legally established in 2021. INNOVAPESCA was formed by four active shipowners from the Pelican Bay Cooperative (owners of vessels with valid fishing permits) and a local researcher. Importantly, INNOVAPESCA is not the cooperative and does not replace it: the cooperative maintains its trade union and representative role, while INNOVAPESCA operates as a business and technical structure to implement innovation, traceability, market access, and sustainable business models that cooperatives, by their nature, cannot implement directly.

The Pelican Bay case demonstrates how community-led knowledge systems can underpin circular economy practices that generate multiple forms of value: economic, ecological, social, cultural, and aesthetic, while strengthening local autonomy and stewardship of marine ecosystems. In parallel, strategic foresight and system-level analysis explored plausible circular pathways for small-scale fisheries as part of the island's food systems, which supported stakeholders in being able to weigh desirability against feasibility within this particularly ecologically sensitive and socioeconomically constrained island context.

Pelican Bay Cooperative's fishing boats at Puerto Ayora harbour

Purpose and Enablers

The practices of the cooperative's fishers often include family-based enterprises in which wives, daughters, sons, and extended family members play active roles in fishing, processing, and selling fish. Knowledge of tides, seasons, species behaviour and fishing grounds is relational, shaped by intergenerational knowledge exchange, cultural transmission, and ethical commitments to the sea. This form of small-scale fisheries knowledge, deeply tied to territory and ancestry, is rarely recognized as legitimate knowledge and expertise within dominant capitalist and technocratic governance models, which prioritize extraction, growth, and efficiency over community wellbeing, ecological reciprocity, and cultural continuity.⁶⁶

Fishers operate largely independently, but are financially and politically connected through the Pelican Bay Cooperative, which provides them with a collective platform for agency, negotiation, and mutual support. While the cooperative has demonstrated strong organizational capacity, its political influence remains constrained by regulatory frameworks that formalize participation without genuinely redistributing power. The reinstatement of the prohibition on long-line fishing in 2018 significantly reduced tuna catches for export, previously a key income stream, intensifying economic vulnerability.⁶⁷ At the same time, regulations requiring fish waste to be discarded far offshore impose both financial and labour burdens on fishers.

Fish-waste upcycling emerged as a community-led strategy to diversify livelihoods, reduce costs, and regain control over resources already embedded in daily practice. The initiative was enabled by the fishers' strong social cohesion, willingness to experiment, and openness to collaboration, alongside facilitation by researchers and students who worked relationally rather than extractively.

In the CVF workshops, participants articulated a shared horizon: 'authentic Galápagueño products' that are high-quality, locally sourced, and leave no part of the fish wasted; they also named concrete barriers, such as lack of political will, limited market access, weak collaboration, and fears of overfishing. Just as importantly, the values discussion foregrounded a regenerative, community-led economy that includes the needs of future generations – an orientation that resonates with *Buen Vivir's* emphasis on collective wellbeing, reciprocity, and responsibility to territory.

Seen from this perspective, both the cooperative and INNOVAPESCA can be understood not as separate initiatives, but as interdependent expressions of the same transition: one safeguarding collective agency, the other enabling regenerative economic experimentation capable of sustaining that agency over time.

⁶⁵ Moreno et al., 2020

⁶⁶ Zisopoulos et al., 2025

⁶⁷ Castrejón & Defeo, 2025

Resources

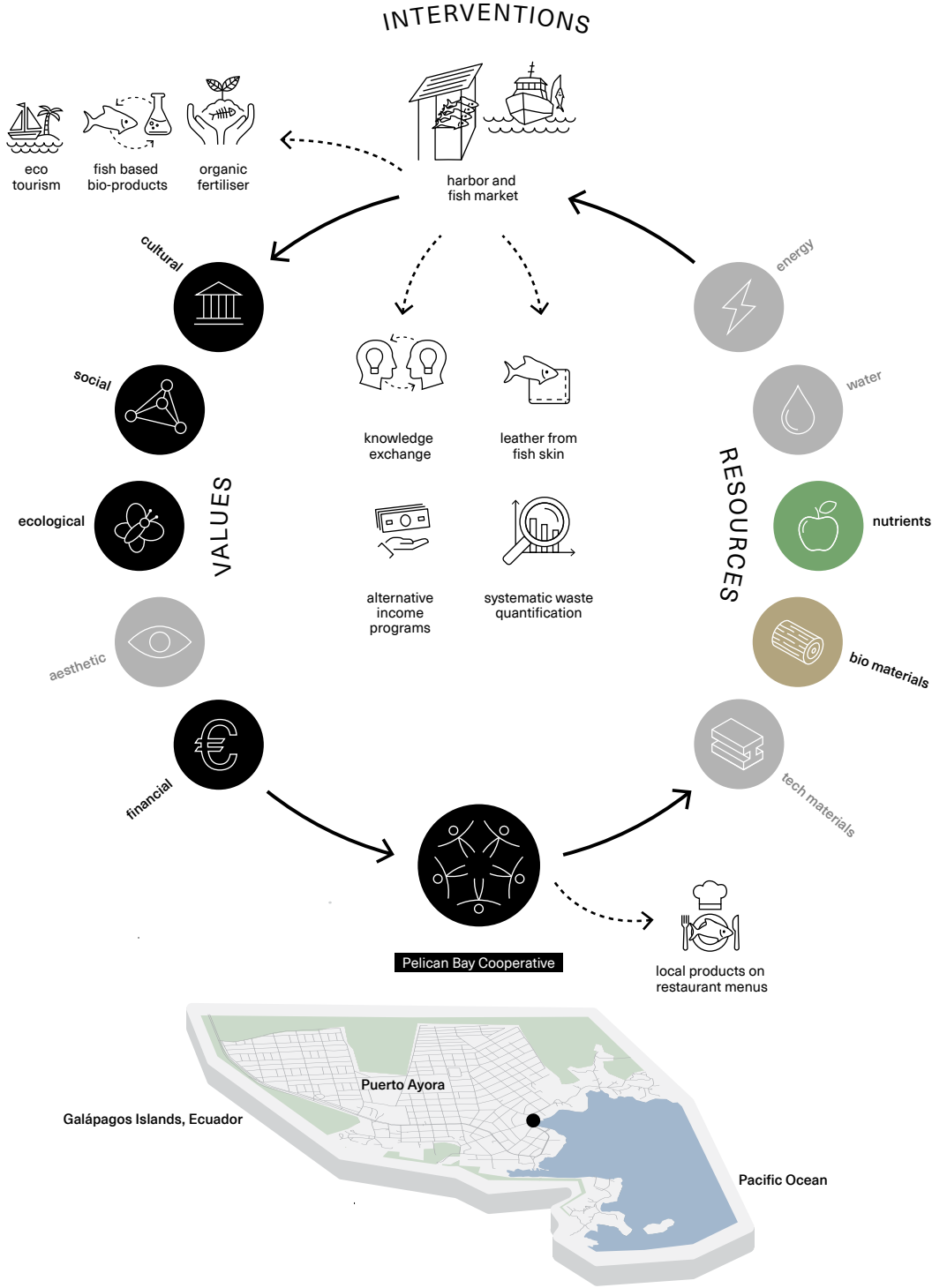
The primary resource explored in this project is fish and the waste, including skins, scales, heads, fins, and offcuts, generated daily through fishing and processing activities. Rather than framing this material as residual waste, fishers and researchers collectively re-imagined it as 'nutrients,' a source of value with multiple potential pathways.

A second key resource identified was invasive plant species from the Galápagos highlands. These plants, which threaten endemic biodiversity, were explored as potential sources of natural tannins for fish-leather production. Guided by fishers, local contacts and artisanal tanning knowledge shared through Indigenous and small-scale producer networks, leaves were harvested and tested as alternatives to industrial tanning agents. This approach linked ecological restoration with material innovation and reinforced the territorial nature of circular practices.



Fish skin as a resource for leather

Value Flower Field Map Pelican Bay Cooperative



System, Activities and Space

The Pelican Bay seafood system can be understood through the interconnected phases of harvesting, (re) processing, storage, distribution, and access. Each phase carries spatial, relational, and ecological dimensions that shape the cooperative's circular ambitions and reveal both the system's strengths and its vulnerabilities.

Harvest

The primary resource entering the system is yellowfin tuna (*Thunnus albacares*), caught by the cooperative's five vessels in the oceanic zones of the Galápagos Marine Reserve, in compliance with current marine zoning regulations. Fishers employ the *ikejime* technique – an immediate-kill method followed by bleeding, evisceration, and on-board chilling – which simultaneously ensures product quality and generates the by-products that feed the circular pathway. The cooperative lands approximately 20,000 pounds of tuna per month. Waste quantification across six documented landings established conversion factors for the main species: bacalao and brujo each produce approximately 13% waste by total weight, while yellowfin tuna generates roughly 14.5%, yielding an estimated 10,000 kilogrammes of fish waste monthly on Santa Cruz Island alone.⁶⁸ This waste – heads, viscera, bones, fins, and skins – constitutes the raw material base for the cooperative's circular interventions.

A second harvest stream operates in the island's highland farms,

where invasive plant species such as guayaba (*Psidium guajava*) are collected for natural tannin extraction. These plants, which threaten endemic biodiversity, are transformed from ecological liabilities into productive inputs for fish-leather tanning, linking upland restoration directly to coastal circular processing.



Processing and weighing fish

(Re-)processing

Fish are currently filleted at the dock and in restaurants, where by-products are generated but not yet systematically recovered. In the circular model under development, restaurants would function as decentralized pre-processing nodes. A HACCP-informed protocol has been designed in which chefs would clean tuna skins immediately after filleting – removing residual meat, fat, and membranes – wash these in cold soapy water, and package them airtight for freezing, all within thirty

Measuring fishwaste by TU Delft students



minutes of filleting. This protocol is intended to ensure collagen integrity and prevent spoilage, potentially transforming routine kitchen work into the first critical step in a circular value chain.

Fish leather production follows a multi-step artisanal process developed and refined through collaboration with an Argentine expert in fish tanning, and adapted to Galápagos conditions. The sequence proceeds from fleshing and descaling through liming, washing and deliming, degreasing (detergent bath), bating (pancreatic enzyme treatment), pickling, tanning, fat-liquoring (oil penetration), drying on frames, and conditioning. The tanning step uses either powdered tannins – added gradually over four days – or plant-based tannins extracted locally by boiling guayaba leaves at 60–80°C and filtering the resulting liquor. Of the various invasive species tested, guayaba proved the most successful

for producing high-quality leather. This preference for vegetable tannins over chromium-based chemicals reduces environmental impact and health risks while reinforcing the sustainability of the final product, and is in accordance with the strict export regulations that apply to the Galápagos Islands.

Beyond leather, other parallel processing streams are emerging. Fish heads, viscera, bones, and fins are being explored as inputs for organic fertiliser and silage production, developed in collaboration with Conservation International and currently pursuing ABG certification for agricultural use. Collagen extraction from fish skins and scales, developed in partnership with a local entrepreneur, represents a third valorization pathway with potential for the nutraceutical and cosmetics markets. Additionally, a wastewater segregation concept based on Intermediate Bulk Containers (IBCs) has been designed to separate, contain, and treat the effluent generated during tanning and processing, creating the possibility for limited water re-use, while protecting the island's sensitive receiving environments.

A pilot-to-automation pathway has been mapped for the fish leather process, translating each manual step into the simplest reliable semi-automated alternative that fits the Galápagos' constraints in terms of budget, maintenance capacity, and available skills. A fisherman's house is currently being prepared as a future production facility, where leather processing and wastewater management infrastructure will be concentrated.

This spatial arrangement – a private home gradually converted into a community workshop – illustrates both the improvised, trust-based

68 Moreno et al., 2020; Dambrink et al., 2025

character of the cooperative's infrastructure and the urgent need for purpose-built facilities that can sustain production at a viable scale.

Storage

Cold-chain integrity constitutes the most critical vulnerability in the system. According to the HACCP protocol developed for the initiative, cleaned and packaged tuna skins would need to be frozen below 0°C within thirty minutes of filleting and stored for a maximum of seven days before collection and processing. Vacuum-sealed or airtight packaging is specified to prevent dehydration and freezer burn, which would irreversibly damage the collagen structure and render skins unsuitable for leather production. In the model envisioned, restaurant freezers would provide the primary storage infrastructure, making the system dependent on decentralized, voluntary cold-chain participation by local businesses.

The absence of a centralized cold-storage facility and dedicated ice-production capacity on the island represents a systemic bottleneck, particularly during seasonal peaks in landings when processing capacity is exceeded. Later phases of the INNOVAPESCA project envision modular, mobile cold-storage and processing units designed to scale up during high-season periods, addressing both the perishability of by-products and the spatial limitations of the current arrangement.

Distribution

Distribution in the Pelican Bay system operates along two inter-

connected channels. The primary channel concerns the tuna itself: fish are sold whole, fresh or frozen, as loin and fillet presentations, or as value-added products such as hamburgers, sausages, croquettes, and canned tuna. Buyers include local residents, restaurants, supermarkets, cruise operators, and middlemen – a diverse but uneven market in which traceability and quality premiums remain largely unrealized.

The secondary channel involves circular by-products. Under the protocol designed, tuna skins would be collected twice weekly from participating restaurants and transported to the processing facility. This model builds on willingness expressed by restaurant owners to separate and store skins without direct compensation – a form of community participation that constitutes a practical precondition for any decentralized circular system. Once processed, leather products are envisioned for local and tourism markets, while fertiliser products would be distributed to highland farms, closing a spatial loop between coast and interior. The traceability system under development by INNOVAPESCA – integrating electronic monitoring, digital logbooks, and camera-based verification – is designed to strengthen both channels by providing credible proof of sustainable, selective fishing practices and enabling access to premium export markets where verified sustainability commands higher prices.

Access

The vision articulated through CVF workshops and INNOVAPESCA's business model is one of responsible consumption: tuna traded and

consumed in local, national, and international markets willing to pay a fair price for a high-quality product, responsibly caught by local artisanal fishers. Fish leather products hold particular promise in the tourism sector, where visitors seek locally produced, sustainability-linked goods with a tangible connection to place. Stakeholder feedback identified fashion accessories and local handicrafts as the most promising applications. Community engagement events – including workshops with approximately fifty high-school students and an Open House Day showcasing upcycling techniques – function as access points for knowledge and awareness, embedding circular thinking within the next generation and broadening community ownership of the initiative beyond the cooperative's immediate membership.

Taken together, analysis of the system components reveals a resource system that is spatially distributed across ocean, dock, restaurant kitchens, private homes and highland farms; relationally held together by trust, voluntary participation and shared aspiration rather than centralized infrastructure, and institutionally constrained by cold-chain gaps, regulatory uncertainty and the absence of dedicated processing space. The CVF analysis made these interdependencies visible and provided the cooperative with a structured overview of where the system is most fragile, and where targeted investment – in cold storage, in a dedicated production facility, in wastewater management – could strengthen the material foundations for circularity without displacing the community ownership that sustains this.

Selling of fish to restaurant owners and middleman



Collaboration

The cooperative operates within a complex stakeholder landscape. Fishers sell primarily to local residents, restaurants, supermarkets and cruise operators, and sometimes to middlemen who provide immediate payment at discounted rates. These relationships shape both income stability and waste generation.

Civil-society engagement included awareness-raising events, which created spaces for dialogue between fishers, residents, and visitors about fish waste and circular futures. Universities – Leiden University, Erasmus University Rotterdam, Universidad de las Américas and Delft University of Technology – as well as Conservation International contributed research support, tools, and facilitation, while deliberately positioning fishers as knowledge-holders rather than research subjects.

Government actors set regulatory frameworks for waste management, but were largely absent from enforcement in practice. Observations over multiple days revealed limited inspection, creating a disconnect between formal rules and lived realities. Anticipated collaboration with the Charles Darwin Research Station remained limited due to distrust, although pragmatic cooperation occurred through the provision of measurement equipment.

Other community members shared similar experiences of mistrust in local government and the large NGOs active on the islands, such as the Charles Darwin Foundation and Conservation International; globally funded organizations with a strong focus on conservation and restoration of the islands' pristine nature. Local people

and their practices are often not recognized within the objectives and policies of these organizations, which causes friction. Conservation and restoration are therefore not universally embraced; they are actively questioned by parts of the community who experience top-down policies as disrespectful, exclusionary, or disconnected from lived realities. As an interviewee articulated, identity in the Galápagos is deeply insular and relational – 'nuestra vida fue en el mar' ('our life was at sea') – yet increasingly strained by class divisions, consumption patterns, and a loss of connection to place. This tension underscores that biodiversity protection cannot be decoupled from social justice, cultural continuity, and community agency.

The Pelican Bay Cooperative has now set up a collaboration with private actors such as restaurant owners, farmers, chefs, and officials from the Galápagos Special Regime's Governing Council, the Ministry of Production, and the Autonomous Government of Santa Cruz. These collaborations started during the workshops and have expanded beyond these, based on shared challenges such as lack of political will for the initiatives, lack of accessible markets, lack of financial support, etc. This collaboration facilitates the development of a collective vision for the islands, based on high product quality, sustainability and local fish (and related products), and a perceived shift in tourists' mindsets through building trust between the various stakeholders.

Value



The Pelican Bay initiative generates multiple forms of value. Economically, upcycling fish waste offers pathways to diversify income and create new livelihoods in response to declining tuna revenues. Ecologically, reducing waste dumping contributes to healthier marine ecosystems, and the commitment of restaurant owners to state on their menus which fish are local and offer of a catch of the day contributes both to ecological values (tourists are hopefully less inclined to buy salmon, imported from Canada) and to the income of fishermen who can sell the fish they catch. The use of invasive plants for tanning supports biodiversity restoration. Socially and culturally, the whole process reinforces existing bonds, intergenerational knowledge transfer, and community pride.

Aesthetic value emerges through the transformation of fish skins into high-quality leather products, demonstrating that circular design can be both functional and beautiful, appealing to local communities and visitors alike. Cultural value is embedded in everyday practices:

families working together at the bay or any improvised space after the municipality kicked the fishers out of the bay, ancestral fishery knowledge and practices shared through doing rather than formal instruction, and the inclusion of newcomers through kinship ties.

At the economic and productive level, this next phase aims to strengthen the transition towards AAA-quality tuna, added-value processing, and access to differentiated markets, with the ambition of increasing participating fishers' income by at least 30 per cent. Equally important is improving the profitability of experimental fishing operations while reducing post-harvest losses, ensuring that value is created and retained within the local system.

At the environmental and governance level, the work reinforces a transition from overexploited coastal fisheries toward more sustainable ocean fisheries, while eliminating illegal, unreported, and unregulated (IUU) fishing on monitored vessels through traceability and electronic monitoring. Here again, value is relational: sustainability becomes inseparable from accountability, and profitability becomes conditional upon compliance and ecological responsibility.

For fishers and their families, this has meant more than increased income potential. It has contributed to a renewed sense of dignity and legitimacy. Recognition, within the community and beyond, has affirmed that relational knowledge of the sea, long marginalized in technocratic governance frameworks, is culturally, economically and ecologically transformative.

Co-creating Interventions

Two participatory workshops took place on Santa Cruz Island, on 27 January and 3 February 2024, coordinated with representatives from the Pelican Bay Cooperative and facilitated using the Circular Value Flower method. A total of 25 participants gathered for these sessions, including fishers from the cooperative, restaurant managers, chefs, and officials from the Galápagos Special Regime's Governing Council, the Ministry of Production, and the Autonomous Government of Santa Cruz.

The workshops were structured around the layers of the CVF, adapted to the specific context of the Galápagos seafood system. In the first exercise, participants discussed their dreams, fears, strengths, weaknesses, and urgencies. Shared dreams converged on a vision of harmonious collaboration aimed at producing 100 per cent sustainable, locally sourced fish products without any waste – what participants called authentic 'Productos Galápagueños'. Fears centred on lack of political will, lack of accessible markets, limited collaboration, and overfishing. The description of their strengths fell within the fishers' own area of control: the variety and quality of their catch. Based on these reflections, both groups arrived at shared urgencies: the priority should be on high-quality, sustainable, local fish products, which required political will, a shift in tourists' mindsets, trust between different stakeholders, and the sharing of knowledge and information.

In a subsequent round, participants discussed the five value dimensions – social, economic, ecological, aesthetic, and cultural

– and formulated shared ambitions. For all participants, a regenerative, circular community-based economy that includes the needs of future generations took a central position. Within this vision, the fishing sector foresees taking responsibility for an economic and ecological system that prioritizes the community, in which fishers are perceived as relevant and valuable contributors. This includes promoting responsible consumption of local fish, guaranteeing fresh and high-quality products, and building a transparent supply chain. Participatory research and policy-making approaches were identified as important methods to include local wisdom and engagement.

The stakeholder mapping exercise produced the most heated discussions. Trust from the cooperative and other local citizens in NGOs and governmental organizations proved to be low, as participants perceived that their interests and values diverged strongly from those of institutional actors. Local citizens felt a disbalance in current power structures: insufficient transparency in information disclosure and a sense of not being engaged or empowered enough to have an effective say in decision-making processes. By contrast, there was more consensus on the constructive role of companies, educational institutions, and experts. This tension became a productive part of the process: rather than suppressing disagreement, the CVF method created a structured space where mistrust could be articulated without collapsing collaboration.

Following the stakeholder mapping, participants brainstormed potential interventions in an open

session. Six key interventions were identified: transforming all parts of the fish into valuable products such as fish oil, collagen, omega-3 supplements, fish leather, fertiliser, and biogas; improving the quality and safety of seafood to enhance value within the supply chain; improving water quality for fish processing and preservation; developing a dedicated fishing facility; strengthening the commercial relationship between fishers and buyers through trust and transparency; shifting towards renewable energy and reduced energy consumption. Sixteen follow-up interviews with local stakeholders – restaurant owners, farmers, market traders, NGOs, and municipal officers – deepened the understanding of roles and responsibilities within the seafood system and helped refine intervention priorities. Fish leather emerged as the top priority for exploration, alongside supply-chain

transparency measures to improve product quality and enable premium market access.

Importantly, many of these ideas did not originate from external expertise, but were already present in the community. Fishers shared existing practices of repurposing waste for soups, animal feed, and pâté, illustrating that circularity was an extension of practices constrained by infrastructure and regulation rather than a novel concept imposed from outside. During the sessions, hotel sector representatives, entrepreneurs working with fish-based products, and fishers immersed themselves in the CVF, using it to observe their reality through a systemic and multidimensional lens. Economic viability, ecological limits, cultural practices, local shared values, relationships, logistics, governance, and everyday trade-offs immediately became visible.

Workshop co-creating interventions following the CVF method



Fish Leather: Exploring the Possibilities

The fish leather pathway, which emerged as the community's first concrete entry point for circular prototyping, evolved through a series of collaborative phases that combined local knowledge, international expertise, and adaptive experimentation under Galápagos conditions.

The process began with open conversations among fishers, who shared how fish skins were typically discarded, and how this disposal had contributed to the removal of their former marketplace at Pelican Bay. Sourcing the necessary materials on the islands proved a significant challenge: tanning agents, specialized chemicals and equipment are not available locally, and must be imported from the mainland, if permitted, at considerable cost and delay. This constraint catalyzed a creative adaptation: rather than relying on industrial tannins, the team explored extracting natural tannins from invasive plant species present in the Galápagos highlands. Guided by local knowledge – a fisher first suggested the plant-based method, and contacts from a local start-up pointed toward highland farmers as potential suppliers – guayaba leaves and other species were harvested and tested as tanning agents.

A hands-on workshop was organized with an Argentine expert with nearly fifteen years of experience in fish leather production. The workshop was held at the home of the project coordinator – a deliberate choice, as fishers stated that they would not participate in sessions held at external locations due to their distrust of institutional actors on the island. This spatial decision itself became a reflection of the relational

dynamics shaping the initiative. During the workshop, the expert guided participants through the tanning process and emphasized that producing high-quality fish leather requires patience and iterative refinement. The pilot involved approximately 30 fish skins from five different species, testing various tanning solutions. Of the invasive species tested, guayaba proved the most successful. The results were documented in a step-by-step fish leather production guide adapted to Galápagos conditions, serving as a practical tool for future production cycles.

Parallel valorization streams have also advanced. Fish-based fertiliser production, developed in collaboration with Conservation International, is awaiting ABG certification for agricultural use. Collagen extraction, developed with local entrepreneur Víctor Vásquez, offers a third pathway targeting nutraceutical and cosmetics markets. Together, these streams illustrate how a single workshop process – grounded in the CVF method and shaped by trust, local knowledge, and adaptive improvisation – can generate multiple interconnected pathways of circular value creation.



Both pictures: experimenting with turning fish skin into leather (TU Delft students)

Main Insights

The Pelican Bay case demonstrates that circular entrepreneurship in small-scale fisheries cannot be understood as a technical transition alone. Rather, this unfolds as a relational, spatial and ethical process, closely aligned with principles of *Buen Vivir*, relational ontologies, and regenerative entrepreneurship. In this framing, value is not extracted from resources but co-produced through relationships, between people, species, places and institutions, over time, rooted in trust-building and reciprocity.

The Circular Value Flower (CVF) workshops were instrumental in making these relational dynamics visible. Rather than assuming consensus, the method created a structured space in which disagreement, fear, and mistrust could be articulated without collapsing collaboration. In a context marked by historically strong social tensions between community members, fishers and entrepreneurs versus conservation and government authorities, the CVF enabled participants to express stereotypes, power asymmetries, and conflicting imaginaries of the food system, while still moving toward shared urgencies and actionable interventions.

This revealed a critical methodological insight: in highly polarized or conflict-laden settings, methods supporting circularity must be adaptive rather than prescriptive. The value of the CVF in Pelican Bay was not that it produced immediate alignment, but that it allowed stakeholders who might not agree, or even trust one another, to understand one another's needs, fears and constraints, and to situate these within the broader territorial system of food, waste,

governance and livelihoods. In this sense, the method functioned as a design tool to bridge sense-making and mutual recognition. Importantly, the workshop revealed that, within contexts of acute social tension and political marginalization, the CVF method itself must be susceptible to adaptation, allowing for disagreement, and creating spaces for courageous storytelling, so that actors who do not initially agree can nonetheless recognize one another's needs and constraints.

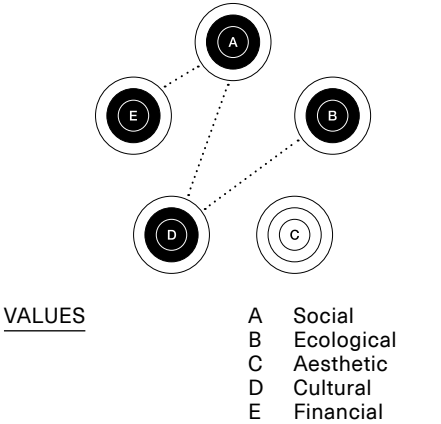
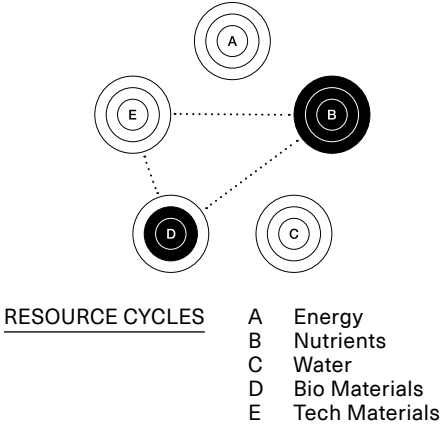
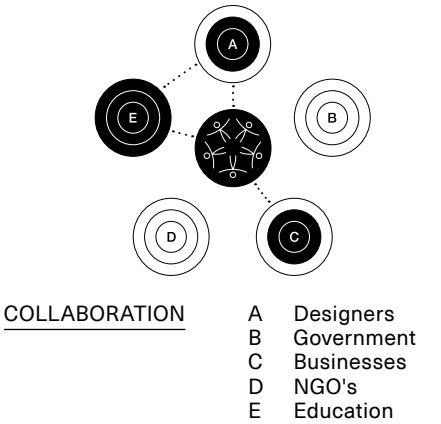
The process also shifted the epistemic position of the fishers themselves. Over time, they became co-researchers and co-designers of the emerging model, participating in the generation of scientific evidence, technological experimentation, and market development. Practical, embodied fisheries knowledge began to inform formal planning processes, including the integration of fishers' insights into ecosystem management discussions for the tuna fishery within the Galápagos Marine Reserve. In doing so, expertise that had long been marginalized within technocratic conservation frameworks gained institutional visibility among academics, state actors, NGOs, and international partners.

Moreover, circular entrepreneurship emerged as a practice of cultural continuity and adaptation. Upcycling fish waste, improving product quality, and experimenting with fish leather were meaningful because they allowed fishers to care for the ocean while sustaining community livelihoods, without increasing pressure from fishing. Multiple value creation – financial, ecological, social, cultural and

aesthetic – thereby arose from territorial practices embedded in relationships, rather than from isolated innovations or market logic.

The infrastructural developments needed to achieve this relational continuity in practice, such as shared storage space, ice provision, co-packing facilities and training programmes, extend beyond those directly involved in the entrepreneurial layer. They strengthen the cooperative as a whole, including members not formally part of the Pelican Bay Cooperative, thereby diffusing benefits across the wider fishing community. The absolute need for collaboration with the Darwin Foundation (in terms of funding) and the municipality (for permits) came as an undesired outcome of the workshop sessions, as the Pelican Cooperative has little trust in these institutions. Collaboration is therefore not a given, but will be a fragile achievement. It requires time, trust, and spaces where different forms of knowledge can circulate without hierarchy. The CVF workshops demonstrated that collaboration becomes possible when disagreement, mistrust, and social tensions are treated as a resource rather than a failure, when the 'art of disagreement' is acknowledged as part of democratic, community-led governance.

Finally, this case reinforces a core insight for regenerative entrepreneurship: when circularity is treated as a cultural and territorial process, bound to ecological quality, working space, governance, identity, belonging and care for future generations, 'waste' ceases to be an externality. It becomes a shared responsibility and a site of collective learning, where regeneration is as much social and cultural as it is material.



Afrikaanderwijk Cooperative

✦ Rotterdam, the Netherlands

Resources Station at the Afrikaanderplein

The Afrikaanderwijk neighbourhood is located in Rotterdam's Zuid (South) district and is considered one of the first multicultural neighbourhoods in the Netherlands. Nearly 9,000 people live around Afrikaanderplein square, where the Afrikaandermarkt market takes place twice a week, attracting 15,000 people a day. The Afrikaanderwijk Cooperative was founded in 2013 with the aim of re-imagining the relationship between the economy, community and local environment through organizing initiatives that generate employment opportunities, thereby supporting a local economy. The starting point of the Cooperative is to 'insource' work that is often outsourced to companies outside the neighbourhood, while emphasizing a

collective, cooperative approach that encourages local residents to participate in the labour process. One of the initiatives conducted by the Cooperative is the 'Circular Market', centred around waste management. Waste collection was originally operated by the city council, but the cooperative took this task over through a Right to Challenge procedure in 2017. As a result, waste is now collected throughout the day during market hours by workers from the neighbourhood who re-use and upcycle the various materials flows at a local Resources Station. Through this practice, residual waste flows are recycled, litter and CO₂-emissions are reduced and social and financial value are generated.

Purpose and Enablers

The Afrikaanderwijk Cooperative builds on the qualities and passion already present in the neighbourhood – its residents, local businesses and the physical environment – for creating inclusive employment opportunities. A number of initiatives have been successfully developed: a bicycle bank, a cleaning company, a landscaping company, a community kitchen and the rental of the 't Gemaal op Zuid building – a community centre where cultural events are programmed, but which also functions as the Cooperative's home base. In addition to these services, a circular initiative has been set up for processing the waste flows from the Afrikaandermarkt. In principle, the market traders are responsible for disposing of their own waste materials, and for the cost this involves. Without enforcement, market traders regularly dumped their waste illegally or left it behind for the city council to collect, as the council ultimately remains responsible for maintaining a clean city. The city council then collected the market's waste at the end of the day as an unsorted residual flow.

Under the Right to Challenge scheme, the Afrikaanderwijk Cooperative took over this waste collection from the city council, and now runs a Resources Station where residual flows of plastic, paper, cardboard boxes, wooden pallets, Styrofoam and leftover fruit and vegetables from the market are collected, separated and sorted for re-use or processing from waste to raw materials, to the highest possible standard. Rotterdam-based waste-management company Renes collects the separated flows when the containers are full.

Since 2023, the Resources Station has been located in a physical building, mostly constructed from repurposed materials, providing low-threshold access to the market traders. At this Station, facilities such as compactors, rollable bins and containers provide the material infrastructure for the storage and processing of waste flows. Twelve employees, who live in the neighbourhood, collect and separate the waste on market days, operate the compactors and monitor the quality of the waste streams. Their technical know-how and communication skills, learned from daily practice, colleagues, and from Renes, are essential to ensure high-quality waste streams; the basis of both ecological and financial value creation. The Station's employees' close collaboration with Renes contributes towards logistical efficiency and allows for easy communication.

The passion, energy and dedication of the local employees contribute to the success of the Station. They are present at the market throughout the day, demonstrating to other residents the worth of waste streams – 'waste is the new gold' – as well as the pride they take in their job. Through these activities, the Cooperative shows both policy-makers and community members that locally initiated and managed resource flows not only contribute to circular economy goals at local and national levels, but also generate social, aesthetic, and cultural value for the community.

Resources

Afrikaandermarkt is the third largest market in the Netherlands with some 280 stalls and 15,000 visitors a day. Although the market format is generally more sustainable than conventional retail, it still generates residual waste, including cardboard and paper, unsold goods (such as fish, meat, and produce), wooden pallets, and various types of plastic. Rather than seeing this as a problem, the Afrikaanderwijk Cooperative saw an opportunity: ‘We could also turn it round and see the market as a labour market rather than a waste market’ (Afrikaanderwijk Cooperative).

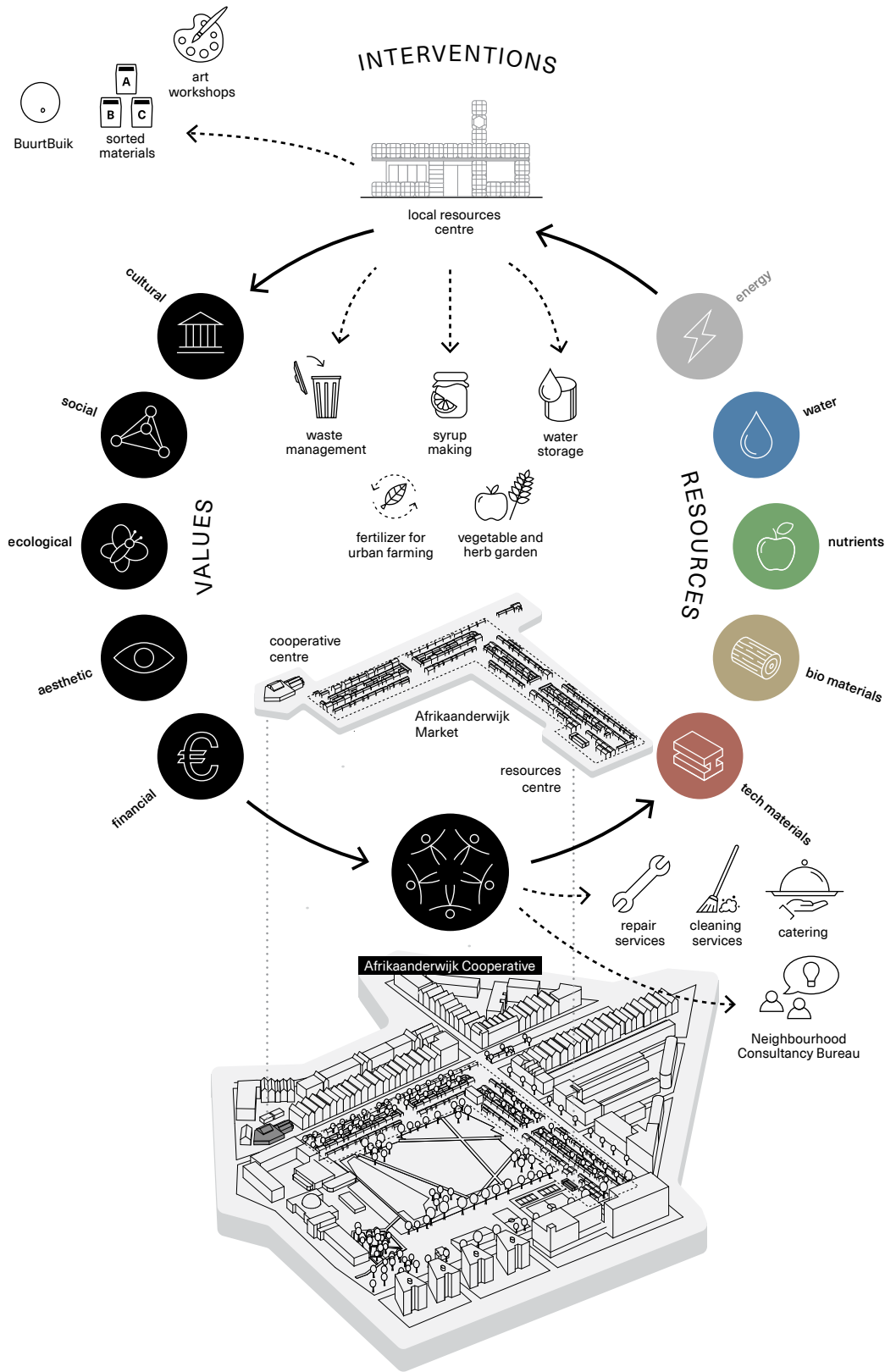
Taking this as a starting point, the Cooperative set up the ‘Circular Market’ initiative, with on-site separation of the market’s waste flows by local workers on market days, followed by processing the separate flows in as circular a manner as possible. High-value materials that can be re-used, such as wooden pallets and plastic crates, flow back to the market. Food and vegetables that are still of good quality are placed in crates outside the Station for local people to collect for free. Within the Station, soup is made from left-over vegetables, which can also be collected for free. On Wednesdays, a local organization, BuurtBuik (‘neighbourhood tummy’), collects surplus fruit and vegetables directly from market vendors. These ingredients are used to prepare a free three-course meal at community center ‘t Gemaal, offering local residents a free shared dining experience where they can enjoy both a nutritious meal and social company. Remaining fruit is processed into syrups, which are served at events and gatherings organized by the Cooperative.

The wood that is compacted and stored at the Station is collected by Renes and eventually recycled into new wood, the plastics into new granulates, and the biodegradables are used to produce compost and biogas. The relatively small amount of residual waste that is not recycled (4 per cent) is incinerated and the heat passes into the heating system that produces energy for Rotterdam. In total the Station processes over 700,000 tonnes of waste a year, of which cardboard (335 tonnes) is the largest flow. Some materials are separated from the regular value chain and are used as materials for workshops in the Afrikaanderwijk, or by art students or other entrepreneurs.

The Station was built with re-used water tanks and can therefore store a substantial amount of collected rainwater (4,500 litres/year). This water is used to water the herb and vegetable garden located on the Station’s roof. This garden is publicly accessible and local residents can work in the gardens and harvest herbs and vegetables for their own use. Primary school children from the school adjacent to the Station act as caretakers for the gardens, learning how to grow vegetables and herbs, developing a connection to the land, and taking on responsibility as active stewards of resources.



Various resource flows are collected from the market



Value Flower Field Map Afrikaanderwijk Cooperative

System, Activities and Space

The Resources Station, which opened in 2023, was designed by the architectural firm Superuse Studios and constructed using reclaimed materials. Prior to this, the Station operated from a corner of the market without a dedicated building or sealable containers; a set-up that proved far from ideal, particularly as it attracted vermin. The design ambition of the Resources Station was to create an iconic building that, in addition to collecting and separating waste, accommodates social functions such as workshops and events. Beyond serving market traders, the Station is also intended for use by local residents and businesses when the market is not in operation. The goal to develop an iconic building proved successful: the building was awarded the 2024 Rotterdam Architecture Prize, thanks to its regenerative approach to urban design.

Inside the Station, everything revolves around materials storage, reprocessing and preparing for distribution, while the outside of the building is primarily a place for the community. There is a publicly accessible green roof maintained by primary school children from the neighbouring school, which overlooks the market; large steps overlooking sports fields; a play area that can be used as a stand for watching children play; and a kiosk where free leftover fruit and vegetables from the market can be collected.

Since the arrival of the Resources Station, there has been a 20% increase in processed waste flows, indicating that a circular treatment of materials requires a different use of space, particularly when implemented within the local neigh-

bourhood. Local processing is not only convenient in terms of logistics and accessibility for market vendors, but also enhances the visibility of circular practices. By handling waste on-site, local workers make these processes tangible to market visitors and residents, raising awareness and engagement and demonstrating that circular practices are not just abstract terms in policy documents, but can in fact contribute to new local jobs, skills development, and learning opportunities.



Recycling containers

Examining the system parts:

Harvest

Market vendors deliver empty boxes, pallets, organic leftover fruit and vegetables and plastic waste to the Resource Station. Employees assess the level of contamination within the different resource flows, as lower contamination increases recyclability. Based on this assessment, they negotiate waste fees with the vendors accordingly. Market vendors pay a fee for wood, biodegradable residual waste, and contaminated pallets.

Processing & Storage

Processing is the most labour-intensive phase and involves the separation, cleaning and compacting of waste materials. To carry out these activities, employees use waste compactors rented from Renes, which require specific skills and technical

knowledge to ensure the production of high-quality, well-separated waste streams. The processed materials are subsequently stored in dedicated waste containers located within the Resource Station. The compression and controlled storage of waste contribute to aesthetic value creation, as large volumes of waste can be stored out of sight, thereby reducing odour, visual nuisance, and the attraction of vermin.

Distribution & Access

Once the containers are full, Renes collects them and further processes the separated waste flows, making these materials accessible to producers and recyclers. The compression and on-site storage of waste result in a 95% reduction in truck movements compared to the former municipal collection system, thereby generating ecological value through improved air quality.



Employee at work in the Resources Station

Collaboration

The Afrikaanderwijk Cooperative is a network organization, the members of which are different types of actors from the neighbourhood such as residents, businesses, organizations and local NGOs. It collaborates with local and external partners in developing initiatives that benefit the community. To design the initiative of a circular market, a working group was set up in which, in addition to the Cooperative and the city council, design company Superuse Studios was involved in thinking about local value creation from residual flows. Current procurement rules made it difficult to realize the Cooperative's and the council's shared ambition – on-site waste separation by local workers. The Right to Challenge⁵⁷ instrument offered a solution, although the initial working mode – a co-creative process with three different council departments and the Cooperative at the table as equal partners – shifted into a relationship of client (City of Rotterdam) and contractor (Afrikaanderwijk Cooperative), which made the process more fragile. Although relations with individual civil servants were good, the innovative nature of the initiative clashed with the inflexibility of the governmental system and the various departments that had to grant approval. After a few years, the municipality changed the formal working relationship to a 'Right to Cooperate',⁵⁸ symbolizing that long-term impact requires shared rather than transferred responsibility. In reality,

the contractual funding relationship has to be renegotiated on a yearly basis, which does not contribute to sustainable long-term prospects.

We have a difficult relationship with the city council as a system, because everything we do is new. So you end up in a system that is very ordered and cannot handle exceptions well; it is also unable to deal with the flexibility of organizing initiatives in a neighbourhood, because all its systems are organized and operated on the scale of the city. I find it difficult because I can't hold anyone accountable for this situation within the council because everyone runs up against the same system (Afrikaanderwijk Cooperative)

With its resources management services, the Afrikaanderwijk Cooperative supports multiple municipal tasks and policies simultaneously, for which they receive funding. This funding is distributed across several council departments, including city maintenance, work and income, and community social services, making it difficult to align and reconcile budgets. The Resources Station also generates financial value through its activities, primarily through the recycling of various waste streams (such as paper and cardboard) and the fees market vendors pay for waste disposal. However, this revenue does not yet constitute a viable business model for the Cooperative.

57 Right to Challenge is a form of democratic renewal that gives (organized) citizens the right to take over local government services if they think they can organize these differently or better themselves. Citizens then gain (co)-ownership of managing local resource flows or facilities.

58 Right to Cooperate is the right of individuals and communities to form, participate in, and maintain cooperative arrangements to collectively address shared needs, manage resources, and produce public or common value (Hermus et al., 2020).

Core team Resources Station



This is also because you are expected to make your business case financially sound according to the norms of the linear economic system. We should actually make those investments in a circular economy as a society, otherwise as a company you bear all the risks and are vulnerable (Afrikaanderwijk Cooperative)

Wholesalers and market traders are key partners in the resource management process. Market traders support the locally run Resources Station, as the ability to dispose of waste on-site saves them both time and money, which is of great value to them. The waste management company Renes plays an important role in collecting the separated waste streams from the Station. The Station's employees maintain friendly and mutually respectful working relationships with these private actors.

Design company Superuse Studios has been a partner of the Cooperative for more than a decade, collaborating on a range of projects, including the implementation of the Resources Station.

The knowledge and expertise contributed by Superuse Studios, along with other design and research organizations such as Design&Publics, support the Cooperative's initiatives and help embed them within broader societal structures.

The Cooperative also collaborates with various knowledge institutions through a range of research projects, including Erasmus University Rotterdam, Cultuur&Campus, Delft University of Technology, and the Willem de Kooning Academy. Researchers and students continuously study the Cooperative's local value creation initiatives, which are regarded as exemplary throughout the Netherlands. While the Cooperative values these collaborations, it is cautious with such relations as these are rarely reciprocal. Although knowledge institutions express an interest in creating community impact, research projects often take a one-sided form in which data is collected to support academic careers, with limited return of value to the community or the Cooperative itself.

Value

The added value of the work of the Afrikaanderwijk Cooperative, and specifically the initiatives relating to the circular Afrikaandermarkt, lies in all value domains differentiated by the Circular Value Flower.

The Cooperative currently employs 80 people, 12 of whom work at the Resources Station. Most of these local employees have experienced labour market disadvantages, faced difficulties in finding suitable employment and have therefore previously relied on social security benefits.

Out of 8,600 local residents this counts for very little, of course, but these people know other people who, as a result, also experience that working can be respectful. Many people we work with have always been at the bottom of the labour market ladder and are often not treated too well, and we are trying to do things very differently. There are people here who don't know anyone who has a job, so if you can change a few people in that situation, it has a big reach in raising awareness (Afrikaanderwijk Cooperative)

Through the job creation at both the Cooperative and the Resources Station, financial as well as social value is generated, demonstrating that these roles are relational, rather than purely transactional.

The market traders also gain financial value because they can hand in cardboard, plastic and non-broken pallets for free at the Station; they pay a fee for wood and fruit and vegetables. The Resources Station creates financial value

through waste treatment, but this value is not yet sufficient to cover all costs, in particular the wages of the employees. Within the current waste management system, the collection and high level of separation carried out by the Resources Station's employees is labour intensive. In the current linear economy, labour is highly taxed and materials are low-cost. It is the expectation that, as we transition towards a fully circular economy, these taxation policies will shift. This will make practices such as those carried out at the Resources Station more financially sound.

The municipality also gains financially through the out-sourcing of the waste collection. Although they support the Resources Station with subsidies, they still save between 126.000 – 183.000 Euros per year on cleaning and waste disposal costs. In addition, the municipality saves on the payment of benefits, as the Station's employees have paid work.⁵⁹

Through the separation of the waste flows and their treatment at the Resources Station, emission into the atmosphere of approximately 1.18*10⁵ kg CO₂ eq per year (the equivalent of the CO₂ intake of 5,900 trees a year) have been prevented.⁶⁰ This is a conservative estimate, as it does not include the multiple times cardboard and paper can be recycled, and the reduction of truck movements. The Cooperative has calculated that, over 2024, there was an estimated reduction from 6,120 truck movements before the waste take-over by the Resources Station to 323 movements in the current

situation (CO₂ reduction of 61.2 tonnes a year). Therefore, in addition to the reduction in emissions generated by the waste treatment, there is also a significant reduction due to reduced traffic on the roads.

Of the total amount of waste processed in the Station, 96% can be re-used in different ways due to the treatment of the different waste flows. In the City of Rotterdam, waste is collected in bulk, except for glass and cardboard. Of this non-treated waste, only 75% can be recycled for other purposes, so 25% of that waste is incinerated. The Resources Station therefore achieves far higher percentages of recycling.

From the waste flow of food and vegetables, 16.6 tonnes a year is saved and distributed at the Station to local residents, BuurtBuik and other food initiatives. Of the remaining biodegradable materials, 17,000 kg compost and 12,500 m³ biogas (= 81,000 kWh energy, heating for 35 Rotterdam households) is produced on a yearly basis. Other ecological value is created through the nature-inclusive garden on the roof of the building, where native plants and herbs, wild flowers and vegetables grow. These are watered with collected rainwater. The presence of the Station and its employees contributes to social value creation within the neighbourhood; the place itself already functions as a local hub, where residents meet and organize activities. The ambition of the Cooperative is to grow this social aspect of the Station by capitalizing on the sense of community and strong local identity. In the years ahead, the Cooperative intends to organize activities and educational workshops to further raise awareness of a circular economy within the community.

Raising awareness is extremely important. It is also one of the reasons we started cleaning during the day to show that there are 'real' people working to maintain the neighbourhood. Seeing the cleaner busy triggers people to keep the place cleaner themselves (Afrikaanderwijk Cooperative)

The market square and surrounding neighbourhood are significantly cleaner now the waste is collected throughout the day, contributing towards enhanced aesthetic values; a more attractive living environment.

In addition, separating, reusing and recycling products and materials on site within the neighbourhood by local employees means this circular market initiative simultaneously contributes to both local and national policies on circularity, unemployment and social cohesion. However, the activities at the Resources Station are not yet fully acknowledged by the local government as a potential learning environment that demonstrates how the transition towards a circular economy unfolds in practice for all stakeholders involved, including citizens. As a result, the Cooperative must repeatedly justify its added value in the annual reports required and in its funding applications, indicating that the local authorities show limited recognition of the cultural shifts required for a successful transition to a circular economy.

Lastly, by generating positive impulses, the Cooperative aims to overturn the negative perceptions of the neighbourhood, both within the wider city and among residents themselves. By demonstrating that circular practices can foster community pride, financial value and local resilience, these initiatives contribute directly to broader goals of climate justice.

⁵⁹ Whenu, 2025
⁶⁰ idem

Looking at the Value Chain in Detail

The Resource Station has been in operation for several years and its circular practices have gradually evolved and expanded. In 2025, the Circular Value Flower was again applied to systematically analyse the value chain of these existing circular practices in detail, with the aim of identifying opportunities to further enhance multiple value creation through potential new circular activities.

The value chain was analysed through the five elements of the systems layer: harvest, storage, processing, distribution and access. For each element, the analysis mapped the required enabling capital, the actors responsible for providing this capital and the types of value generated, as well as the beneficiaries of this value. This structured approach enabled a comprehensive understanding of the interdependencies within the system and informed the identification of potential intervention points for regenerative design. For the outcome of this detailed analysis, see Figure on page 76 - 77.

The value created at the Resource Station is supported by various forms of enabling capital at each stage in the value chain. During all phases, goods such as rollable waste bins, forklift trucks, compactor containers, and the physical location itself make collection possible. During the harvest, process, and access phases, employees require negotiation and communication skills, as well as knowledge of different waste streams to ensure the separation of 'clean' from polluted streams. The carefully built-up network of relations between traders, Resource Station employees and the



Left-over fruits and vegetables can be collected by residents

company Renes provides trust and the coordination needed to make operationalization efficient. Employees actively cultivate passion and pride in their work, as illustrated by one local employee: 'Waste is the new gold. We are not just workers collecting waste; we are proud workers generating new nutrients.'

The Resource Station receives funding from the European Union, which enables the implementation, development, and improvement of its regular circular practices. In addition, it receives compensation from the City of Rotterdam for employing people with labour market disadvantages, as well as project-based funding to explore new circular practices and programming. The detailed analysis shows that, across the entire value chain, a diverse set of enabling capitals supports the operationalization of existing circular value creation practices, which are deeply embed-

ded within the ecosystem surrounding the Resource Station. Through the collaborative nature of these practices, multiple forms of value are generated for a range of stakeholders, including local government and members of the community.

When the Cooperative started waste collection in 2017, the dominant narrative focused primarily on social and financial value creation: providing employment opportunities, reclaiming agency in a marginalized neighbourhood, and diverting waste from incineration while reducing municipal cleaning costs. By 2021, ecological value creation had become more central in the narrative guiding the management operations of the Resource Station.

Building on the opportunities identified through the value chain analysis, the focus of the Resource Station could shift to more explicitly include aesthetic and cultural dimensions in order to reinforce its identity as an enabler of circularity, expand its educational and training functions, and further develop its role as a social hub within the neighbourhood. Realizing these opportunities for growth requires strengthening ties with local residents and organizations. Through the development of new circular activities positioned higher on the R-ladder, the Resource Station can demonstrate both its regenerative potential and the organizational potential of this holistic approach to value creation at this scale within the community.



Social gathering at the Resource Station



A CCI as a Key Transition Enabler

As discussed in the introduction, (academic) research and policy development on circular economy strategies, technologies and governance has expanded rapidly over the past decade. Frameworks such as the R-ladder have become established tools for assessing the environmental impact of innovations, with acknowledgement that higher-order strategies such as regeneration, reduction and re-use would offer greater long-term benefits than recycling alone. Despite this growing body of knowledge, implementation of the higher-order strategies in particular remains limited and fragile.⁶¹ Circular practices often struggle to scale, fail to deliver systemic change, and remain embedded in the linear production logics of economic growth. As a result, many ‘innovations’ optimize current systems, rather than opening pathways towards fundamentally different, more just and circular futures.⁶² In the Netherlands and elsewhere, recycling infrastructures have proven economically vulnerable, and energy transition initiatives frequently depend on the continued existence of the very systems (continuous supply of waste and industrial heat) they aim to replace. At the same time, citizens and local organizations are often sceptical about sustainability transitions, fearing loss of autonomy, affordability or quality of life.⁶³

Amidst this dark scenario, where humanity appears unable to break with current production practices that are devastating the planet, and with that ultimately ourselves, com-

munity-led and locally situated circular practices such the Resources Station in the Afrikaanderwijk could provide an alternative, beyond circular initiatives that seem to maintain the status quo. At present, this is assessed through the lens of the linear economy, primarily as a recycling facility. However, from a longer-term perspective, the Resources Station has the potential to operate as an adaptive, transformative space which could evolve alongside the R-ladder, leading the way – from the bottom-up – in the development of new inclusive circular practices. The ability to operate in an agile way – to constantly transition towards the policy ambitions of being fully circular in 2050, while at the same time ensuring that all stakeholders genuinely benefit from these practices – could be considered as a form of performative politics.⁶⁴

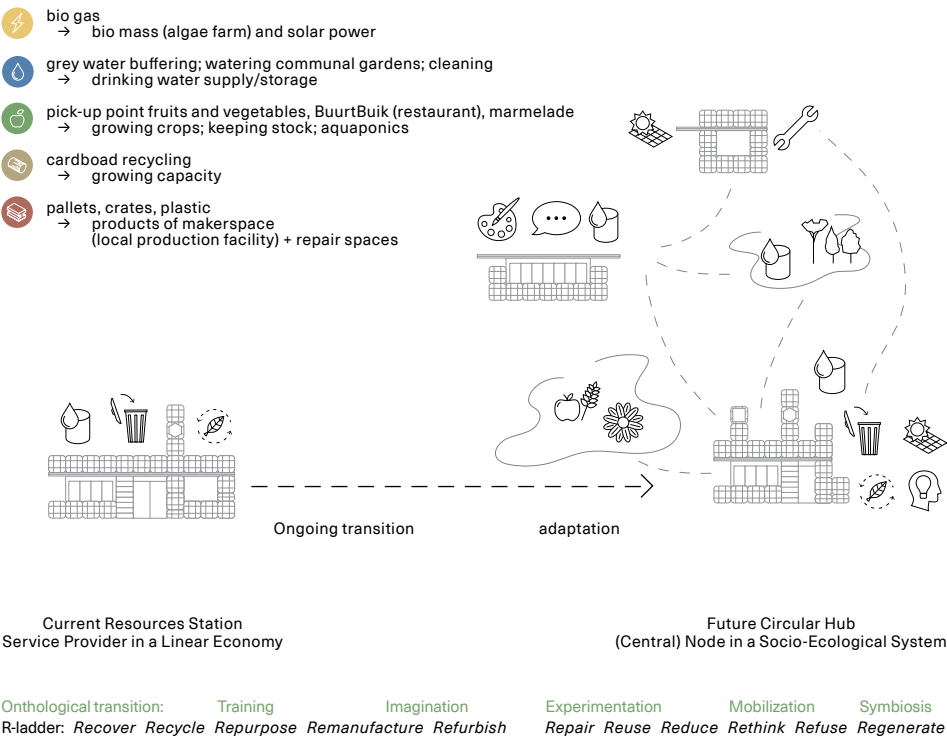
The employees of the Resources Station have voiced exactly this ambition: to serve and become recognized as an agile and resilient space for circular and cultural transition. Together with design studio Design & Publics, they engaged in an endeavour to explore how various forms of knowledge – academic, practical, Indigenous, futures-oriented and design-driven forms of knowledge and experimentation – could be used to develop shared imaginaries of what the Resources Station could become. By using the Circular Value Flower method, employees brainstormed at a first exploratory session and came up with a number

61 Kirchherr et al, 2025; Fraser, M., et al., 2024
62 Loorbach et al., 2024
63 Rijshouwer, E., 2026
64 Törnberg, A., 2021

Opportunities for a possible future of the Resources Station mapped

of new practices that could inspire a regenerative future. They discussed the fact that this transition is, in their view, primarily a cultural shift, in which humans should re-establish their relationship with nature through symbiosis. They told a story of how humans would metaphorically merge with mushrooms to become ‘humrooms’, capable of consuming plastic. In other words, we need to think beyond purely technical and spatial solutions, and instead look for a change in being, rather than just knowing or doing. The first step in this cultural transition is to raise widespread awareness that we are collectively addicted to consumerism as a way to feel good. We must rediscover happiness through activities that foster engagement with nature, and with one another.

A good example of how to achieve this is the development of small, collectively owned urban allotments, where owners can engage in experimenting with forms of mutual resilience and experience a shared capacity to act. According to this vision, the Resources Station will ultimately grow into a networked web of spaces hosting a wide range of activities rooted in regenerative and collective practices: food production on small and larger sites across the urban landscape; the design, production, re-manufacturing, and repair of long-lasting goods within ‘making spaces’; and dedicated local spaces for learning. Together, these nodes will form a dense yet fluid network of social infrastructure at neighbourhood level, strongly related to an economy of care.



Main Insights

The aim of the Afrikaanderwijk Cooperative is to make the Afrikaanderwijk neighbourhood and its residents more resilient by developing initiatives in co-creation with local businesses, citizens and external partners, such as the city council and experts, based on the local environment and the opportunities available within this spatial and social context.

We are creating a different way of working, another type of collaboration with the local government. Of course, as outsiders we don't have all the answers either, so I prefer to work closely with the city council. In co-creation. We pick out the people who understand and want to innovate. So within this innovative collaboration between local government and citizens, value is created (Afrikaanderwijk Cooperative)

However, this collaboration does not come naturally and is not on equal terms (yet). Because the city council pays for the Cooperative's waste collection in the form of subsidy, there is a perception that this funding is a 'gift', whereas in reality the Cooperative fulfils a task for which the council itself was previously responsible and would be again if the Resources Station ceased to exist. Therefore, the Resources Station (and the Cooperative) can in fact be seen as an integral part of the governance system – something Rotterdam's city council has yet to fully recognize.

The Cooperative has been responsible for waste collection for ten years, and the city council now expects the Resources Station to become financially self-sufficient.

In doing so, the council is ignoring the fact that this Resources Station operates its circular practices within a still largely linear economy: labour is highly taxed, while materials remain low-cost. In addition, these circular practices generate a range of other values – social, aesthetic, and economic – that meet objectives across several council departments. However, both the costs and the benefits are distributed across these departments, making it difficult – as yet impossible – to establish a straightforward client-contractor relationship. 'When the various departments are not aligned with each other, it is difficult to work with them' (Superuse Studios).

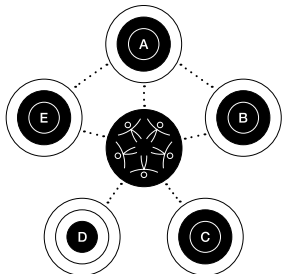
Exploring new value systems through experimentation with circular practices is essential, but inherently carries the risk that outcomes differ from what was imagined. Too often, an experiment is then dismissed as unsuccessful and people revert to the old system or the familiar way of doing things.

But especially if people (in vulnerable positions) are part of such a process, it is important to realize that you need to try to change the system in a structural way, rather than giving up easily. To develop a new model, you therefore don't so much need a short-term project, but rather a long-term process in which learning and exploration are seen as a valuable part of the journey (Afrikaanderwijk Cooperative)

The council does not yet value the Resources Station as a place for testing innovative circular practices, for the production and exchange of

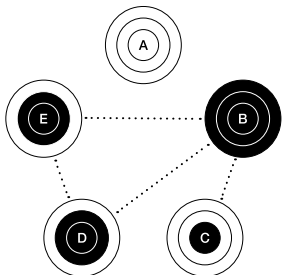
knowledge, and for raising awareness of these practices among local residents. 'Local residents now see circularity [as] a vague notion but as something that could bring them jobs' (Afrikaanderwijk Cooperative). As the future study discussed in the previous paragraph demonstrates, the Resources Station could in fact be an agile enabler in the transition towards a circular economy; the Station, being low-tech and low-cost, can adapt both its practices and spatial configuration while moving up the R-ladder.

Despite the laborious and obstinate nature of official decision-making, this case study shows that cooperative entrepreneurship in collaboration with local government can contribute a great deal to the economic and social development of a neighbourhood. That said, citizen engagement in transition processes, especially in vulnerable neighbourhoods, is not a given. The business model for processing waste from the Afrikaandermarkt discussed in this section demonstrates that closing resource cycles could be financially viable at community level, through the engagement of local residents as active agents in circular practices contributing to the transition toward a sustainable, just society.



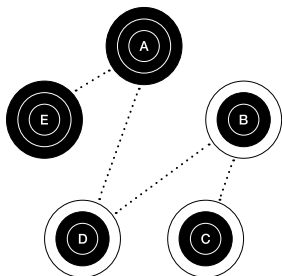
COLLABORATION

- A Designers
- B Government
- C Businesses
- D NGO's
- E Education



RESOURCE CYCLES

- A Energy
- B Nutrients
- C Water
- D Bio Materials
- E Tech Materials



VALUES

- A Social
- B Ecological
- C Aesthetic
- D Cultural
- E Financial

Bioregional Construction Programme

Bouwtuin, Gooi & Vechtstreek, the Netherlands

In the Gooi & Vechtstreek, a forested suburban region on the south-eastern edge of the Amsterdam Metropolitan Region (MRA) in the Netherlands, a bioregional construction programme – known in Dutch as the Streekbouwprogramma (Bioregional Construction Programme) – is currently underway.

The programme – initiated by Bouwtuin, a local research, design and construction collective – aims to (re)-establish a small-scale, bioregional value chain for hybrid timber-frame housing construction, rooted in the regional landscape and reconnected with its regenerative material resources, such as local timber, earth and fibres. By connecting various local initiatives, material processors, and makers in the field of natural building, a culture of open, collaborative construction is being revived. Supported by the Gooi & Vechtstreek regional government, this seeks to strengthen the biodiversity and resilience of regional forests, while safe-guarding the long-term regional availability of high-quality timber

through responsible landscape stewardship. The reintroduction of regional timber value chains using residual wood from local forests also strengthens social cohesion in the region. From 2020 onwards, a regional construction collaboration has been established among various local value chain stakeholders, ranging from forest stewards, farmers, sawyers, (prefab) builders, (landscape) architects and planners.

Inspired by the concept of the regional landscape as a commons, the Streekbouwprogramma draws on the heritage of the *Erfgooiers* – a regional organization of peasant farmers from the Gooi & Vechtstreek who collaboratively managed land and resources for more than 650 years (±1300–1971). Since 1932, their land is managed in perpetuity by the Goois Natuurreservaat (GNR), a regional nature conservation foundation governed by a collaboration between the local municipalities in the Gooi & Vechtstreek region. GNR is a key stakeholder within the Streekbouwprogramma.

Sticking the sawn Douglas timber for air drying

Purpose and Enablers

The Streekbouwprogramma aims to regeneratively reconnect the regional landscape with local housing construction, thereby enhancing and balancing ecological, social, cultural, financial and aesthetic values. To achieve this, Bouwtuin and Delft University of Technology have designed a future-proof bioregional value chain system for hybrid timber frame housing construction. This system is being prototyped in practice within the Gooi & Vechtstreek through the Regional Timber Construction Initiative (RTCI), a two-year project (2024–2026) supported by the GNR, local municipalities, and funding from the Province of North Holland and the non-profit Built by Nature.

The initiative brings together various regional value chain stakeholders to collaboratively test and refine the system in practice.

The system design of the bioregional value chain is represented by the Regional Construction Com-

munity model (ReCoCo), which is structured as two interdependent segments, each representing a phase of the bioregional value chain:

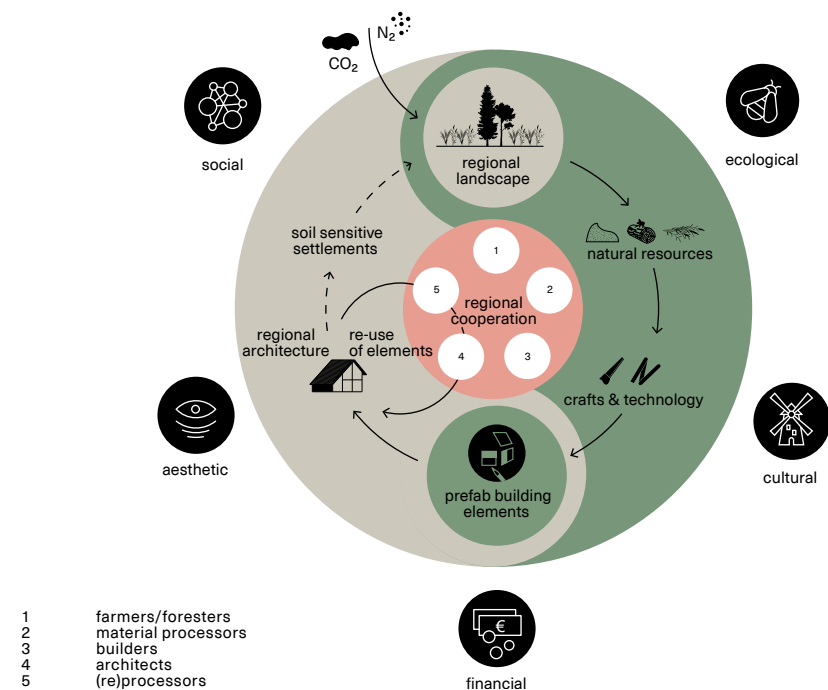
Landscape segment

- Encompasses all steps from sustainable forestry and timber processing to the prefabrication of hybrid timber frame components for housing.
- Focus: Regenerative resource management, biodiversity enhancement, and responsible material sourcing and processing.

Construction segment

- Covers all steps from prefabrication of timber frame components to housing assembly and the reintegration of landscape-sensitive housing clusters into the (urban) landscape.
- Focus: Circular construction, modular design, and landscape-sensitive clustering.

Streekbouwmodel / Regional Construction Community model



Based on the logic of the Circular Value Flower, the Regional Construction Community model (ReCoCo model) – maps value chain activities per segment, collaboration among actors, and the values generated. It also systematically identifies the existing community enablers – skills, networks, wisdom, passion, and goods – essential for developing the system envisioned, while identifying gaps to ensure the value chain's long-term sustainability.

For the RTCI project in Gooi & Vechtstreek, the transformation of a former Douglas fir production forest into a biodiverse, eternally regenerative regional construction forest serves as a real-world prototype for the landscape segment. For the corresponding construction segment, the *Streekhuis* – a modular regional home used as an example – acts as a practical prototype, defining performative system requirements from a housing perspective.

The involvement of the GNR as a nature conservation organization and large land owner anchors the landscape segment within a robust regional policy network. GNR owns essential forestry equipment – such as tractors and chainsaws – and maintains skills for selective tree thinning. While GNR's expertise in managing forests for biodiversity and accessibility is extensive, its focus on timber productivity is limited, as this is not part of its original core mission. Consequently, local timber wisdom has faded: knowledge of which trees hold value for local construction has weakened, and regional experience in timber processing and application has diminished. The Streekbouw-programma seeks to bridge this gap, unlocking regional timber potential through closer-to-nature forestry.



Impression of the *Streekhuis*

Through the construction segment, the programme reimagines hybrid timber frame housing as a layered, regenerative open system, synchronized with the regional landscape and using timber as the primary carrier for other local materials. The *Streekhuis* construction enables regional sawyers to develop expertise in resource-efficient tree conversion, while builders gain skills in appropriately applying local timber. A central challenge is certifying locally harvested timber for housing construction, a critical bottleneck in bioregional value chains, demanding collective exploration, innovation and amended legislation.

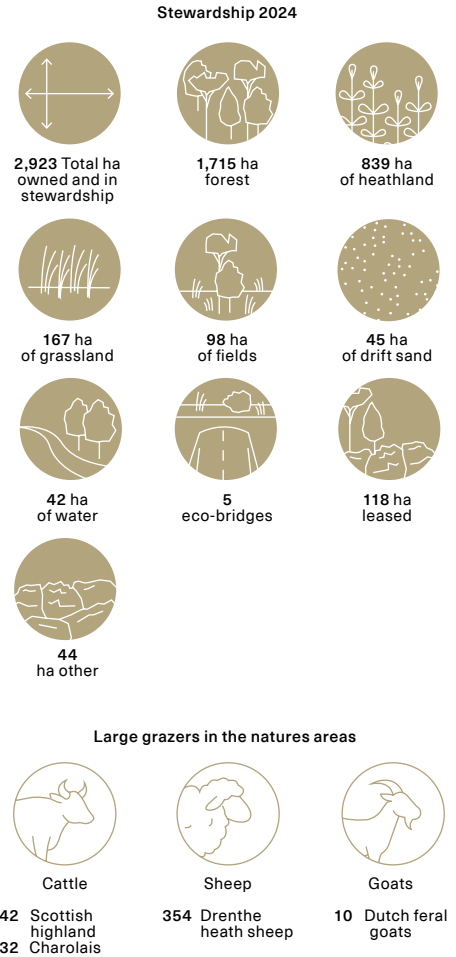
Tree selection by GNR forest steward for the selective thinning of the even-aged Douglas Fir forest



Resources

The Gooi & Vechtstreek is known for its forested character and cultural landscape qualities, while being part of an urbanized environment. The landscape stewardship by GNR plays a crucial role in maintaining this quality for the future: it contributes to the vitality of regional forests and the regional landscape at large. Within this territory of ± 2900 hectares, there are various types of forests with a total area of ± 1715 hectares, including natural forests, open forests, transitional forests (formerly production forests), even-aged forests, coppice forests and clearcut forests.

From 725 hectares of GNR forest area, timber is harvested that can be sustainably used as a biological material in local construction. Each year, ± 1524 m³ of timber is harvested by GNR, of which 914 m³ is considered qualitative construction timber, while 305 m³ is earmarked as timber for particle board (OSB), and another 305 m³ is earmarked as firewood (GNR data, 2024). Most of this timber becomes available from the transformation and thinning of former production forests (271 hectares).

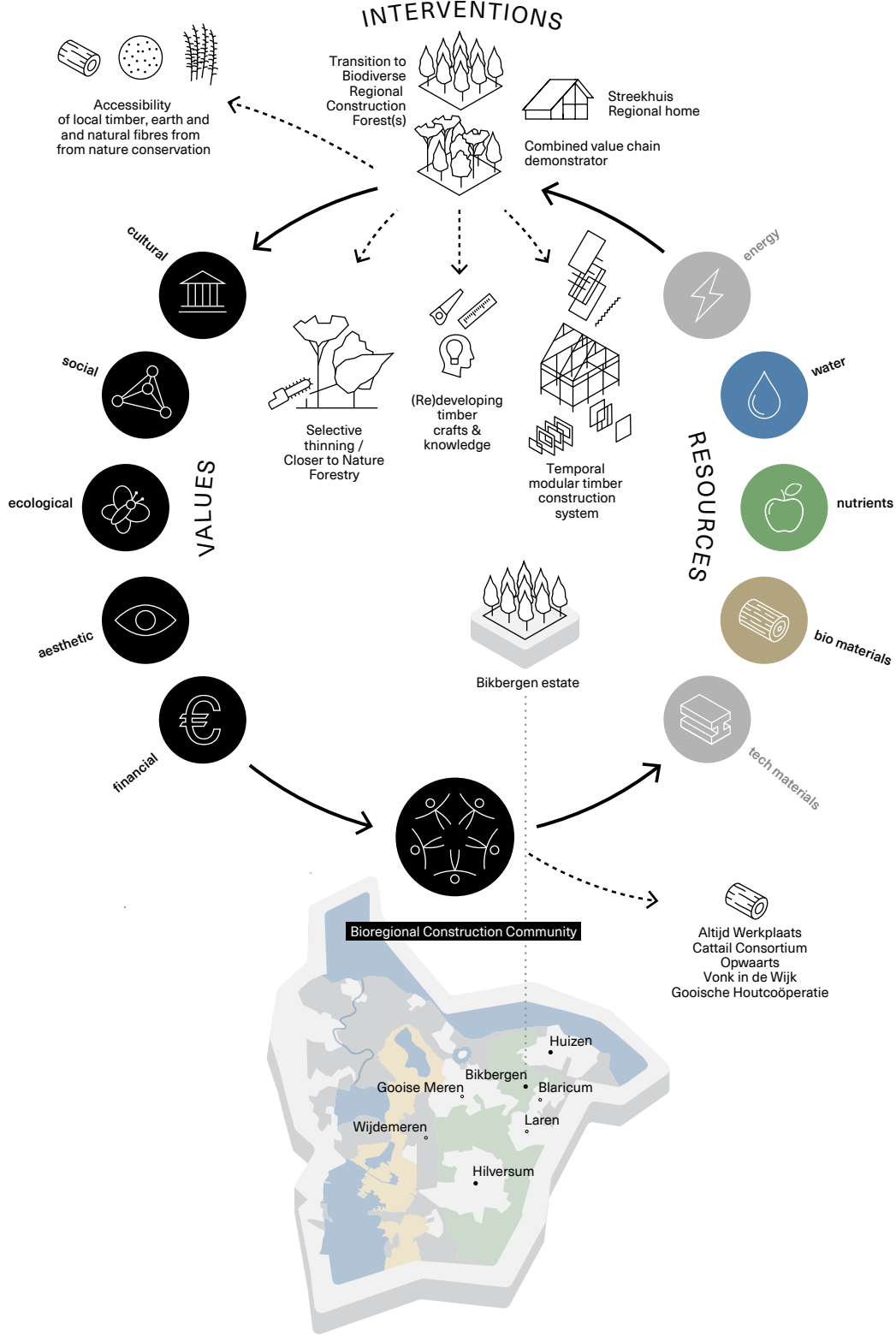


Forest type	Timber harvesting regime	Area (ha)
Natural forests	No harvesting	937
Open forests	Moderate timber harvest when selective clearing is needed	224
Transitional forests (formerly production forests)	Timber harvest for transformation (next 30 years)	271
Even-aged forests	Continued timber harvest	68
Coppice forest	Moderate firewood harvest, maintaining cultural forest	4
Clearcut forest	Continued moderate timber harvest	162
Total forest		1666

Regional landscape typologies and cattle stewarded by GNR

GNR forest types and timber harvesting regimes

Value Flower Field Map Bioregional Construction Programme



For GNR as a nature management organization, timber production is not a goal in itself. The goal of the selective thinning method, which GNR uses in former production forests, is to improve the forest structure and increase biodiversity. Thinning creates light on the forest floor for undergrowth development and natural regeneration.

In this case study, the focus is on timber resources which become available from the transformation of former production forests – more specifically the transformation of a former Douglas fir⁶⁹ production forest. This type of production forest is quite common within the region, as the exotic Douglas fir was planted after WWII as a fast growing productive tree, yielding good quality timber. Douglas fir is expected to constitute the largest share of timber yields within the Gooi & Vechtstreek region over the next 30 years. Douglas fir is also common in other parts of the Netherlands, accounting for approximately 12 per cent of total timber yields nationwide.⁷⁰

	m³/yr	%
Construction timber	914	100
Douglas fir	320	35
Corsican pine	183	20
Japanese larch / Norway spruce	91	10
American Oak	183	20
Beech	46	5
Other	91	10

69 Douglas fir (*Pseudotsuga menziesii* (Mirb.) Franco) is a large conifer from North America that was brought to Europe by David Douglas in the nineteenth century. Although it was initially planted as an ornamental tree it became a major economic species because of its fast growth rate and good quality timber, and is now the most abundant non-native tree species cultivated in Central European forests. European Atlas of Forest Tree Species https://forest.jrc.ec.europa.eu/media/atlas/Pseudotsuga_menziesii.pdf

70 Schelhaas et al., 2022

71 Brand, 1994

As part of the complete regional timber construction value chain, the RTCl project team hypothetically designed a step-by-step process to transform a Douglas fir production forest into an eternally regenerative, biodiverse regional construction forest.

In the envisioned regenerative scenario – to be achieved in 100 years across five stages – one hectare of biodiverse forest yields ± 60 m³ of varied timber every 10 years. A limited number of Douglas firs will remain, supplemented by beech, sweet chestnut, birch, and ash. The forest balances ecological needs with technical construction demands.

Key constraints include:

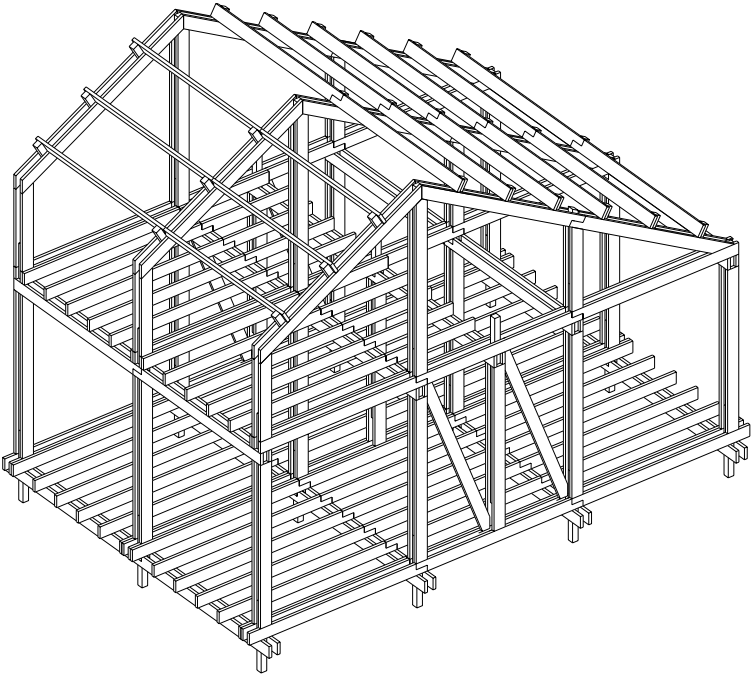
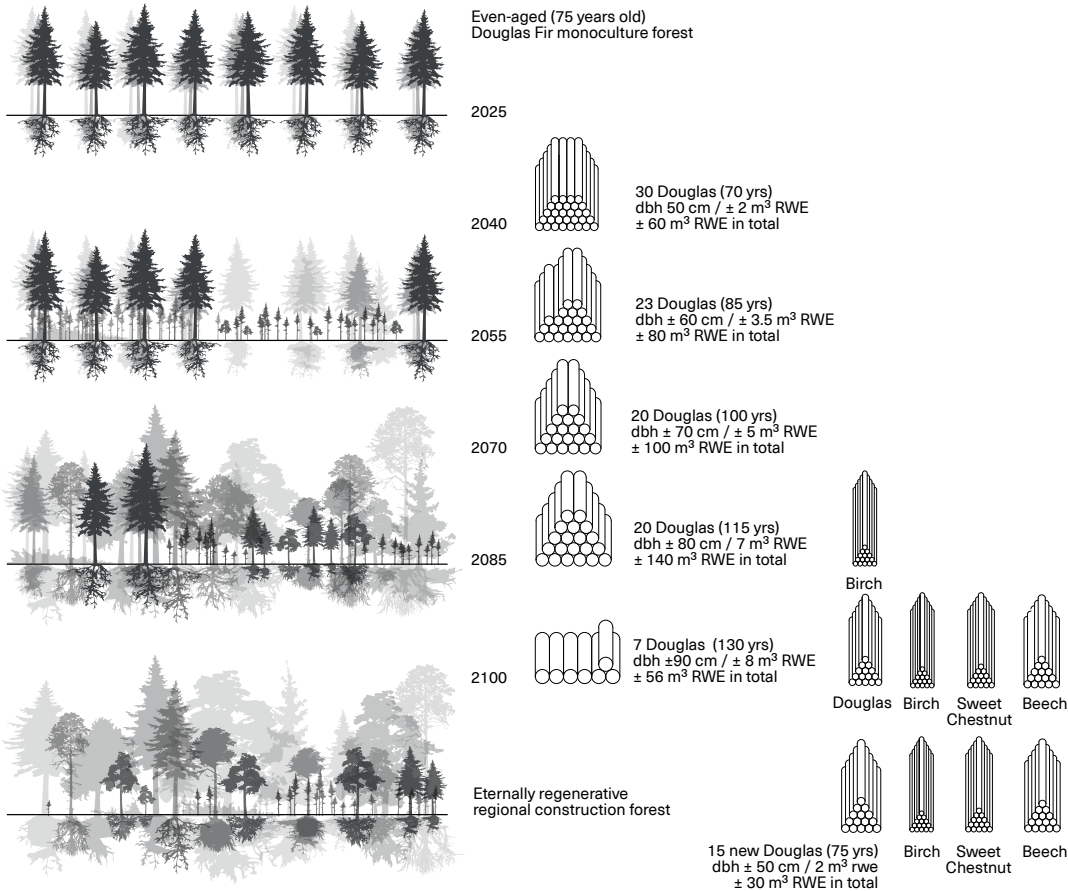
- Sandy soil (poor to moderately poor, drought-sensitive)
- Existing closed Douglas fir canopy, deep shade
- No large clearcuts

The harvested volume and type of timber align with the regional home's lifecycles and its layered, adaptive design.⁷¹ The action research emphasizes designing a modular, adaptive load-bearing structure of prefabricated Douglas fir columns and beams, with interchangeable elements lasting at least 100 years. The regional home adapts internally while synchronizing materially and temporally with the forest's long-term regenerative cycles.

Nature conservation timber yields of the Goois Natuurreservaat per year per tree type (numbers of 2024)

Isometric view of the modular load-bearing structure of prefabricated Douglas Fir columns and beams

Design of the phased transformation of a former Douglas Fir production forest into a biodiverse regional construction forest



System, Activities and Space

Through action research within the RTCI, a diverse group of foresters, sawmill operators, architects, builders, and policymakers has collaboratively strengthened the bioregional construction value chain as a landscape-based system. The *Streekhuis* – a regional house type – and the transformation of a Douglas fir production forest into a regenerative, biodiverse *Streekbouwbos* (regional construction forest) serve as a combined demonstrator. This project establishes practical guidelines for prototyping the value chain, focusing on the landscape segment and timber processing activities up to prefabrication, all aligned with the principles of the Circular Value Flower.

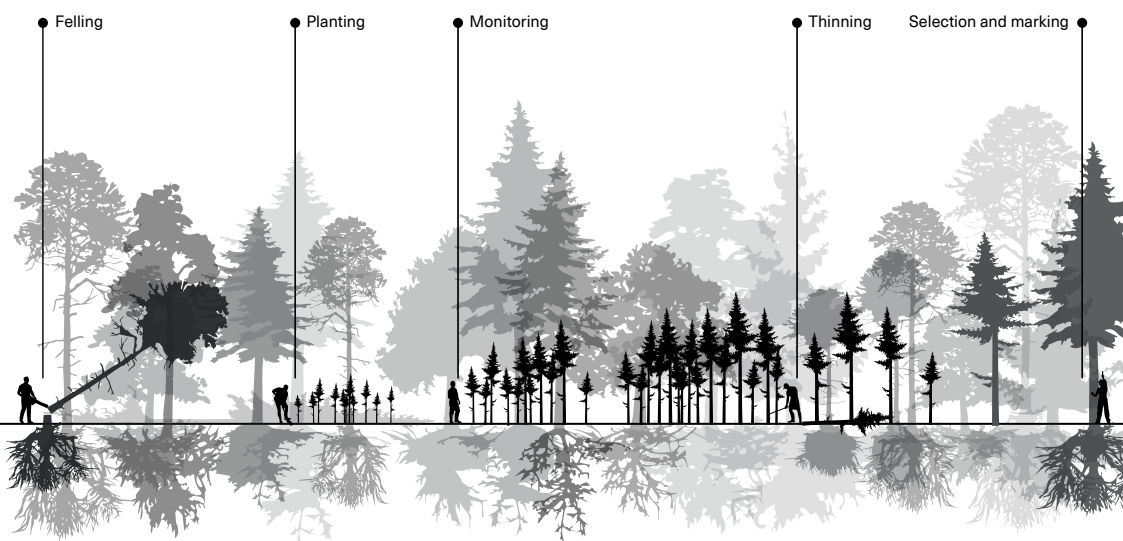
Harvest

The action research team developed a step-by-step process for converting a former production forest into a regenerative construction forest, integrating silvicultural practices,

timber harvesting, and construction use. A Douglas fir forest in the Bikbergen estate (Huizen) was selected as a case study, and eight trees, needed for the loadbearing structure of the *Streekhuis*, were harvested during training on selective thinning.

The process began with tree selection, guided by criteria co-developed with foresters to balance ecological health and timber quality. Decisions about timber quality and dimensions were made in the forest, where tree trunks were bucked into logs immediately after felling. This on-site approach ensured optimum material use and minimized waste, aligning with the specific requirements of housing construction.

Log extraction posed challenges, as traditional tractor winching can damage the forest floor. To mitigate this, a logistic plan was drawn up to minimize impact, while the regional Hoorneboeg estate explored horse-drawn extraction as a low-impact



Sustainable forestry activities



Tree marking with a 'blesmes'

alternative. While temporary log storage in water can improve timber quality and reduce drying time, this was not tested here due to the lack of flowing water near the forest and sawmill.

Biodiversification and rejuvenation techniques should be tested in collaboration with ecologists to transform the monocultural forest into a biodiverse regional construction forest, improving sapling survival rates. A forestry expert from GNR with an ecological background led the development of the forest transformation plan. Throughout the process, a checklist was established for real-time monitoring, ensuring low-impact harvesting, operational efficiency, and high timber quality.

Timber (Re-)processing & Storing

The GNR transported the roundwood to the local sawmill at the non-profit AltijdWerkplaats nature and work organization, where logs up to 6.1 meters could be processed. Upon arrival, the logs were unloaded, stacked, and measured for length and diameter. This step revealed the

importance of sorting and numbering logs in the forest before transport, allowing for logical grouping at the sawmill and efficient yard logistics, as each log diameter range requires its own sawing pattern.

Sawing the logs into beams and planks was a critical activity, where decisions directly influenced timber quality and suitability for housing construction. The aim was to minimize sawing loss, whereby the length and diameter of each log plays a crucial role. By linking the structure of the forest and the anatomy of a single tree to the requirements of the load-bearing structure, the team developed an ecologically integrated modular construction system that maximizes material efficiency and retains its value over time across the entire timber resource.

The sawing process generated a continuous flow of residual materials, including offcuts, sawdust and wood chips, which posed logistical challenges due to limited yard space. However, these residues are repurposed: sawdust is used as insulation for façades, floors, or roofs, while sapwood is employed as sacrificial cladding. This approach demonstrated how waste streams in a bioregional construction value chain can be transformed into valuable resources, embodying the principles of circular construction.

After sawing, the timber was immediately stacked for drying; a process best done naturally using air-drying methods. While slower than kiln drying, this method sustainably harnesses the energy of the sun and wind to reduce moisture content. The sawmill's yard layout was organized into modular units of stacked timber, with dynamic planning to accommodate the required drying time for each batch.

Once dried, the timber underwent grading to ensure it met standards for quality, strength and end-use applications. Appearance grading was applied, evaluating moisture content, structural integrity, and dimensional accuracy. Lower-grade timber was repurposed for non-structural uses, such as cladding, to minimize waste.

Planing, which smooths and sizes timber to precise dimensions, was considered, but deemed too costly for small-scale operations. Instead, rough sawn Douglas fir was used to explore how to manage challenges such as dimensional inaccuracies and rough surfaces in construction.

Distribution, Access, and Scaling the Value Chain

After processing, the timber was distributed to Bouwtuin's prototyping site. Logistics were optimized by adjusting stacked timber dimensions to fit standard truck loading spaces, reducing costs and emissions.

To ensure the timber was accessible, it was stored in a temporary yard for the construction of the *Streekhuis*. A 1:1 prototyping process by Bouwtuin provided valuable insights into the applicability of sawn Douglas fir, familiarizing the team with the quality and structural behaviour of regional timber. Looking ahead, enhancing the bioregional value chain will focus on accessibility through collective timber hubs within the region that connect supply and construction demand. Additionally, developing training programmes and open-source guidelines will empower builders with the knowledge and skills needed for circular timber construction and modular assembly.



Log sawing workshop



Prototyping the modular timber structure

Collaboration

The Bioregional Construction Programme evolved as a result of previous research activities into landscape-based construction undertaken by the Bouwtuin Foundation within the region. The quantities of local timber that become available through nature conservation by GNR on an annual basis give insight into the potential of this for local (housing) construction.⁷² From the harvest of residual Douglas fir through nature management, load-bearing wooden structures for approximately 30 homes of $\pm 60 \text{ m}^2$ could be produced annually.

The insights from this research attracted the attention of the Gooi & Vechtstreek regional government, prompting them to ask the Bouwtuin Foundation to design and develop a regional timber construction value chain for local housing. Currently, with seed funding from the Province of North Holland and Built by Nature, the Bouwtuin Foundation prototyped the value chain with local value chain stakeholders, working closely with Delft University of Technology on defining the boundaries and performances of its system design.

Bouwtuin applies its Regional Construction Community model (see Fig. on page 83) to map and actively engage the various stakeholders across the bioregional value chain. Within this model, stakeholder groups are positioned along the chain, from landscape stewardship to housing landscape and neighbourhood design. The stakeholder groups identified include policy-makers, housing developers, landscape

stewards, timber processors, (pre-fabrication) builders, architects, and planners.

Acting as system designer for the bioregional value chain, Bouwtuin was actively involved in each stage of the incremental development of this. In this capacity, it took the lead in designing the regenerative construction forest and the landscape-based construction method for the regional example home.

By mid-2026, the RTCI project has reached the half-way stage. All the timber has been processed, which means it has been sawn, dried and transported to Bouwtuin's workshop in Hilversum for small-scale prototyping. The next stage will consist of the prefabrication of the modular timber frame elements, followed by the assembly of the complete home through a series of participatory workshops at a cultural innovative hub in Hilversum.

Meanwhile, the project led to the development of a regional timber cooperative called the Gooische Houtcoöperatie. This cooperative - initiated by Bouwtuin, Opwaarts, Altijd Werkplaats and the Hoorneboeg, focusses on the processing of local wood from three sources: forest timber, urban timber and reclaimed timber.

⁷² Smit et al., 2022

Values

The regional construction programme is still in its early stages, particularly when considered from the perspective of long-term forest management. The project team designed a transformation plan for a former Douglas fir production forest, aiming at maximizing the ecological value of this over a 100-year period. The first harvest of Douglas firs by Goois Natuurreservaat marks the beginning of this journey, though at this moment the ecological benefits – beyond long-term CO₂ storage in the wood used for the Streekhuis – are difficult to quantify exactly.

Yet, even in this short time, the project has already created significant added value within the Gooi & Vechtstreek region. Culturally, the collective landscape stewardship heritage of the Erfgooiers – a regional peasant farmer organization in the Gooi & Vechtstreek – has been revitalized. Among various stakeholders, there is a growing awareness of the valuable, reciprocal relationship between the built environment and the landscape of the Goois Natuurreservaat, demonstrating that sustainable nature management can, to a certain extent, align with productive goals.

Working with unprocessed, sawn wood demands a cultural shift in prefabricated construction, particularly regarding measurements and tolerances. The illusion of perfect alignment must be abandoned; instead, designs should inherently accommodate imperfections and variations in size. In this regard, the practice-oriented project has already yielded substantial cultural value.

Small-scale wood processing is labour-intensive, and struggles

to compete financially with mass-produced timber within the current economic system. However, by considering not only the added value of regional wood processing but also its connection to regional architecture in housing, aesthetic and financial value creation go hand-in-hand.

Reintroducing small-scale wood construction chains creates considerable social value by involving the community of nature conservation volunteers in sustainable forest management, through which broad support for building with local wood emerges, and costs can be mitigated. It is important to note that felling trees is a craft requiring skilled experience.

The construction of the Streekhuis recently began in Bouwtuin's workshop. Through 'co-building days', volunteers can sign up to contribute to the prefabrication of the detachable, insulating shell (facade, roof, and floor elements) around the modular Douglas fir frame system. The first co-building days on Saturdays were immediately fully booked, indicating strong enthusiasm for learning practical skills together, and socially contributing to a sustainable regional project. As a result of the RTCI project, Bouwtuin and the other partners involved in the establishment of the Gooische Houtcoöperatie (Gooi Timber Cooperative) are currently mapping what would be needed to process all the timber available each year within the region, which is currently approximately 1400 m³ of round wood of different tree types per year. The goal of the Gooische Houtcoöperatie is to give the regional community – companies but also

private consumers – equitable access to local timber.

At the same time, financial value will be created in the form of timber processing and construction jobs. Last but not least, considerable financial value will be created by avoiding costs caused by current linear, harmful housing construction practices. This blind spot is currently being mapped in collaboration with various knowledge institutes.



Natural air drying of stickered Douglas timber elements

Main Insights

The Circular Value Flower has proven a highly effective model for designing a bioregional construction value chain. By explicitly connecting the performance of system parts to the broader values of the system as a whole, it creates a shared framework that empowers multi-stakeholder collaboration. This approach ensures that all stakeholders feel accountable for co-creating a truly regenerative system.

Before the project began, with some exceptions, regional wood from nature conservation efforts was not being utilized within the region. The project has raised awareness among local stakeholders (municipalities, landscape managers, and the construction community) that a significant amount of regional wood is available and that this can be utilized if a supply chain involving stakeholders and the necessary infrastructure is in place. The project has also prompted municipalities in the Gooi region to put the processing of urban wood from green space management on their agenda. This awareness has strengthened Bouwtuin's initiative to collectively restore lost expertise in processing and applying local timber.

The specific RTCI case study of the transformation of a former Douglas fir production forest into a regenerative construction forest gave insight into the potential value of a long-term horizon, through which unhealthy monocultural ecosystems can be transformed into biodiverse, regenerative landscapes. Paradoxically, a productive relationship with ecosystems – such as forests – encourages responsible stewardship.

The action research enabled a dialogue on timber between forest



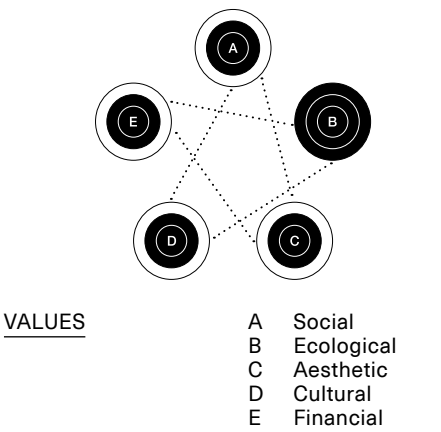
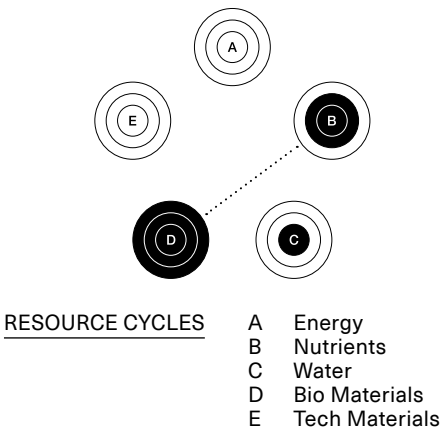
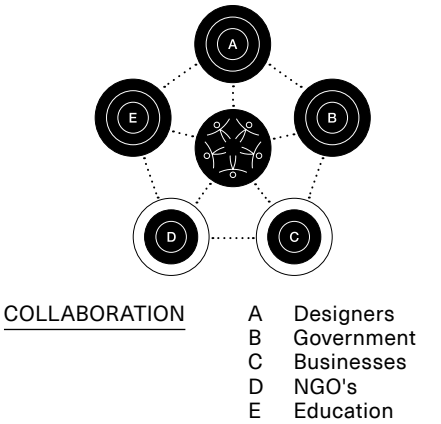
and building needs, revealing which design and management choices are in conflict and which most critical. Linking the life cycle(s) of the forest to the life cycle(s) of housing systems creates an integrated, adaptive approach.

The backbone of a value chain is formed by a series of specific activities for which dedication, expertise and skills are needed. With regard to the establishment of a regional timber value chain, every step from tree to beam must be carefully managed, raising questions about how processing impacts both forest health and timber quality for construction. Designing the system performatively clarifies what is expected from resources, actors, and the activities needed at each stage.

The use of wood in residential construction imposes specific requirements that affect how this wood

is processed in terms of dimensions, strength, and surface finish. If you know the best applications for a specific type of wood and how to use it, then the sawing pattern for a tree log can easily be optimized and standardized. Efficiency can be further enhanced by linking tree anatomy to construction needs. The management of cut offs and sawdust also requires space and a logistics plan. It is precisely this practical knowledge that has been lost in the region, and this is what the project aims to restore.

Logistics and storage are critical for small-scale regional timber chains, as even short distances require significant time and budget for the transportation of large volumes of wood. To address this, collective organization of storage, drying spaces, and workshops offers major advantages. For this reason, the Gooische Houtcoöperatie is taking steps to process local wood from forests, urban areas, and reclaimed sources, with support from local municipalities. Currently, research into the implications for the built environment is underway, led by Bouwtuin and the other cooperative partners.





Easy Urban Green Growers, Youthprinua, Tempo Arts Centre, Nairobi, Kenya

Mathare river landscape, Nairobi

Numerous Nairobi-led community organizations have woven their circular practices into the riparian zones of Nairobi's seven rivers, their livelihoods and identities inseparable from the living fabric of the riverbanks. These organizations share an ambition to strengthen individual and community resilience by creating sustainable entrepreneurial business plans, to develop circular management systems for various resources (water, nutrients, energy, and

building materials) through which they can generate multiple forms of value. These initiatives can be understood as expressions of relational worldviews closely aligned with African *Ubuntu* philosophies, in which wellbeing is produced collectively and human/nature relations are treated as interdependent rather than extractive.⁷³

Four initiatives located along the Mathare River in the Lucky Summer and Babadogo wards – LEWMO, Easy Urban Green Growers, Youthprinua, Tempo Arts Centre – incorporate waste recycling, urban farming, education and learning, creating green and social spaces and community and youth engagement in their daily activities that take place in the riparian zone. Rather than viewing the riparian zone as marginal or disposable land, these initiatives reframe it as a living socio-ecological system: a space of care, financial potential, learning, and cultural reproduction.

The riparian land consists of a 30-meter-wide legally recognized buffer zone intended to protect Nairobi's communities from floods; but, as Nairobi's population has been steadily growing in the last decades due to both demographic growth and migration from rural to urban areas, lack of affordable housing has forced people to build informal settlements, also within this dedicated flood zone. In May 2024, extreme rainfall caused flooding, landslides and the collapse of dams and bridges. More than 220 people died as a consequence, and 23,000 people were displaced in the aftermath. As is often the case, less fortunate communities residing on the riparian land were disproportionately affected.⁷⁴ Unfortunately, this tragic event must be seen as part of a recurring pattern of drought and heavy rainfall.⁷⁵

In 2023, the Nairobi Rivers Commission (NRC) was established to mitigate the consequences of climate change and make Kenyan regions more climate adaptive. This aims 'to coordinate the initiatives... fostering inclusive and sustainable urban development and quality of life for all by 2030'.⁷⁶ In addition, Nairobi City County Government (NCCG) has drawn up a masterplan for Nairobi's riparian areas as part of their climate mitigation strategies; this includes enforcing the 30-meter-wide no-building zone along the riverbanks.⁷⁷ In the weeks following the flooding in May 2024, the National Government took action, resorting to mass eviction of residents living within riparian land along the Nairobi rivers, leading to the displacement of over 127,000 citizens. These top-down actions destroyed informal settlements' livelihoods, social capital, and community initiatives. The four initiatives – LEWMO, Easy Urban Green Growers, Youthprinua and Tempo Arts Centre – operating at the riverbanks of the Mathare River also suffered losses, e.g. LEWMO's buy-back centre was destroyed; nevertheless, they continued their activities.

⁷³ Ewuoso & Hall, 2019; Mugumbate & Chereni, 2019

⁷⁴ *The Guardian*, 07/05/2024

⁷⁵ African Climate Foundation, 2023

⁷⁶ <https://nrc.or.ke/mission-vision-core-values/>

⁷⁷ Nairobi City Council Climate Action Plan 2020-2050, 2022

1 YOUTHPRINUA

Youthprinua is a vibrant youth-led organization in Babadogo, focused on community empowerment through environmental conservation, digital inclusion, and creative expression. It integrates themes of education, health, climate action and art. Youthprinua spearheads innovative initiatives such as 'Waste for Water', enabling residents to exchange solid waste for clean water. This directly addresses both sanitation and water shortages in the area, as well as waste collection challenges. This reciprocal system encourages household recycling while incentivizing participation through essential utilities.

Youthprinua also delivers health education, tech awareness, and arts programming as part of its approach. Youthprinua leverages informal sector networks and digital platforms to mobilize volunteers, share environmental information and co-design interventions with residents. By foregrounding youth voices and encouraging multi-disciplinary action, the organization exemplifies grassroots leadership and circular innovation in underserved urban environments.



2 EASY URBAN GREEN GROWERS

Easy Urban Green Growers (EUGG) advocates for community-led urban agriculture, environmental education, food security initiatives and tree-planting campaigns. Located in Babadogo ward in Nairobi, its core activities focus on urban farming, including the development and operation of vegetable gardens, hydroponic systems and fish ponds. Central to its approach is collaboration with schools and schoolchildren, grounded in the belief that teaching young people how to grow vegetables not only equips them with valuable knowledge and skills, but also fosters a deep connection to land and nature, which is particularly important in dense urban environments. EUGG promotes low-cost, sustainable food production tailored to densely populated settlements. One of its key innovations is the re-use of recycled containers, such as plastic cans, to create small gardens on balconies, in alleyways, and in other small, neglected spaces. Through its work with schoolchildren, the initiative also reaches parents and, in turn, the wider community, sharing knowledge of cultivation techniques, cleaning up dumpsites, and repurposing recycled containers for urban agriculture. In doing so, waste dumpsites are transformed into productive green spaces, reducing food insecurity.

By actively engaging community members – particularly children and young people – EUGG strengthens both ecological and social resilience in Nairobi, demonstrating the potential of community-led circular practices.



3 LEWMO

LEWMO is a youth-led environmental organization located in Nairobi's Lucky Summer ward. Its mission is to merge environmental conservation with youth employment, as demonstrated by its slogan: 'Taka Langu, Jukumu Langu' ('My Waste, My Responsibility'). It consists of a consortium of 15 organized groups with the overarching aim of empowering local residents within the 18–50 age bracket, with the majority of participants being under 35 years, through solid waste management and environmental conservation.

LEWMO coordinates weekly door-to-door waste collection and separation and incentivizes recycling through buy-back schemes through its 'Football for Plastic' programme. In addition, the organization collects waste from informal dumpsites, cleans the soil and transforms these previously polluted riparian riverbank areas into community green open spaces. Through these collective activities, LEWMO raises community awareness of waste and the environment, conducting regular cleanups of the common spaces in the neighbourhood, inviting community members to participate. Through their capacity building programmes, they offer members of the community knowledge and skills concerning waste management practices and building businesses, demonstrating the organization's role not just as environmental guardians and social entrepreneurs, but also as educators and social capacity builders.



4 TEMPO ARTS CENTRE

Tempo Arts Center occupies a reclaimed quarry at the confluence of the Mathare and Nairobi Rivers, serving residents of Lucky Summer, Korogocho, Babadogo, Ngomongo, and Dandora wards. Originally a practicing ground for youth aerobatics, the centre has evolved into a multifunctional arts centre and community park. It provides a secure space for performance arts, visual art creation, gardening and riverbank restoration. Through creative re-use, Tempo has transformed an abandoned dumpsite into a vibrant venue, using recycled tires and reclaimed materials in its theatre space and communal facilities.

Community-led programming, including arts workshops, environmental cleanups and youth mentorship, positions Tempo as more than just a cultural space. The organization also organizes events aimed at raising awareness of environmental conservation and prioritizes social cohesion through shared cultural experiences, while also fostering environmental awareness by integrating art with ecosystem restoration. Tempo demonstrates how creative expression can be paired with environmental stewardship to yield meaningful community transformation.



Purpose and Enablers

Lucky Summer Environmental Waste Management Organization (LEWMO) was founded in 2017 to address the dual challenges of environmental degradation and youth unemployment. Lack of employment leads to high crime rates among young people, and by providing employment LEWMO aims to reduce the levels of crime within the neighbourhood. Through its waste collection and treatment activities, LEWMO is able to currently provide a source of consistent income for 120 youngsters and regenerate the riparian land along the Mathare River by cleaning up dumpsites and replacing these with green spaces. In *Ubuntu* terms, this work restores land and more, as social relations re-embed young

people within the community as contributors rather than risks, and repositions care for land as a shared moral responsibility. Both Lucky Summer and Babadogo wards are classified in the government’s planning policies as ‘informal’, so waste is not formally collected in these neighbourhoods. This institutional absence mirrors the failure of technocratic governance to recognize community solutions and their forms of creating value, often resulting in policies that undermine rather than enable collective self-organization.⁷⁸

Financially, LEWMO sustains its activities through money gained

78 Ewuoso & Hall, 2019



Fishpond for food and educational purposes

Plastic press



deploys capacity building initiatives to engage the wider community in their activities. These initiatives include educational activities with children, teaching the next generation the value of waste collection, recycling and planting green spaces. For example, the fish farm and green spaces are designed as educational spaces for children to inspire and make them aware of the value of such places, in the hope they will go on to act as environmental stewards and pass this wisdom on to the next generation.

LEWMO acknowledges the importance of having a stable and reliable network of like-minded people and organizations, and is a co-founder of the Mathare River Regeneration Network, an initiative in which multiple organizations collaborate towards the overarching objective of circular practices along the Mathare River.

from selling the waste in bulk to other vendors, as well as through grants and funding from various organizations. The organization also engages in door-to-door waste collection campaigns and promotes recycling through initiatives such as ‘Football for Plastic’.

Additionally, LEWMO buys, repairs and reuses tools, machinery and vehicles needed for waste collection and separation processes. For most of the smaller material that they need, such as gloves, charts, overalls, etc., LEWMO is supported by Kenya Extended Producer Responsibility Organization (KEPRO), a collaborative partnership that promotes the growth of Kenya’s recycling ecosystem, and by SHOFKO, an NGO promoting citizen-led change. These organizations also provide training programmes to enhance knowledge and give skills to LEWMO’s members. LEWMO then

You can have a lot of money, but if you don’t have a good network or good relationships with the system, your money will end up not supporting you. So having connections is more powerful, because at least you are just a phone call away from guidance
(a LEWMO member)

Resources

LEWMO organizes its initiatives around the following resource types: tech materials, bio materials, nutrients, and water. Importantly, stewardship of these resource flows is embedded in social relations such as households, youth groups, elders, and informal economies, reflecting an *Ubuntu* logic in which resources circulate through relationships rather than markets. Primarily, their focus is on tech and bio material cycles obtained through the collection of household waste and from cleaning up neighbourhood dumpsites. They separate metal, plastic and organic materials. The organic material (food and vegetable waste) is dried in the sun and used as animal feed directly, and for black soldier fly farming to produce fertilizer. Metal and plastic are separated and pressed into bulk packages that are collected by larger recycling companies when a substantial amount is reached.

On the land that LEWMO and community members have cleared of dumped waste, they have planted indigenous trees and plants, turning a string of formerly non-useable space along the river into attractive green spaces where locals can meet, protected from the sun. Some of the trees and plants provide fruits, others can be used as traditional medicines which local doctors come and collect while explaining their use to community members, and in particular to youth, passing on long traditional lines of wisdom from one generation to the next. The green spaces are also used as allotment gardens to produce locally produced vegetables. The trees and plants play a vital role in restoring the river banks, and in enhancing biodiversity.

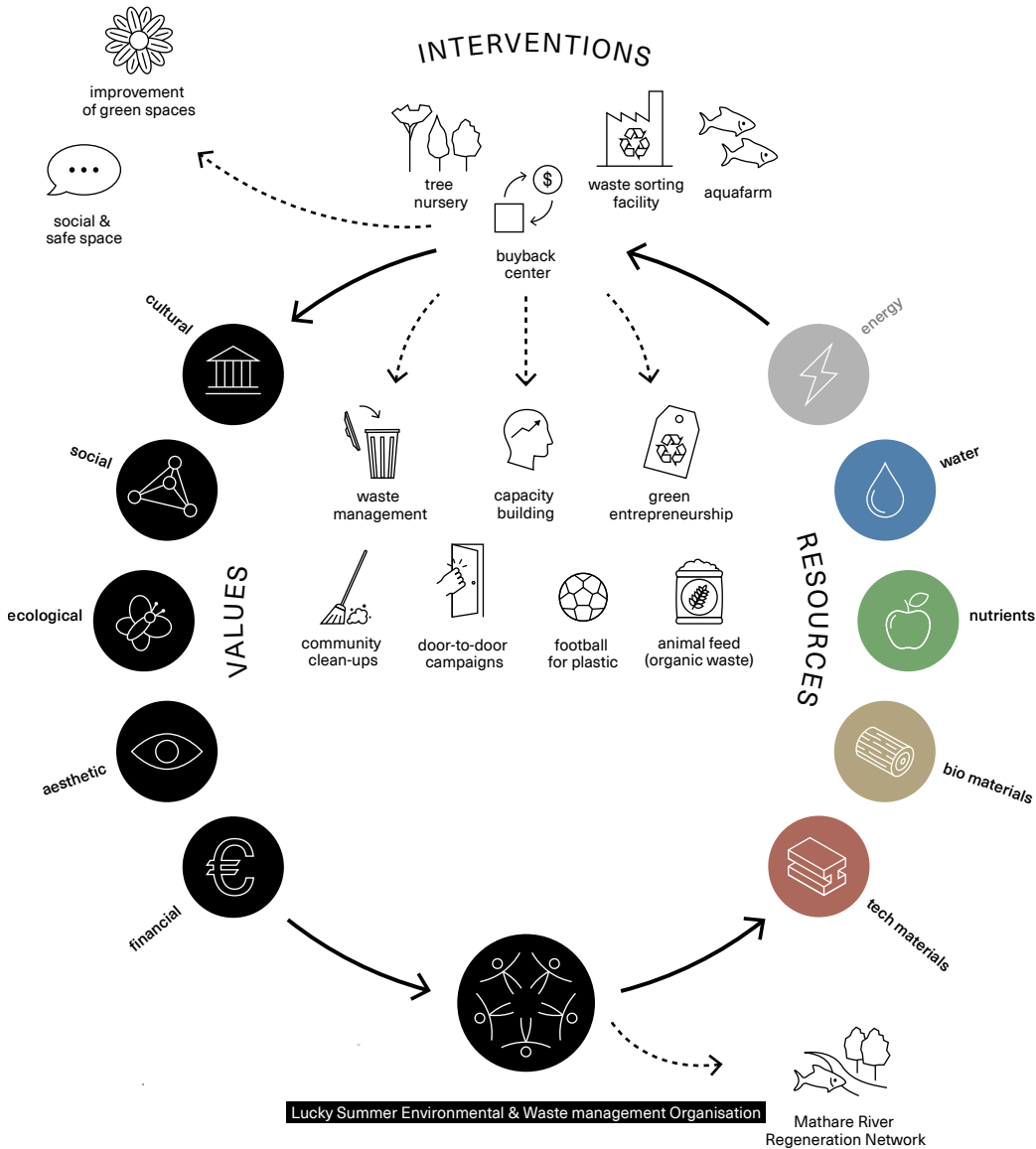
LEWMO runs an aquafarm which takes drinking water in dry times, but during the rains the pond collects water. The fish produced here are used for consumption, but also to educate local children about aquafarming.



Black Soldier Fly farming



Sorted plastic



Value flower Field Map LEWMO

System, Activities and Space

LEWMO's activities are closely tied to the spatial context of Lucky Summer ward; carts are used to harvest household waste from this neighbourhood, either collected from the households directly or stacked at numerous pick-up points throughout the neighbourhood. Community awareness activities are often organized to make residents aware of the dedicated pick-up points.

LEWMO had a 'buyback centre' – a building where they could re-process waste through recycling different waste flows and storing these until the volumes were substantial enough to be sold to larger recycling companies. A buyback centre also functions as a location where local people can buy cans, for example, for their own use, to sell on later or to make something useful from them. The centre thus also functions as a space where recovered materials are made accessible to the community again. The original building was demolished by the government in 2024, just after completion, as it was located within the 30 m riparian zone. LEWMO now operates from a new facility, which was made possible in part by collaboration with the Circular Community Foundation on the research project 'The Nairobi River as a Driver for Circular Communities', funded by LDE Global,⁷⁹ see page 113. After pressing the plastic, packages are compiled and sold to recycling companies and collected by trucks. The dried organic material is partly used as fertilizer for the green spaces developed by LEWMO, and the remainder sold to farmers.

The co-developed green spaces provide fruit, vegetables and medicinal plants for local community members, who can freely access and harvest this produce. Open to all, these spaces also serve as green, sociable refuges along the river.



Pressed plastic in bulk

Hydroponics at Umoja Primary School (Easy Urban Green Growers)



Household waste collection



79 Leclercq et al., 2025

Collaboration

LEWMO is aware that its success depends on its network of local and external actors. The organization collaborates extensively with local entrepreneurs and individual households, who remain the most essential partners in the circular practices. A good working relationship is maintained with KEPRO, which supports the organization in establishing visibility within the community, spreading awareness and providing training on waste management practices, as well as with equipment. Nairobi-based NGOs such as SHOFCO, VSO and Nuvoni Centre for Research provide additional knowledge and support.

LEWMO is co-founder of and an active participant in the Mathare River Regeneration Network (MRRN), a network of community-led organizations along the Mathare River whose collaborative efforts focus on revitalizing the Mathare River ecosystem, promoting regenerative practices through community involvement.

While LEWMO engages with local leaders, including the Chief, and climate-focused agencies, there is little support from the government or the Nairobi River Commission; recent actions, such as the demolition of the buyback centre, have hindered the organization's progress. This raises a potential future risk as LEWMO's activities also depend on the goodwill of the local MCA (Member of County Assembly), with which LEWMO has at times had an adversarial relationship.



This mirrors broader tensions identified in African sustainability debates, where state-led sustainable development agendas often compete with, rather than build upon, community-led practices, leading to mistrust and policy friction.⁸⁰ The adversarial relationship with governmental bodies is, from a policy perspective, deeply paradoxical: LEWMO's circular practices advance more sensible resource management as well as the regeneration of the riparian land, both of which are explicit objectives of Nairobi County and the Nairobi River Commission's own policy frameworks.

⁸⁰ Ewuoso & Hall, 2019

Value

LEWMO's work creates significant value in relation to all elements of the Circular Value Flower: social, ecological, aesthetic, cultural and financial. These multiple values echo *Ubuntu*'s holistic valuing of life, where economic activity is inseparable from social dignity, cultural continuity, and ecological care. Socially, the organization empowers youth by providing them a way of earning an income in a harsh job market; it also improves health and wellbeing by growing locally produced fruit and vegetables, and fosters stronger community bonds by including local community members, in particular youth, in its activities.

LEWMO's green overalls contribute to a positive image for the young waste-pickers; instead of being stigmatized as criminals, local residents value their work and contribution to a cleaner environment. The waste-pickers themselves take pride in and ownership of their work. The overalls thus create a recognizable identity that contributes to the trustworthiness of the

waste-pickers and the organization as a whole. LEWMO's waste management practices – collecting, separating, accumulating and selling waste – generate an income for more than 120 people, creating substantial financial value.

LEWMO's practices contribute to the generation of ecological value in different ways. Firstly, waste treatment and raising awareness of environmental degradation through depletion of valuable resources and through dumping waste onto common land has an ecological impact. Secondly, the removal of dump sites on riparian land and replacement of these with indigenous trees and plants supports the restoration of biodiversity, but also enhances wellbeing for local residents who can meet in attractive green spaces. The restoration of the riverside also adds to climate adaptivity, as floods are predicted to occur more often due to climate change.

The green spaces add aesthetic value; they provide easily accessible green refuges along the river, providing opportunities for residents to (re)connect with nature. 'I feel a spiritual connection when I sit here' (a LEWMO member). Participants' descriptions of spiritual connection to these spaces resonate with African relational ontologies, in which land is not inert property, but a prerequisite for community wellbeing.

Although LEWMO has made promising steps in terms of raising awareness regarding sustainability and waste management, circularity and regeneratively are not yet fully embraced by the local community, nor embedded in their daily practices.



Mapping a Valuescape

The Circular Community Foundation (CCF), together with its research partners Nuvoni, LDE Global, TU Delft and HIS,⁸¹ organized a one-day multi-stakeholder workshop in Nairobi in March 2025 as part of the ongoing research project 'Nairobi River as a Driver for Circular Communities' (2025). Community members from the four community led organizations referred to in the introduction on page 100 and 101 were invited to present their initiatives to a range of stakeholders, including representatives from UN-Habitat, the World Resources Institute, Nairobi County Council, Slum Dwellers International, Public Space Network, and local foundations such as the Ghetto Foundation, Mazingira Yetu, and Muungano wa Wanavijiji.

In the first part of the workshop, all participants were invited to reflect on the significance of the riparian landscape as a valuable, regenerative ecosystem. We aimed to explore the potential of this zone as fertile ground for local food and raw materials production, biodiversity and community value.

Accordingly, participants were asked to collectively map the enabling capital (networks, passion, wisdom, goods and skills) currently present in the riparian landscape and how these relate to the different resource cycles. Subsequently, participants explored the system from the perspective of specific resource types (water, energy, nutrients, bio-materials and technical materials), identifying the potential multiple values to be generated at each

stage of the value chain, including harvesting, storage, distribution, (re) processing, and access. Barriers and opportunities were then identified.

The discussions revealed that communities' interconnected relationship with the river and its surrounding landscape goes far beyond food provision, relating to broader aspects of being, described by participants as a 'web of life'. Their stories illustrated how human beings, plants and animals are interconnected within the riparian ecosystem and are mutually dependent on one another to thrive. Key values identified included:



Creating a river value scape at the multi stakeholder workshop

- Recreational space: The riparian provides space for recreational activities away from the built-up areas of the city, offering opportunities for relaxation and community engagement.
- Conservation: The riparian land offers opportunities for urban conservation and biodiversity restoration.
- Spiritual space: The land supports spiritual activities such as prayer and meditation, fostering a connection with nature.
- A source of food: The land enables urban farming activities compatible with its function as a flood reserve.
- A source of identity and belonging: The communities living along rivers identify strongly with the riparian reserve as a place of belonging.

Participants emphasized the need to protect and restore the river, given their strong connection to the riparian landscape. Accordingly, the workshop aimed to highlight and discuss how the valuescape – demonstrating the multiple value creation of different community-led initiatives – contributes significantly to community wellbeing, as well as to broader city/county, national, and global objectives relating to climate change, social justice and poverty reduction.

The CVF method and the overall workshop setup proved highly effective in mapping the various dimensions and values of the resource systems present within the riparian zone of the Nairobi River. By assigning specific roles to each participant group, the workshop generated a remarkable richness and diversity of responses. Within just one morning, a comprehensive landscape was mapped for five distinct resource systems, across multiple dimensions.

In the second part of the workshop, the four community initiatives co-created an intervention with other stakeholders based on the outcome of the morning session and their earlier analysis. An intervention is seen as a new step in the overall aim to further close a resource cycle or to start including a new resource cycle in an initiative's pallet of activities. Each community-led initiative facilitated its own brainstorming process, guided by the CVF design material, and developed the initial frameworks for an intervention, which were subsequently further detailed and implemented⁸² (see page 112 and 113 for the implementation of these interventions).



Co-creating interventions

⁸¹ Nuvoni Centre for Innovation Research, Leiden Delft Erasmus Global, Delft University of Technology and Institute for Housing and Urban Development Studies

⁸² Funded by LDE Global

Interventions



Youthprinua

Youthprinua constructed a new building for their digital and educational activities.



Tempo Arts Centre
Tempo Arts Centre constructed a multifunctional shed that serves as a space for sports activities such as

yoga, while also providing a sheltered area for community gatherings and educational activities protected from rain and sun.



Easy Urban
Green Growers
Together with the school children of the Bright Angels School, EUGG

created an urban allotment garden where the pupils learn urban farming techniques and skills. The harvested vegetables support a nutritious diet.



Intervention LEWMO
LEWMO constructed a new building, having lost their original buy back centre that got demolished.

In this building they combine their recycling activities with other circular practices such as Black Soldier Fly and pig farming.

Main Insights

During the workshop, representatives from the community initiatives and other participating stakeholders shared the view that, within the Nairobi Rivers Commission and the Nairobi County Council – both formerly responsible for maintaining the riparian zone – there is limited awareness of what community initiatives have to offer in terms of protecting the riparian landscape and contributing to wider policy objectives. These insights suggest that the core challenge is not lack of community capacity, but lack of institutional recognition of community-led, relational forms of value creation. Currently, governmental bodies tend to override community initiatives, as these are not perceived as having sufficient impact at a larger scale. Collaboration among the various community initiatives is therefore essential in order to develop a stronger, collective voice. The 363 community initiatives currently active within Nairobi's river landscape need to form a broad, interconnected network by overcoming the barriers that prevent connection and collaboration.

From an *Ubuntu*-informed perspective, regeneration cannot be imposed through enforcement alone; this must be cultivated through trust, dialogue and recognition of lived expertise. The CVF method proved effective precisely because it created a shared analytical language through which conflicting actors could raise fears, stereotypes and assumptions, and gradually move from opposition toward mutual understanding.

Ideally, national and county institutions should recognize that the multiple value creation generated by this dense network of community-led

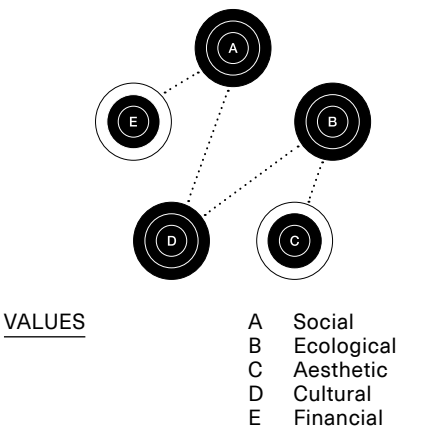
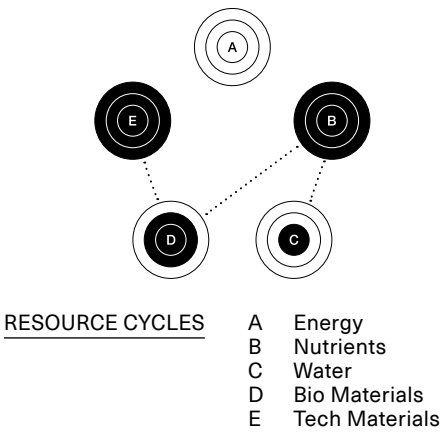
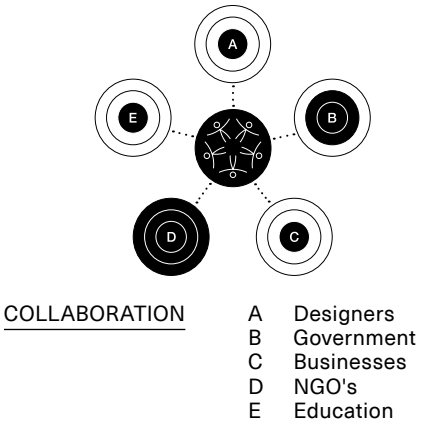
initiatives within the riparian landscape contributes not only to their own objectives, but also to global goals related to climate adaptivity, poverty reduction, circularity, and social cohesion. Accordingly, these institutions should support and facilitate such initiatives through policies, planning frameworks and funding opportunities. During the workshop, the CVF method enabled riverside communities to demonstrate that they do, in fact, contribute significantly to the wider urban community's socio-ecological, economic, aesthetic and cultural values. Further policy advocacy is needed to show how communities contribute to the broader ecological system, and how locally available knowledge, experience and resources should be integrated into policymaking. Such inclusion is essential to enable a holistic understanding of how the various elements of the riverside ecosystem are interconnected across spatial and governmental scales.

The CVF method provided participants with a clear framework to analyse the spatial and functional dimensions of existing value chains within the specific context of the Nairobi River riparian zone. At the same time, it offered insight into the activities required for circular resource handling and helped identify and articulate value potential at each step of the chain. The workshop further guided participants by revealing value gaps for which future interventions can be collectively designed and developed. As one participant noted: 'The CVF helped us see things differently, to analyse ourselves and come up with new paths for the future' (Easy Urban Green Growers).

Based on the insights generated during the workshop, three calls to action were formulated:

- Commitment to a holistic, regenerative approach toward the river eco-system.
- Commitment to a clean river.
- Action means doing and learning from what is done.

These calls align with regenerative entrepreneurship as a practice of ongoing learning and collective responsibility, rather than predefined solutions, echoing *Ubuntu*'s principle that action emerges through relationship, not prescription.



Fashion Village Lab, Kampung Kollektief, Bale Bengong

✧ Bandung, Jakarta (Java),
Denpasar (Bali), Indonesia

The Fashion Village Lab (FVL) is an overarching programme for a series of initiatives aimed at transforming the greater Bandung region into a healthy, innovative ecosystem for the fashion industry and the communities it serves. Although the programme itself has concluded, various individual initiatives continue, demonstrating the relevance of this programme as a valuable trans-scalar case study of a circular community project.

The FVL programme, initiated by Indonesian and Dutch designers and researchers, addresses the ongoing pressure the global fashion

industry places on both people and the environment across its supply chain. Workers live in polluted neighbourhoods, lack decent housing and proper sanitation. They depend on factories for employment, yet these same factories pollute their water sources and disrupt riverine ecosystems on which local village communities depend. Many villagers have lost their livelihoods as farmers or fishers and have changed careers, becoming textile waste traders, independent garment makers, or landlords who rent rooms to migrant factory workers.

Residual textile traders

Living in harmony with the local landscape,
Baduy village, traditional kampung on West Java



Under the influence of the global fashion industry, these originally rural settlements have rapidly transformed into unplanned, polluted, and densely populated industrial *kampungs* – the Indonesian term for an (urban) village or neighbourhood. In these *kampungs* surrounding the factories, a large, thriving residual material economy (textile offcuts, cardboard, plastics) has developed on the back of the global fashion market. This entrepreneurial scene made up of local businesses forms a huge opportunity for the revitalization of the polluted industrial live-work environment.

The FVL programme started in the village of Cigondewah Kaler, an exemplary case study on the southern periphery of Bandung, with the aim of supporting local communities in re-establishing circular and bio-regional fashion systems that restore water, soil and social well-being, enabling the regeneration of polluted industrial areas into healthy, self-sustaining Fashion Villages. Cigondewah Kaler, once a traditional Sundanese village with a community living in harmony with the local landscape and its rivers, has now become a heavily polluted industrial *kampung*. The aim is to revitalize this area into a healthy, resilient, and flourishing Fashion Village by setting up circular initiatives with the local community and other fashion industry stakeholders.



Purpose and Enablers

The city of Bandung is located in the highlands of West Java and forms part of the Citarum River basin. Numerous small rivers flow through the city toward the Citarum River, and every village whose name begins with 'Ci-' is connected to a tributary of the Citarum – as therefore is the Fashion Village Cigondewah Kaler.

The availability of clean, flowing river water was a key reason why textile factories chose to settle in the metropolitan region of Bandung, as textile dyeing and washing processes are highly water-intensive. In addition to textile manufacturing (yarn production, weaving, dyeing), many factories also produce garments for international fashion brands. While textile production depends heavily on water, material and energy resources, garment manufacturing strongly relies on inexpensive labour, triggering rampant urbanization.

What started as an economic opportunity has resulted in a social and ecological disaster, as textile factories have failed persistently to take responsibility for their surroundings

and the people involved in their processes. Effluents containing heavy metals have been dumped into rivers and other bodies of water, workers often endure long hours in halls without natural light, and previously green areas are now paved with concrete, creating severe water management issues.

The purpose of the Fashion Village Lab programme is to demonstrate that polluted areas can be revitalized through community-led circular design interventions, thereby prioritizing the health of the local landscape. The programme is inspired by the holistic *kampung* practices of the Sundanese, the *adat* (traditional customary law) community of West Java. Sundanese *kampung* practices – often referred to as *Gotong Royong* – include communal land use, community-based forestry, circular water management, collective housing construction, textile weaving and the harmonious integration of settlements with the local landscape. The programme is a collaboration between community

members of Cigondewah Kaler and a group of Indonesian and Dutch spatial designers and researchers.

In Cigondewah Kaler, the Fashion Village Lab builds upon the community's wisdom of nature-based *kampung* practices, skills in garment-making, passion for craftsmanship, networks connecting village-level textile production with global fashion industries and locally available goods and facilities such as shared *kampung* workplaces, vehicles and recycled materials. These enablers have the potential to transform polluted industrial *kampungs* into resilient, creative, sustainable fashion spaces.

The ambition of the Fashion Village Lab across the various scale levels consists of the following long- and short-term sustainable development goals:

Regional level > 20 years

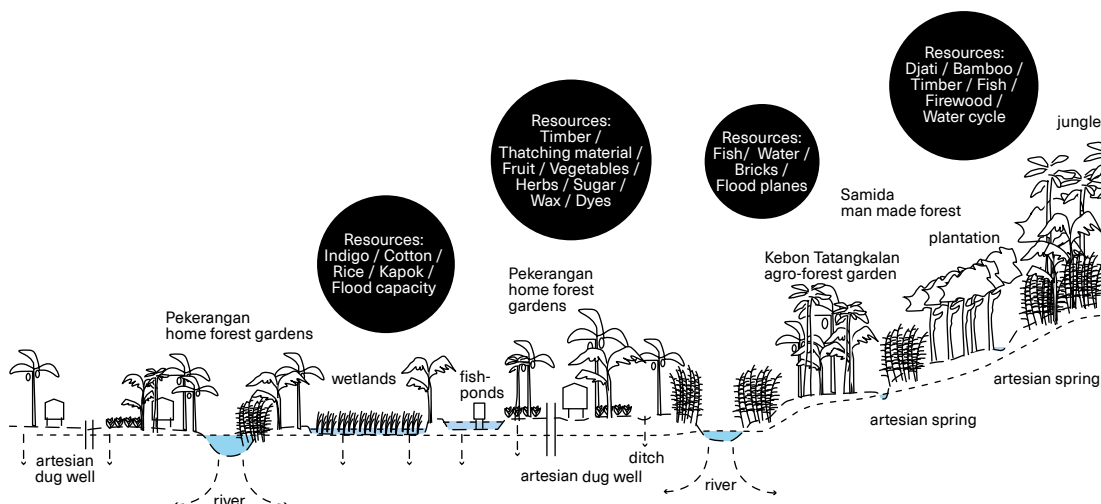
Developing greater Bandung as a sustainable, innovative bioregion for fashion production by restoring the reciprocal connection between the landscape and its village communities, between ecology and economy. Transforming the Citarum River, heavily polluted by the fashion industries, into a source of life again.

Village level > 5 years

Transforming the polluted industrial district of Cigondewah Kaler into a healthy, flourishing Fashion Village. The regeneration of Cigondewah Kaler serves as an example of community-led circular village development and is replicable in greater Bandung and other regions in the world.

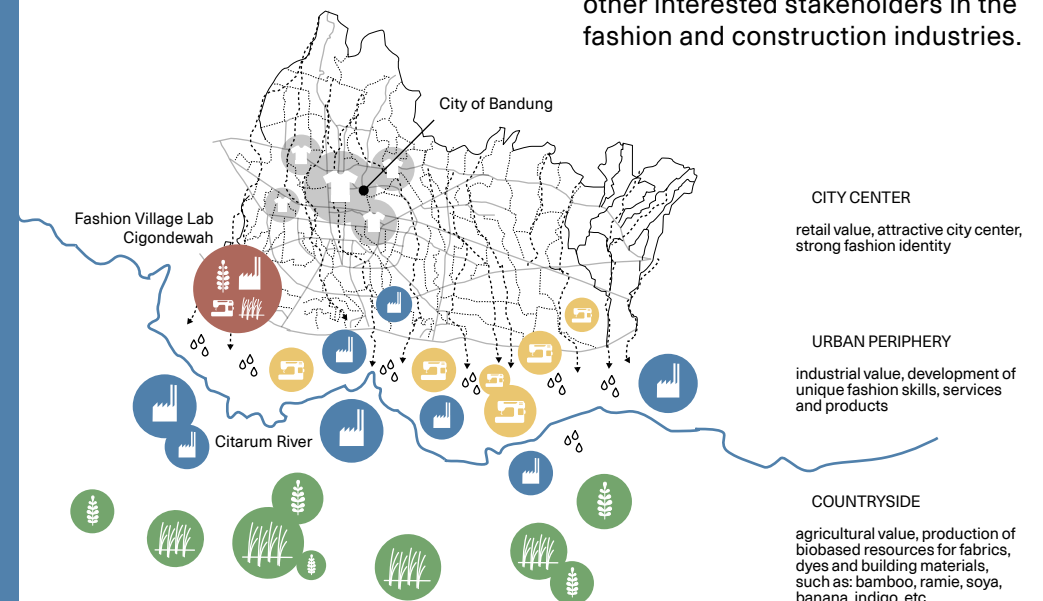
Initiative level > 1 to 3 years

Realizing various Fashion Village Initiatives through the Fashion Village Community (people living and working in Fashion Villages) and other interested stakeholders in the fashion and construction industries.



Sundanese cultural landscape

Greater Bandung, Towards a sustainable bioregion for textile production



Resources

Cigondewah is well known in the region and beyond for its textile and garment production and whole-sale markets. The *kampungs* of Cigondewah evolved informally from rice-producing rural villages into factory villages under the influence of large-scale textile and garment industries that arrived in the 1980s. Companies such as PT Kahatex, PT Sansan, and PT Ipatama employ thousands of workers, who migrated to the area following opportunities created by local and global fashion markets.

As discussed above, the industrial community of Cigondewah faces significant spatial and environmental challenges, including inadequate (worker) housing, extreme water pollution, overexploitation of ground-water resources, land subsidence and flooding, lack of garbage collec-

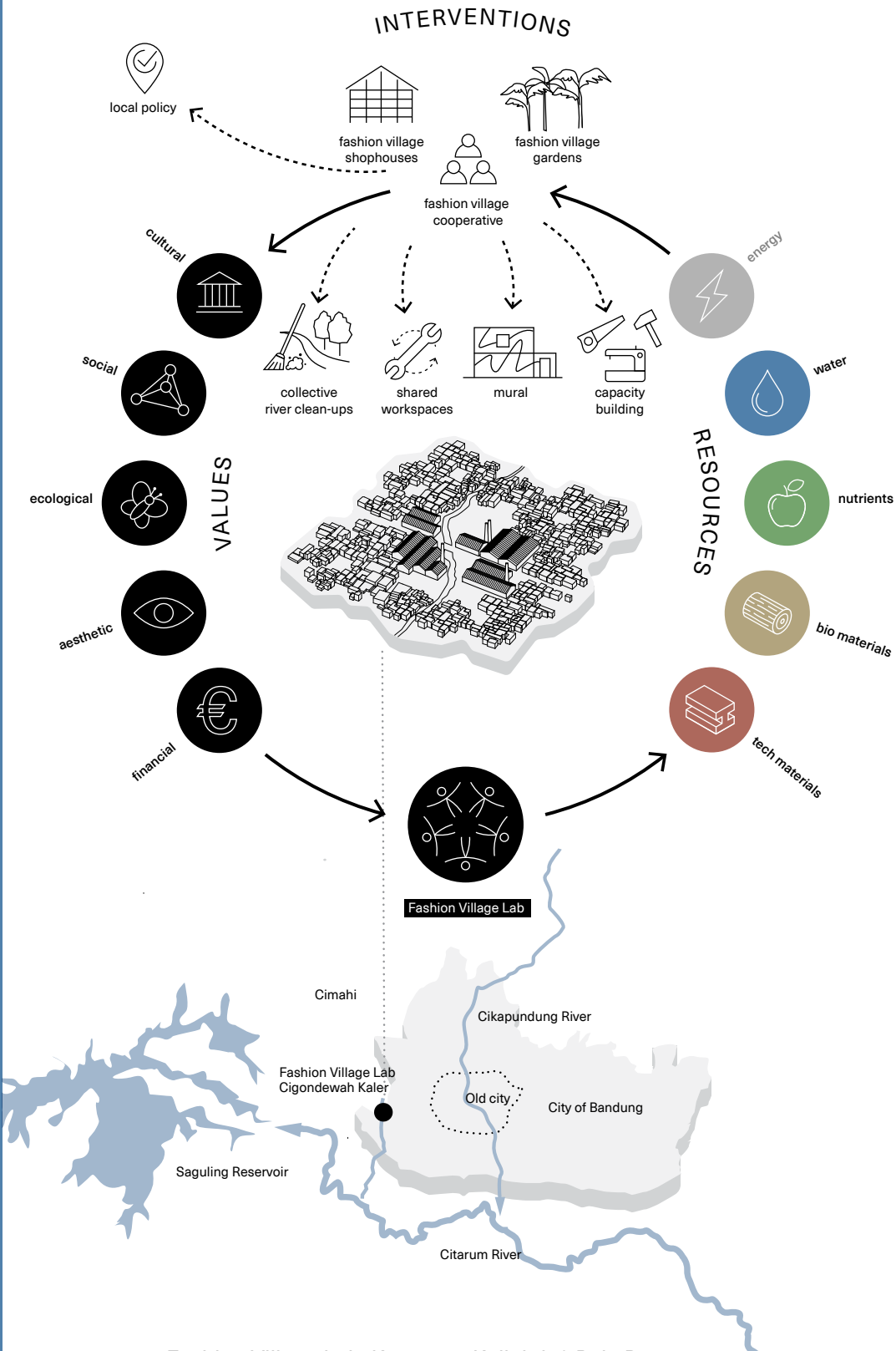
tion services, degraded agricultural land, and outdated energy systems.

Despite these challenges and the lack of adequate facilities, the industrial *kampung* environment supports a socially and economically tight-knit community. Residents are accustomed to taking care of themselves and each other. The local village community and textile and garment industries are deeply interwoven and interdependent. Driven by economic factors, original *kampung* inhabitants and migrant factory workers live side-by-side. Former farmers and fishers now make a living by sorting and trading factory textile waste or running small, home-based garment workshops. They simultaneously take orders from large factories and produce for their own small, independent fashion brands.



Textile cutting waste sorters and traders.

Value Flower Field Map Fashion Village Lab



Industrial *kampungs* such as Cigondewah Kaler function largely off the urban grid and exhibit a self-sufficient character. Although many current ad hoc solutions are unsustainable, there are opportunities to integrate domestic and industrial resource cycles in ecologically responsible ways.

This off-grid character forms a starting point for communities to make their neighbourhoods not only economically self-sufficient, but also ecologically regenerative. Rather than wasting resources, these can be (re-)incorporated into closed-loop systems at the scale of the industrial *kampung*. Learning from Sundanese *kampung* and landscape practices, collective strategies and circular design concepts can be revived, now also including collaboration partners outside of the community.

To guide the community-led transformation, the designers involved in the FVL developed a Fashion Village Development Plan for Cigondewah Kaler. A collective water management system designed by landscape architect Suzanne Loen forms its main backbone. The plan envisions collective, circular village networks for water, nutrients, energy and biological materials. Achieving this long-term goal requires serious collaboration by the community with fashion industries, government agencies, and knowledge institutes.

At this moment, liveability in Cigondewah Kaler is threatened by industrial water pollution, increased flood risk (climate change), and the depletion of freshwater sources by the water-intensive fashion industries, and the growing community.

Safeguarding the urban supply of fresh water and mitigating flood risks by re-introducing a collective water management system and a circular water network are the starting points and backbone of the Fashion Village Development Plan. These consist of three interdependent layers:

1 Circular Waste Water System

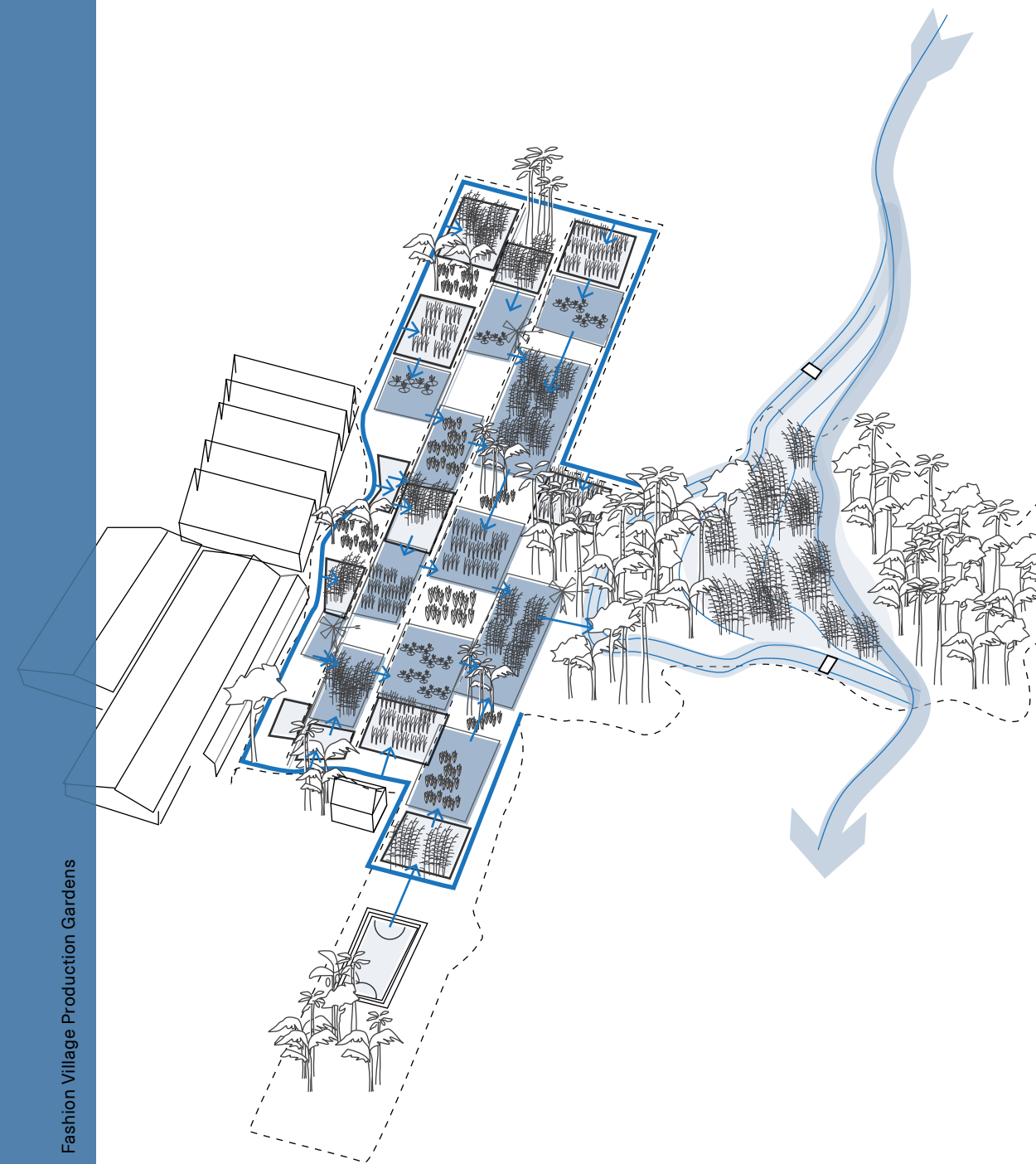
Polluted storm water and runoff is directed to waste water gardens before being re-used or entering the water system. Grey water is first collected in tanks before entering the wetlands for purification. Industrial waste water is treated within the factory and re-used.

2 Circular Fresh Water System

Rainwater is harvested on roofs and treated with sand filters. Via existing wells, the water is directed underground where it is stored for re-use in closed cisterns or in the open shallow aquifer. This means the shallow aquifer is recharged with clean water without further depletion of deep aquifers.

3 Fashion Village Water System

The Fashion Village water system controls water levels and mitigates flood risks in a patchwork of wetlands and drainage canals with dams, weirs and pumps. The system is first introduced to the proposed production gardens, tested and improved, before being scaled up for the whole Fashion Village.



System, Activities and Space

The Fashion Village Lab was developed between 2016 and 2018 as a result of the research-by-design project Home at Work, a collaboration between Indonesian and Dutch spatial designers and researchers who developed circular design strategies to revitalize polluted industrial *kampungs* surrounding large-scale textile factories within the Greater Bandung area.

To enable the transformation of Cigondewah Kaler from a polluted industrial district into a healthy, flourishing Fashion Village, the Fashion Village Lab team first developed a systemic design in which Cigondewah is presented as a regenerative, circular Fashion Village.

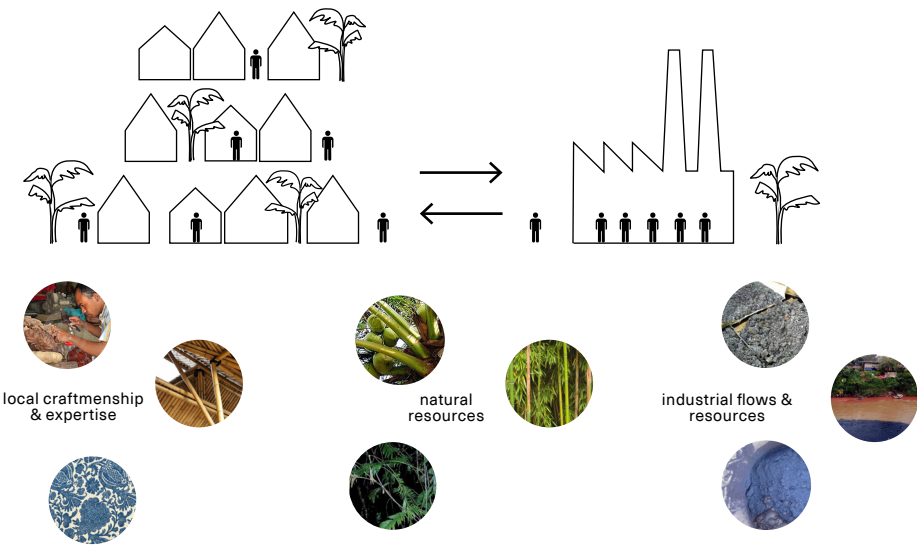
At the centre of this hypothetical Fashion Village is a clean global factory, which currently operates in a largely linear and environmentally harmful manner. This factory is surrounded by various *kampung* entities and other agricultural spaces, including polluted rice paddy fields. The model then explores how the resource flows required for fashion production can be spatially reconnected to the

life-work environment in regenerative ways.

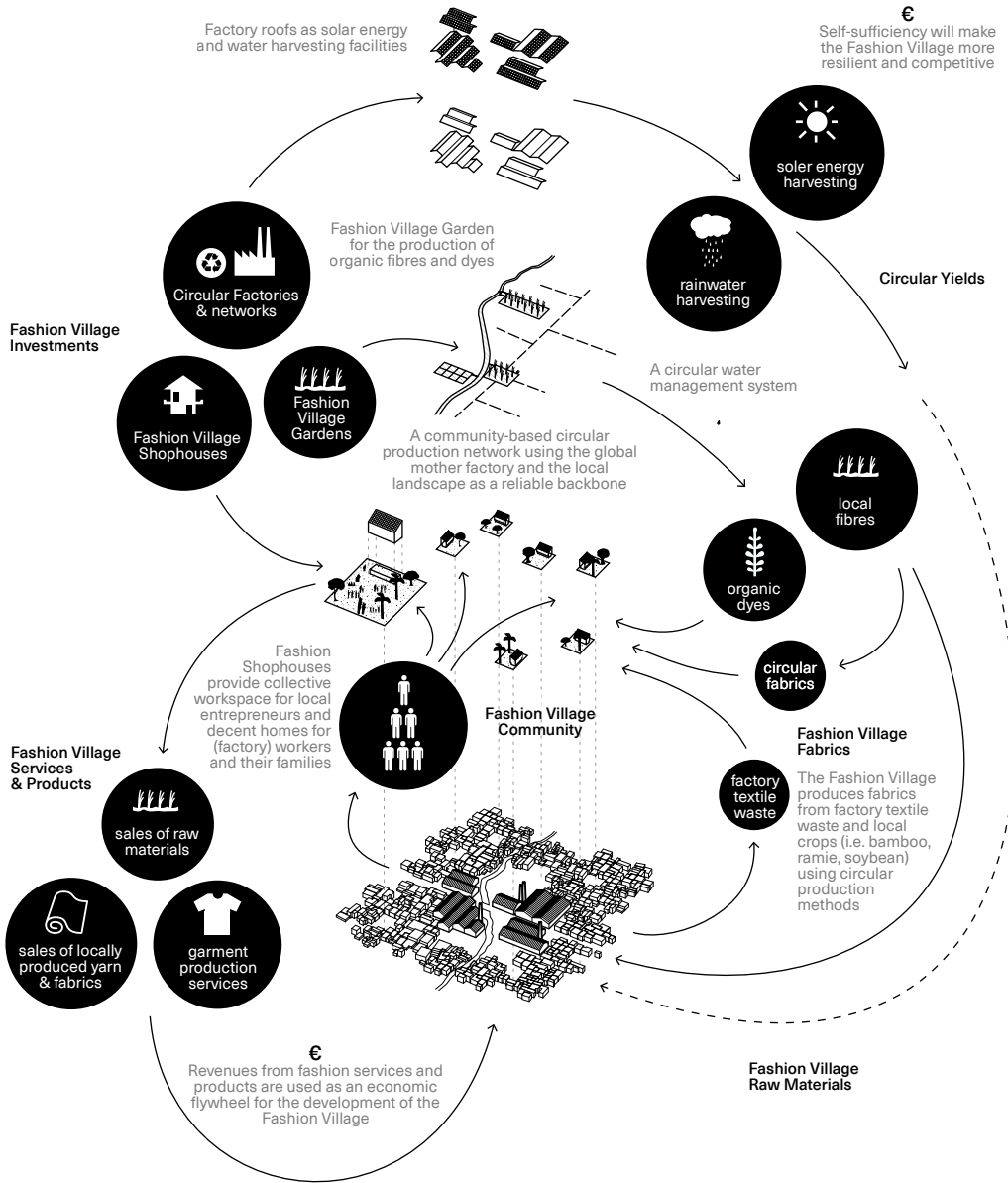
By defining resource system boundaries, mapping value chain activities and establishing a collective circular production network for crafting unique fashion editions (see page 125), the model aims to reverse the overexploitation of water, energy, materials, and labour.

Drawing on Sundanese heritage, the Fashion Village model reconnects economy and ecology using local resources – such as textile cutting waste, bamboo, banana, and indigo – for the production of environmentally responsible textiles and building materials. Factories and communities exchange services in equitable ways, while the local landscape functions as a valuable, reliable backbone.

The Fashion Village supports village crafters, farmers and entrepreneurs in developing sustainable fashion products, linking them to sustainable markets, locally and globally. By adding value to raw materials, these community members become important co-producers within the fashion supply chain.

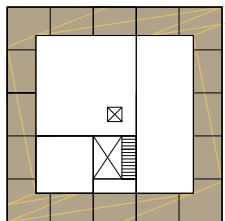
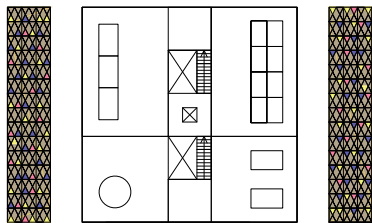


Fashion Village model



Creating synergy between villages and factories

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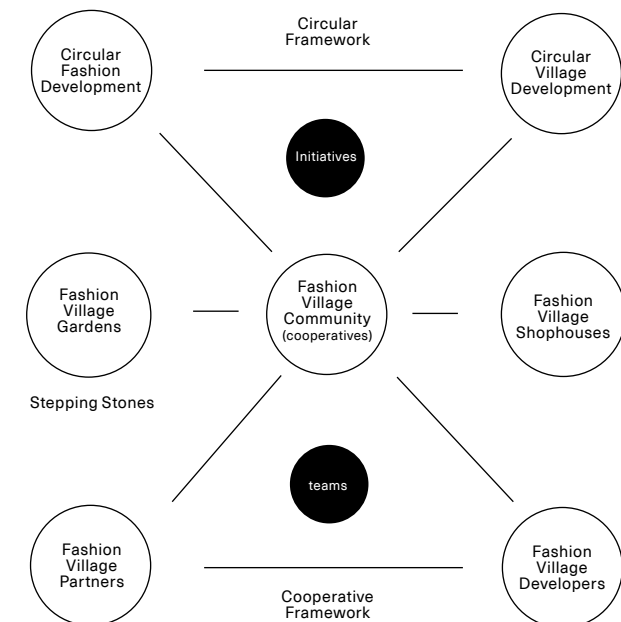


Fashion Village Snophouse

The Fashion Village Lab is a concept that has been developed by a team of Dutch and Indonesian designers and researchers who engaged during a longer period with the Cigondewah community, from 2014 to 2018. With funding from the Creative Industries Fund NL and the Netherlands Enterprise Agency, a roadmap for the development of the Fashion Village Lab was developed by a multi-stakeholder collaboration of designers (COCOCAN, LILA Living Landscapes), consultants, academics (ITB, STTT, TU Delft), and NGOs (Bandung Creative City Forum – BCCF), with the support of local government and businesses. An educational programme of Institut Teknologi Bandung and TU Delft into collective circular resource systems was connected to the Fashion Village Lab. The mapping of various resource systems by ITB students of Human Settlement

To organize the Fashion Village Lab, a Development Framework was drawn by the team. BCCF, as the local social design partner, played a central role in this, guiding the community and establishing initiatives with them. The framework defines the roles of the various organizational bodies within the Fashion Village Lab and how these are structured and organized around Fashion Village Initiatives for circular fashion and village development (see Figure below).

The Fashion Village Community, consisting of (cooperatives of) local fashion-makers, farmers and builders, lies at the core of the Fashion Village Lab. They team up with the Fashion Village Developers and the Fashion Village Partners to pilot Fashion Village Initiatives that help grow circular and cooperative businesses within the Fashion Village.



Fashion Village Partners

The Fashion Village Partners are a diverse network of parties and people contributing to the Fashion Village Lab with knowledge, activities, financial contributions, policy support and otherwise. Fashion Village Partners is made up, for example, of fashion industry companies, knowledge institutes, governments and NGOs. They can play a variety of roles during different development phases of Fashion Village Initiatives.

Fashion Village Community

The Fashion Village Community consists of local fashion makers, farmers and builders committed to developing their live-work environment through sustainable initiatives and cooperative business models, related to both fashion and village development. The Fashion Village

Lab aims to support the Fashion Village Community in becoming respected co-producers of unique, sustainable fashion products.

Fashion Village Developers

Fashion Village Developers are the Fashion Village Lab's development organization. They contribute to the realization of a healthy and thriving Fashion Village by identifying, developing, consulting and facilitating Fashion Village Initiatives together with the Fashion Village Community and other stakeholders. They open up and enlarge the sustainable markets in favour of the Fashion Village Community.

Fashion Village Initiatives

The Fashion Village Initiatives are organized as much as possible as autonomous social business models



ITB student during circular settlement co-creation workshop

helping build a healthy and flourishing Fashion Village. Innovation is steered by the collaboration between communities, industries, governments, NGOs and knowledge institutes.

From a business model point of view, the Fashion Village Lab makes a distinction between the following two types of Fashion Village Initiatives:

- Cooperative Business Initiatives Initiatives as a profitable cooperative business model for the Fashion Village Community, such as the development of an organic dyeing service for the fashion industry. These initiatives are the drivers of the Fashion Village Lab and generate revenues for the further development of the Fashion Village.
- Public-Private Business Initiatives Initiatives as a public-private business model aimed at transforming the rural/urban landscape around fashion industries into healthy and thriving Fashion Villages, such as the development of circular water, waste and energy networks. These initiatives are connected to the Fashion Village Development Plan.

First Fashion Village Cooperative

The establishment of a local Fashion Village cooperative was initiated as a first stepping stone. The cooperative, a legal form for a collective enterprise, is a common organizational form in Indonesia. In the countryside, many cooperatives of rice, coffee and cacao farmers exist. However, in many fashion industry related villages, such as Cigondewah Kaler, cooperation between different village entrepreneurs is organized as small-business-to-small-business.

As a result of social mapping and focus group discussions within Cigondewah Kaler, a diverse group of villagers has been involved as members of the first Fashion Village Cooperative. With the support of the Cooperative Department of the City of Bandung (KUKM INDAG), they have established a legal cooperative structure to develop sustainable businesses together. This cooperative, Koperasi Kawisan, takes part in the initiatives of the Fashion Village Lab.

Capacity-building through initiatives

The social mapping identifies how the different groups of village entrepreneurs are organized, what their markets are, how the various supply chains are structured, what kinds of skills, knowledge and capacity the local entrepreneurs have, and what kinds of products and services they currently provide. This situation forms the starting point for the development and capacity building of the Fashion Village Cooperative. Together with the Fashion Village Shophouse and the Fashion Village Production Garden, the Fashion Village Cooperative forms an essential starting condition for the Fashion Village as a resilient production environment. Through the organization of Fashion Village Initiatives, different business model(s) can be developed, tested and optimized. With the first Fashion Village Initiatives, the aim is to establish a large part of the community-based fashion supply chain, covering fabric production, colouring and garment-making. The ultimate goal is to develop economically and ecologically profitable cooperative businesses from these initiatives by following the 'from waste to biobased' logic.

Values

Through the activities of the Fashion Village Lab in Cigondewah, greater awareness has emerged –both within the community and beyond – of the possibilities for responding to the polluting activities of the global textile industry. The devastating power of this market-driven sector has become undeniable.

At social, cultural and financial levels, value has been created through the establishment of Koperasi Kawisan as a Fashion Village community. The community of individual entrepreneurs has increasingly organized itself as a collaborative network. The upgrading of collective workspaces and the central public space – including the removal of a dumpsite in collaboration with the municipality and the creation of a mural – has fostered cultural pride in the identity of the Fashion Village. The mural, created by the community in collaboration with local artists from the BCCF network, also adds aesthetic value to the neighbourhood.

The cultural value of the kampung river as the backbone of the community has been reinforced by the Fashion Village Lab through the reintroduction of a circular water system, a design developed in collaboration with LILA Living Landscapes.

Ecologically, the problems are enormous, and efforts to address these in collaboration with the large textile factory have ultimately yielded little. The restrictive contracts the factory must sign with major brands in order to survive leave little to no room for improving the living conditions of workers. However, as a result of the FVL programme, the community has become more aware of the ecological value of the riverbanks and the remaining rice fields in their neighbourhood. A group of residents has pro-actively started community gardens and river clean-ups.

Financially, the rental of rooms is a major source of income for local villagers. In the neighbourhood, many new homes are being built and expanded using environmentally harmful materials such as concrete and steel. Through the project, attention has been drawn to the use of biobased materials, such as wood and bamboo. In Cigondewah, a number of projects have been realized by local bamboo-makers. The use of local materials and building techniques has enormous potential aesthetic value for the kampung.

Socially and culturally, it has become clear that local Sundanese kampung traditions, such as Gotong Royong (building houses together, working the land together, etc.), are still present, and form a particularly valuable starting point for collective circular practices and regenerative landscape management.

Koperasi Kawisan,
Fashion Village community



Mural at collective Fashion Village shophouse



Main Insights

In contexts where community challenges stem from exploitative global economic forces – such as those in the textile industry – activist designers and researchers can serve as a lever in the exposing and disrupting of destructive patterns. The development of a Living Lab such as FVL offers a powerful narrative framework within which to foster collaboration among communities, businesses, designers, knowledge institutions, and government bodies.

However, holding large textile corporations accountable for the damage caused by their production remains challenging. These companies often outsource work to local factories, which operate under minimal oversight and are trapped in exploitative contracts. Culturally, the local river landscape holds profound importance for the community as a space for reflection, purification, and food production. The river thus presents a natural entry point for the harmonization of bottom-up and top-down interests. While the FVL program envisioned restoring a circular water

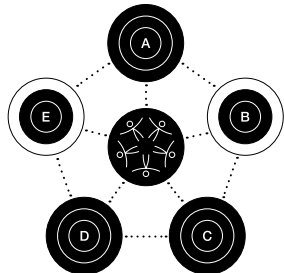


Multi stakeholder workshop, including community members of Cigondewah, designers, businesses, government officials and academics

system for the community, its actual development would have required a sustainable public-private partnership – one that never materialized due to the COVID-19 pandemic.

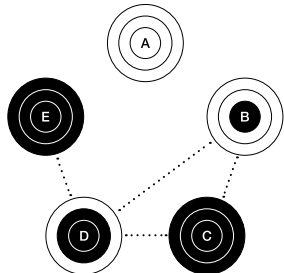
Sundanese *kampung* culture, with its tradition of *Gotong Royong* (collective mutual aid), provides a strong foundation for (re-)developing circular practices. At its core, there is a deep ecological connection to the landscape and a collective approach to its stewardship. Yet, in industrial *kampungs* – where many young factory workers endure long hours – the social cohesion that underpins *Gotong Royong* is often weaker, diminishing its effectiveness.

Finally, the local community's heavy reliance on unsustainable practices tied to large textile and garment factories further complicates progress. Some families have prospered by renting rooms to factory workers or trading textile waste, while their traditional livelihoods as farmers or fishers have become impossible due to severe environmental pollution. Anticipating a future where polluting industries collapse and are replaced by local, sustainable, bioregional enterprises is therefore prudent.



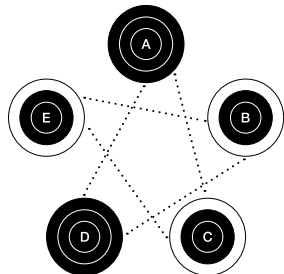
COLLABORATION

A	Designers
B	Government
C	Businesses
D	NGO's
E	Education



RESOURCE CYCLES

A	Energy
B	Nutrients
C	Water
D	Bio Materials
E	Tech Materials



VALUES

A	Social
B	Ecological
C	Aesthetic
D	Cultural
E	Financial

Kampung Kollektief: Reconnecting the Community

Kampung Kollektief is an open collective of spatial practitioners that co-creates with urban communities to shape and activate shared spaces. The collective's methodology centres on participatory work, while the outcomes gather experiences and strategies from different contexts and exchange these across communities. The collective's work began in 2023 through What if Lab (now known as Co/Lab), a Dutch-Indonesian intercultural design collaboration by the Dutch Design Foundation and Erasmus Huis Jakarta. During this programme, the collective spent a year collaborating with Kampung Susun Kunir in Jakarta, Indonesia, to co-create a sustainable public space.

Urban *kampungs* are irregular neighbourhoods commonly found in Jakarta, Indonesia. Even a 10-minute walk through the city centre can lead you through narrow *kampung* alleys, busy *warung* 'shops', and crowded homes. The prevalence of these has grown and spread, squeezing between available gaps of land, building homes by hand, forming tight-knit communities. Though it is a mundane scene for locals, this juxtaposition of formal and informal elements in Jakarta has afforded its residents proximity to low-income housing, affordable food, informal jobs, and more. Despite the vital role these urban *kampungs* play, they are often perceived as unruly and opportunistic, while being underrepresented and excluded from the city's future development.

Amid rapid urbanization and growing land scarcity, poor urban *kampungs* with contested land ownership are often driven out to control and 'tidy up' the city.

In 2015, threats of eviction became a reality for Kampung Kunir and many other communities on the Ciliwung riverbanks. Eviction was justified by officials as a method of flood mitigation and a necessary step towards progress for the city. For years, the community fought for their housing rights alongside a robust network of volunteers: JRMK, UPC, AKUR, ASF, RUJAK, and Gerakan Seajar. In 2022, a partnership with the government resulted in the creation of a new vertical living space. Building upon this success, Kampung Kollektief joined the network in 2023, with the co-creation of a sustainable public space in Kampung Susun Kunir.

Together, these actors sought to understand what sustainable public space meant for *kampungs* by acknowledging their past, listening to their present needs, and imagining what is possible for the future. Through multiple participatory workshops with Kampung Susun Kunir, tools from the Circular Value Flower method were applied, such as the Onion Diagrams, to better understand the values held by different stakeholders in this project. These values informed how the team prioritized resources and design features suited to the project's limited time-frame and budget.

After further analysis, it was concluded that the idea of a typical public space, such as a park, did not fit the *kampung's* limited availability of land. This led to a broadening of the definition of what a public space is, to include irregular and temporary features such as *kaki lima* (street vendors) or *pasar malam* (night markets), common in *kampungs*.

This resulted in Rujak Plaza: a set of movable planters that can create temporary public spaces. Inspired by the shared memory of preparing and eating *rujak*, an Indonesian fruit salad, this concept aims to recover a sense of dignity, belonging, and ownership toward the paved road where these people's homes once stood, by appropriating space to suit the community's needs. Since May 2024, Rujak Plaza has become a tool to step toward a better future, serving as a neighbourhood meeting point and attracting curious visitors, dispelling prejudice with storytelling, and more.

Beyond What if Lab, the project has expanded to Rotterdam's Tarwewijk neighbourhood and Barrio Potosí in Bogotá. Each neighbourhood adopts the Rujak Plaza model to suit its own local context, creating a connection between communities halfway across the world.

Rujak Plaza: movable planters and street furniture



Co-designing an Intervention: the Bale Bengong Barter Market

Bali, Indonesia faces significant challenges due to the rapid growth of tourism and modernization, which threaten traditional community values and practices. The erosion of traditional environmental practices and the commercialization of cultural values undermine the community's intrinsic motivations for sustainable living. Effective ways to motivate sharing products and services within Balinese communities could support a shift in current practices toward circularity, leveraging traditional cultural values to enhance sustainability and resource efficiency. Bale Bengong is an online journalistic media platform that reports on local social issues, including circular and regenerative initiatives.⁸³

To explore ways of stimulating sharing practices, a workshop was set up at the Bale Bengong co-working space in Denpasar Bali, with local community members, including members of NGOs PlastikDetox, Nuturang, Swap Party; designers; government officials such as the village head, the Head of the Banjar Dinas - the administrative arm of the Banjar, the traditional Balinese neighbourhood community that serves as the cornerstone of communal life, governing customary, ceremonial, and everyday affairs⁸⁴ - and the editor of Bale Bengong. The Circular Value Flower method was used to analyse cultural practices and values related to sharing, and to guide the co-creation of an intervention. The co-creation phase of the workshop was divided into a series of steps following the CVF method.



The steps identify shared urgencies, values, stakeholders, resources, and intervention ideas, and finally culminate in detailed action plans for the intervention selected.

The workshop began with an analysis of individual values, which highlighted the potential of Bali's cultural wisdom, strong social networks, availability of shareable goods, and community skills. Traditional practices such as *Ngayah* (voluntary community service), *Tri Hita Karana* (harmony between humans, nature, and the spiritual realm) and the *Banjar* (community organization) play a fundamental role in promoting circular practices and supporting communal cooperation.

In their discussion aimed at identifying a shared urgency, the participants addressed the impact of current economic activities on cultural and spiritual traditions, acknowledging that these activities have social and ecological costs.

The group emphasized the value of non-monetary assets such as relationships and community attachment, and the need for fairness in economic transactions.

During the brainstorming phase, the participants came up with the idea of a barter market, where harvests and tools are exchanged without monetary transactions, to enhance sharing behaviours. The concept of a barter market aligns with traditional Bali practices and values and is present on the island; however, it is not as prevalent as in other regions of Indonesia. In addition to providing less waste, this experiments, again, with an alternative to a financial economy; a barter market also facilitates cultural exchange and knowledge transfer through the interactions that are inherently required.

This intervention was subsequently implemented by Bale

Bengong at the end of June 2024 from the afternoon until midnight, in collaboration with several local communities; local craftsmen and farmers participated with their organically produced food, slow and upcycled fashion items, and other local, handmade products. In 2025, a market was again organized in Denpasar, in which 20 local community farmers and craftsmen joined from villages across Bali. The main objectives were to raise awareness of locally made, sustainable products and to create a collaborative space for people with similar aims and commitments. At the market, goods can only be purchased through a specific Barter Market token, to honour the tradition that bartering is about reciprocity and sharing and not about monetary transactions. These markets have been a success, with more than 300 people visiting the events.



⁸³ <https://balebengong.id>
⁸⁴ Sudama, 2020



Insights Gained



The international cases in this book were first analysed using the thematic layers from the Circular Value Flower. Second, the CVF method was used as a participatory design tool to facilitate the co-design and co-development of new circular possibilities. Sometimes, these new paths took the form of new entrepreneurial business models such as on the Galápagos Islands and in the Gooi & Vechtstreek region. In other cases, new interventions were designed to extend existing practices or increase value creation by incorporating additional resource flows, as seen in Nairobi, Rotterdam and Bali. In all the initiatives described, we – as authors – had an active engagement in the design process together with the community initiative-takers, a variety of other stakeholders, as well as students, researchers and designers. These collaborative, dynamic processes have yielded interesting insights into the way communities around the world engage in circular practices, how they organize their processes – almost always in close collaboration with other actors – and how they form seeds of valuable knowledge production concerning multiple value creation while embracing resource stewardship based on reciprocal relationships with land and people.

The objective of depicting the cases through both an analysis of the initiatives and an examination of how the CVF method facilitated new design interventions was not to assess the extent to which the initiatives differed or were similar, but primarily to learn from divergent process methods grounded in different worldviews. Sharing these insights hopefully fosters an acceleration of the transition towards a regenerative and just economy, and stimulates the broad scaling of communities into a dense network supporting their resilience. In this chapter, we discuss reflections and draw conclusions from our collaborations over the past years, based on the Circular Value Flower method. These are clustered in the following paragraphs:

- Towards a Community-led Regenerative Economy
- Circular Communities as Seeds of Transition
- Dealing with Complexity: Collaboratively Designing Interventions

Towards a Community-Led Regenerative Economy

Our Relationship with Nature

Despite good intentions and well-intentioned policies, global economic activities are still depleting the planet; where the energy transition starts to take shape and offers hope, the transition towards new economic models rooted in regenerative and circular practices fails to materialize.⁸⁵ We still fail to realize that we as human beings, but also our economies and production processes, are intrinsically part of nature, not separate from it or external to it. Large sectors of our economy, such as agriculture, food and construction industries, are entirely dependent on natural systems. The degradation or loss of nature will therefore have direct repercussions for both global and local economies.⁸⁶ And we are losing nature and biodiversity at an unprecedented rate.⁸⁷ 'The only way we can create a sustainable future for us and for all other living creatures on Earth is by utterly rethinking our current relationship with nature'.⁸⁸ A recent study shows that the connection between human beings and nature has declined by 60% over the last 200 years, driven by urbanization, environmental degradation and lack of passing on of the engagement with nature and nature-based practices through generations. This decline highlights growing risks for both environmental stewardship and human mental wellbeing.⁸⁹

To re-establish a close relationship with nature and embed this relationship into our economic thinking, policymaking and value creation practices, we need to develop new narratives. We have strong language to critique what is failing; we have fewer shared practices that make alternative realities workable. The cases discussed in this book offer concrete examples of how such alternatives can take shape in practice: community-led, place-based regeneration through multiple value creation, in which ecological, social, cultural, aesthetic, and financial values are held together rather than traded off. In Nairobi, young entrepreneurial minds turn dumpsites into beautiful green public spaces that serve as social hubs for community members and as allotment gardens, but these spaces are also recognized as spiritual spaces; spaces where you experience a connection to a greater whole. In the very urban context of Rotterdam, the community members involved in the waste management at the large market perceive their work not as any old job, but as a mission to make the world a greener, fairer place. In a very similar concrete context, the *Kampung* residents in Jakarta use green moveable planters to connect to nature and to their cultural traditions of eating fruit salad together. The fishermen on the Galápagos Islands referred to the ocean as 'life'; having been deeply connected to the ocean for generations, they see the ocean as a living relational system that sustains identity, food and belonging.

85 Fraser, M., et al., 2024

86 WEF, 2020

87 Keck, et al., 2025

88 Schouten & Van Riel, 2025

89 Richardson, M., 2025

And in Gooi & Vechtstreek, the felling of specific trees is used to both regenerate the woodland and build biobased dwellings.

Although these communities are located in different parts of the world, they share a deep spiritual connection to the natural environments in which they live, along with a conscious understanding that the activities they initiate should not only generate financial value for themselves and their communities, but also create social and ecological value. Their entrepreneurial practices, rooted in ecological stewardship and intergenerational transmission of knowledge and skills, are relational rather than transactional.

The communities' lived connections to land, sea, and territory resonate deeply with Indigenous knowledge systems that have long understood the relationship between humans and nature not as one of management or extraction, but as one of reciprocal kinship. In the Andean and Amazonian concept of *Buen Vivir* (*Sumak Kawsay*), wellbeing is not an individual achievement measured in material accumulation, but an emergent condition of balanced relationships among human beings, other-than-human beings, and the territories they co-inhabit.⁹⁰

Similarly, the *Ubuntu* philosophy of Southern and East Africa – 'I am because we are' – positions individual wellbeing as inseparable from the health of community and ecological relations.⁹¹ The young entrepreneurs along the Mathare River in Nairobi enact this principle daily, understanding that their personal futures are bound to the condition of the river, and that restoring its banks is simultaneously an act of ecological repair, spiritual practice, and economic foundation. In Bali, *Tri Hita Karana*, the three causes of wellbeing, articulates harmonious relationships with God, with other people, and with the natural environment as the foundation of a good life; a philosophy that infuses Balinese agricultural, ceremonial, and community practices. The Bale Bengong established the barter market on these principles, where food and local products from farmers around Denpasar are shared or bought using a unique token, intertwined with cultural festivities.

What these worldviews share is not a romanticism about nature, but a sophisticated understanding that ecological, social, spiritual, and economic dimensions are ontologically inseparable. They challenge the Western tendency to treat nature as an externality to be 'incorporated' into economic models, and instead propose that economies, governance, and knowledge systems are always already embedded in living territorial relationships. The concept of land as a pedagogical, political, and spiritual space, not merely an ecological base, reframes what regenerative entrepreneurship means in practice: it is not the application of circular techniques to a resource base, but the cultivation of reciprocal responsibility between human communities and the living systems that sustain them.⁹²

For the circular communities in this book, this insight carries a practical implication. The most resilient initiatives are those where circularity is not a strategy imposed upon a context, but an expression of existing relational commitments to land, water, and one another; commitments that are cultural, spiritual, and intergenerational. Indigenous and local knowledge systems thus offer not a supplementary perspective but a foundational reorientation: from circular economy as a technical fix to circular communities as relational practices of care, continuity, and collective responsibility for the conditions of life.

Resources, Value Chain and Value Creation

The circular community initiatives discussed in the book and in our other research projects demonstrate that there are many citizens around the globe involved in closing and maintaining resource cycles while rebuilding relationships with land and one another. These initiatives highlight above all that circularity cannot and should not be perceived first and foremost as a technical transition, but rather as the cultural transition of a series of initiatives and processes based on the interdependency of relations, resources and reconnection to land and nature. Perceiving the circular economy as a form of resource stewardship grounded in interconnected environmental, social and financial values shifts the perspective on sustainability and justice, whereby the economy is defined as a means for organizing society in relation to nature, rather than being considered a standalone goal.⁹³

This (re)learning of experimentation with other economic realities rooted in multiple value creation, reciprocity, ecological embeddedness and co-operation seems to come more naturally in the cases in the Global South; the community-led initiatives in Nairobi, Jakarta, Bandung, Bali and the Galápagos operate in a closer relationship to nature, land and the resources this provides. The fishermen of the Pelican Bay Cooperative are well aware that their livelihood depends on what the ocean offers, and therefore refer to the ocean as 'life'. The young entrepreneurs from different organizations along the Mathare River in Nairobi all agree that a clean river and river landscape form the foundation of their current and future existence, and function as stewards for future generations embracing multiple value creation, spirituality and education as the key drivers of their activities. At the barter market in Denpasar, a special market token was introduced to mark the original spirit of sharing and reciprocity. In the two Dutch cases, the Afrikaanderwijk and Gooi & Vechtstreek cooperatives, although both are widely recognized as exemplary in their field, they have to navigate the complex policies and funding regimes of the 'governance system', which supports their activities with appreciative words, but fails to guarantee a long-term sustainable existence. Exploring new value systems through experimentation with circular practices is essential, but inherently carries the risk that outcomes may differ from what

90 Acosta, 2012; Gudynas, 2011

91 Ewuoso & Hall, 2019; Mugumbate & Chereni, 2019

92 Arjaliès & Banerjee, 2024; Denny et al., 2025

93 Velenturf & Purnell, 2021

was imagined. Too often, an experiment is dismissed as unsuccessful or too complicated, and people revert to the old system or the familiar way of doing things.

Across the different contexts, community initiatives demonstrate that these approaches to circularity require craftsmanship, networks, skills and knowledge of the resource cycles, spatial context, local customs and small amounts of finance, rather than large technological investments. In the Western context, as demonstrated by both the Gooi & Vechtstreek and the Afrikaanderwijk cooperatives, this is not yet resulting in viable business models, as labour remains expensive while materials are still relatively cheap. When assessing such circular community initiatives, it is important to realize that these initiatives still largely operate within a linear rather than a circular economic context. This linear economic context is based on the capitalist notion of private property rights, competition, and the promise of endless economic growth, resulting in transactional and extractive relationships with nature. Current mainstream practices, entrepreneurial models and policies such as green growth, carbon credits and green technology that do not address the fundamental causes of the current ecological and human crises assume that the destruction of the natural ecosystems can be prevented without addressing the political-economic system of capitalist relations that destroys this.⁹⁴ Elinor Ostrom's Social-Ecological-Technological Systems framework, further developed in the Circular Value Flower method, provides an example of adaptive governance in which resource management is organized across the entire value chain. Linking ownership and democratic participation to relational stewardship offers a holistic model for non-exploitative value creation.

Circular Communities as Seeds of Transformation

At a time when climate change, biodiversity loss and inequality are deepening and governance is failing to achieve adequate solutions, we see circular communities as place-based nodes in ecosystems where circular and regenerative entrepreneurship becomes operational in everyday infrastructures, shared spaces, and local economies. These communities generate livelihoods while repairing land, strengthening social cohesion, and sustaining cultural continuity. From Nairobi to Rotterdam to the Galápagos, these circular communities demonstrate how locally rooted practices can inform broader pathways toward equitable, sustainable futures, precisely because they are not only technical solutions but also social agreements on responsibility, ownership, and participation. We need to adjust the perception that only the government can take care of collective values and that citizens only feel responsible for their own individual interests – precisely as Elinor Ostrom proved in her work on the commons. In line with her research, we have witnessed active citizens in various corners of the world engaged in economic

94 Arjaliès & Banerjee, 2024

activities around stewarding resources that not just generated financial value but also ecological, social, aesthetic and cultural value. Their activities are not rooted in competition but in collaboration, and do not obey to the rules of supply, demand and scarcity as dictated by capitalistic economic models, but rather are based on reciprocity, relationships, symbiosis and the cycling of resources.⁹⁵

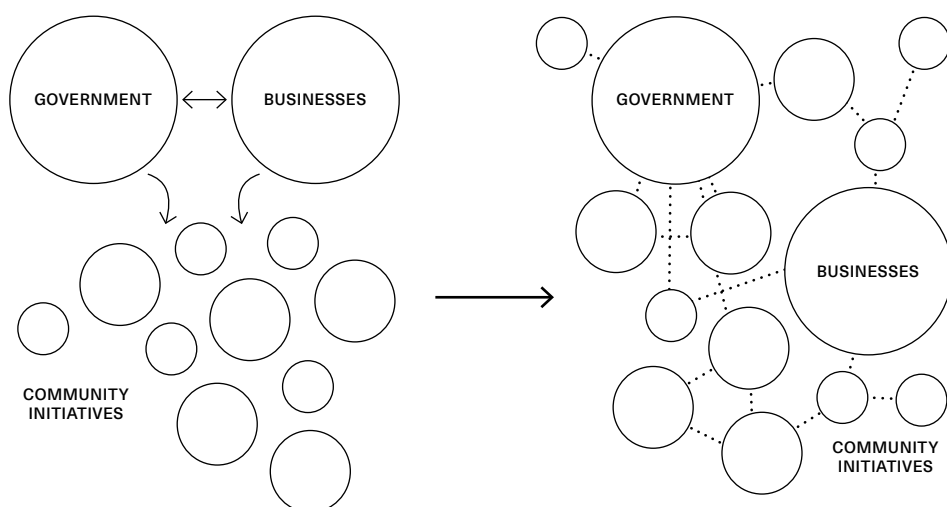
Circular communities stand or fall with contributions from active citizens who have an idea or vision for change, and who also have the ability (energy, time and resources) to participate for a long period of time. The cases studied in this book suggest that the core challenge is not a lack of community capacity, but a lack of institutional recognition of community-led, relational forms of value creation. Currently, governmental bodies tend to override or oversee community initiatives, as these are not perceived as having sufficient impact at a larger scale. During a large multi-stakeholder workshop, where representatives of the Nairobi County Council, UN Habitat and the Nairobi Rivers Commission were present, the community-led initiatives were given a stage to present the content and impact of their initiatives and demonstrate that their achievements simultaneously contribute towards local, national and global policy goals of climate adaptation, social justice and resource stewardship. In Afrikaanderwijk, the subsidy agreement with the municipality ends at the end of the year 2026 and extensive negotiations are underway to stabilize a sustainable, long-term financial construction within a strong collaborative framework in which the Cooperative is firmly recognized and embedded in the city's governance system. In these conversations, the emphasis is on recognition of the Resources Station as a place for testing innovative circular practices, for knowledge production and exchange, and for raising awareness of these practices among local residents, while generating multiple value that also contributes to the council's policy objectives on circularity. Whereas in many of the cases discussed, the community initiatives are overlooked as valuable testing places for innovative circular practices and therefore as places of knowledge production and exchange, the case of Gooi & Vechtstreek shows how a community initiative can be an embedded and a valued partner in a wider collaboration between governmental bodies and private actors. Within this community-led process, institutional partners embraced new ways of cooperation and knowledge production, based on respect for one another's positions and interests.

Circular communities therefore function well in collaborative networks rooted in continuous learning that have the time to address root causes, to test innovative ideas, to emerge and to grow – but importantly also to fail. The initiatives in Nairobi have united in the Mathare River Network, through which they can develop a stronger, collective voice, share knowledge and skills, and collaborate on their shared mission to regenerate the riverscape. Their broad scaling approach can also be seen in Jakarta, where the moveable planters with fruit trees succeeded in creating a new communal public space, fostering community cohesion. The Indonesian and Dutch designers

95 Eisenstein, 2021

who collaborated with the Kampung community brought these successful insights to both the city of Rotterdam (the Netherlands) and Bogota (Colombia), where the same planters, made from recycled plastic, are being used to create temporary collective spaces.

Circular community initiatives should therefore not be treated as merely 'local projects', but as living infrastructures of regenerative practices in which justice encompasses ecological security, cultural continuity and economic autonomy, enacted through community-led regeneration. The act of broad scaling through relational engagements in formal and emerging and fluid liminal spaces will ultimately result in dense regional networks that are able to make the necessary shifts towards sustainable and just societies through local resource stewardship. This does not alter the fact that global resources – such as fresh water, marine ecosystems, and tropical rainforests – require institutional protection and stewardship at national and international levels. However, effective governance for global resource stewardship can learn from the knowledge and practices developed by circular communities (Ostrom et al., 1999).



Dealing with Complexity: Collaboratively Designing Interventions

The Circular Value Flower Method: from Analysis to Design

The CVF method offers a holistic approach to collective stewardship of resources by visualizing different value dimensions as interdependent 'petals' of a flower, integrating all the dimensions of a resource-system within one diagram – including and embracing complexity rather than eliminating it. 'Understanding a complex whole requires knowledge about specific variables and how their component parts are related'.⁹⁶

The CVF method has proven an effective instrument for analysing and designing value chains at community and regional level. By explicitly connecting individual system components to the broader values of the system as a whole, it creates a shared framework that supports multi-stakeholder collaboration. This approach ensures that all participants feel ownership of and accountable for co-creating circular, regenerative practices.

Applied through co-creative workshops, interactive sessions, constellations and game-based formats, the CVF method has been highly effective in mapping the diverse dimensions and values of resource systems across cases. These participatory sessions also helped raise participants' awareness of the value potential of circular resource management, allowing them to design new interventions and actionable pathways to advance regenerative entrepreneurship. In practice, the four initiatives in Nairobi, Bale Bengong (Denpasar) and the Pelican Bay Cooperative (Galápagos Islands) each organized one or more collaborative workshop sessions in which stakeholders co-designed interventions and action plans, which were subsequently implemented in all cases. In Gooi & Vechtstreek and Afrikaanderwijk, the CVF method was used to map potential future value chains, identifying the activities, enabling capital and network partners required to achieve these desired futures.

The CVF workshops were instrumental in making these relational dynamics visible and tangible. The method created a structured space that allowed for dialogue, conflicting views and interests and constructive disagreement, leading interactions from competitive to cooperative, turning collaboration into a worked-for condition that requires trust-building, flexible formats and culturally sensitive facilitation. Differences in power, values and ownership patterns among actors make conflict inherent in the design of stewardship agreements, making participatory processes in which all voices are heard both necessary and essential.⁹⁷

Effective, sensitive communication and facilitation are therefore crucial in these co-creative sessions. These help create spaces for collective learning

⁹⁶ Ostrom, 2009

⁹⁷ Dietz et al., 2003

and making, where different forms of knowledge are valued and the distinction between 'experts' and 'lay people' begins to blur. The method and its accompanying materials was intuitively understood by the communities applying these. In Nairobi, the community-led initiative Easy Urban Green Growers introduced the method in another project, developing urban allotment gardens at a primary school together with teachers and students. Following an introduction to the CVF method, teachers used this to further develop and translate their ideas into a holistic proposal and action plan.

The Role of the Designer

The cases discussed demonstrate how the role of the designer is expanding beyond its traditional boundaries of working on spatial solutions commissioned by either a private or public client. Within this broadened scope, a designer takes on multiple, interconnected roles. In addition to design knowledge and technical expertise, designers increasingly act as mediators between governmental bodies and community members. In the case of the Afrikaanderwijk Cooperative, both architectural practice Superuse and design studio Design&Publics took on a mediating role to negotiate new financial and collaborative frameworks between the Cooperative and the city council's departments. In this position, an understanding of formal policy frameworks and planning processes becomes as important as an ability to facilitate inclusive and adaptive design processes. Rather than delivering fixed, prescriptive solutions, designers engaged in circular practices must adopt flexible methods and responsive mindsets that can evolve alongside the complexity of the systems within which they operate. The CVF method and its associated workshop materials have proven valuable in supporting this facilitating role within community-led processes.

Designers can also act as driving forces behind the promotion and implementation of circular practices in close collaboration with communities, as the cases of the Fashion Village Lab and Gooi & Vechtstreek demonstrate. In this way, a designer contributes to driving social and policy change by initiating and organizing collective agency, aligning stakeholders and fostering collaboration across sectors between different stakeholders with sometimes conflicting interests through dialogue to search for common ground and shared ambitions. The case of the Galápagos can be seen as an example, where a heated conflict between the Cooperative and the municipality eventually resulted in greater mutual understanding and respect. The role of designers in such community-led processes is also to support and test collaboratively designed interventions and reflect upon their impact, using experimentation as a way to validate, learn, and refine approaches before scaling them further through the networks established. In all the cases described, the use of the CVF method supported the design of interventions or future pathways.

In these collaborative processes, designers also contribute to research and knowledge generation through collectively produced new insights and skills, which helps inform both action and policy. This contribution, however, raises

a fundamental question about whose knowledge counts, and how expertise is recognized within circular, regenerative transitions. In the Galápagos, one of the most significant impacts of the collaborative process has been the gradual recognition of fishers' expertise within the wider community. Activities developed in collaboration with researchers from the Universidad de las Américas (UDLA) and TU Delft shifted how fishers are perceived – no longer as passive beneficiaries of conservation policy, but as knowledge-holders and innovators, capable of having a say about the islands' future. This recognition was translated into institutional support, including the awarding of a Galápagos Life Fund grant for a three-year project designed to deepen and scale regenerative practices.

Finally, designers can play a key role in communication and narrative change, as demonstrated by the case of Gooi & Vechtstreek. Through storytelling, framing and cultural expression, designers help shape how circular practices are understood and valued, shifting public perception and enabling new imaginaries to emerge. In this way, the designer becomes not only a creator of form, but a facilitator of processes, relationships, and systemic eco-system change. Ultimately, the question is: which narrative do we want to embrace in order to be able to fundamentally address current ecological, economic and social crises? And are we able to recognize the transformative role that circular communities whose livelihoods, territories, and futures are at stake can and should play in creating new imaginaries?

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Mo Smit is an architect and academic at TU Delft specializing in landscape-based construction, bio-regional architecture and circular settlement design. Her focus stems from her education and research activities in Indonesia, where she explored community-based ecological settlements, vernacular heritage, and low-tech building methods. Mo mentors students in developing forward-thinking, (eco-)systemic design approaches, preparing them to contribute to a sustainable built environment and healthy building culture. Mo recently started PhD research into the Value of Landscape-based Construction, focusing on understanding the potential value of re-installing bio-regional value chains for hybrid timber (frame) housing construction. She is co-founder of the Circular Community Foundation and of Stichting Bouwtuin, a research-driven design & build collective.

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From local action to global inspiration: how communities around the world are shaping a circular future through collective, relational, and regenerative entrepreneurial practices. Building on the first edition of *Circular Communities* (2022), this second edition explores culturally diverse and community-led approaches to circular resource stewardship. These examples demonstrate how communities generate ecological, cultural, social, aesthetic and financial value by collectively closing resource loops.

In their new book, urban designer Els Leclercq, architect Mo Smit and regenerative entrepreneurship expert Fátima Delgado Medina expand on the Circular Value Flower: a value-based, relational model developed to analyse, communicate and design circular practices. This enables a holistic environmental approach by linking communities with the (urban) landscape and wider eco-system through resource stewardship.

Written for communities, spatial designers, policymakers, researchers, and practitioners, this book offers insights and instruments with which to design, collaborate, and act – supporting global circular practices and allowing these to flourish, connect and grow into valuable networks.

