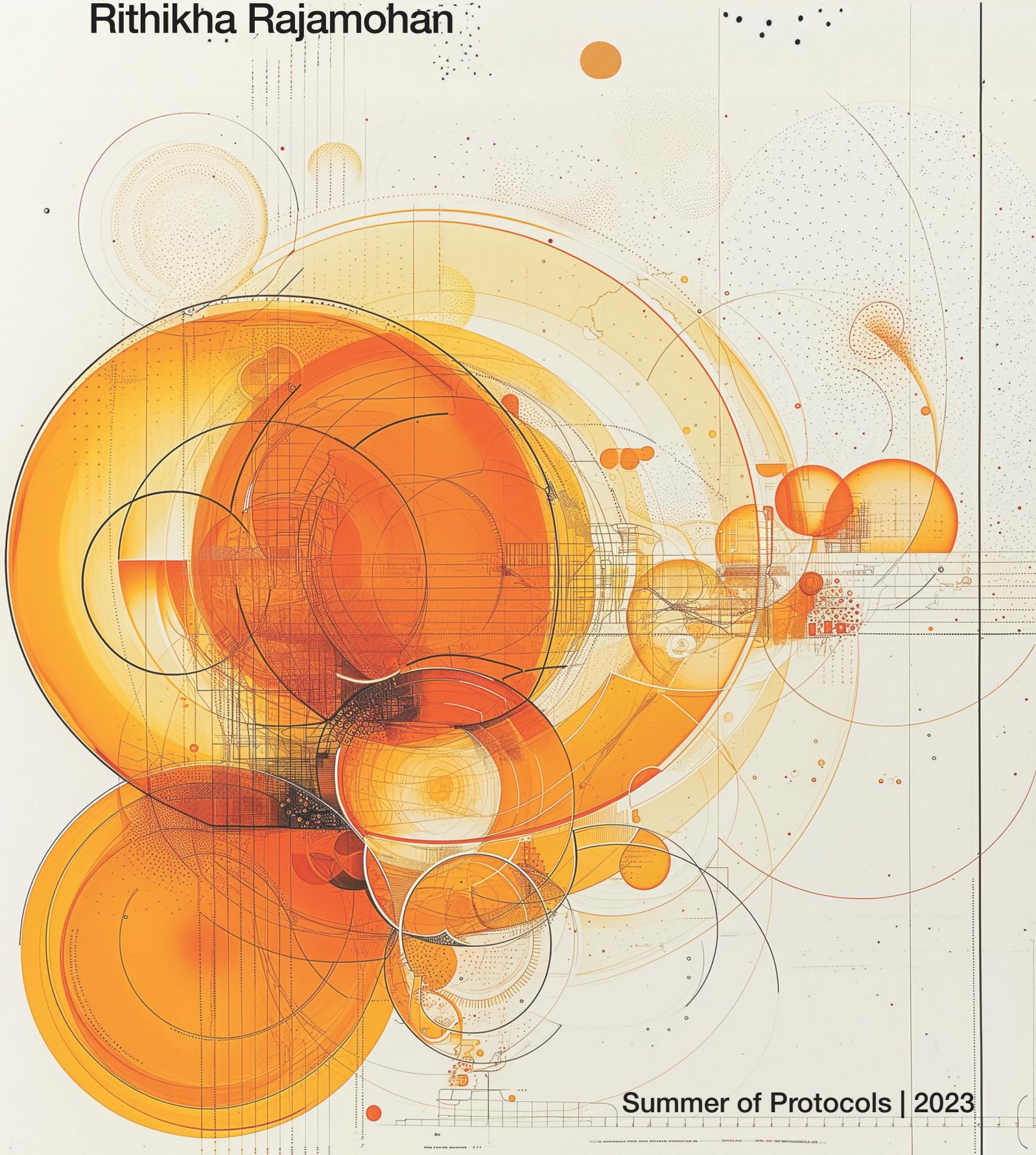


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Dispatches from Cascadia

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Bears and Bioregions

Just 35 years ago, the City of Vancouver, British Columbia, like many other cities around the world, was struggling under the weight of a polycrisis: land and marine heatwaves left sidewalks too hot to touch, winter king tide events submerged homes and roads for weeks at a time, and a year-round housing crisis incited social instability and growing public distrust.

The place I stepped out into from the city's SkyTrain station displayed little of this recent history, however. Instead it looked like one of many public spaces built with grandeur typically reserved for private establishments. Though not without its challenges, the city today stands as a testament to the transformation created by 7,462 cities around the world that together form the Global Protocol Network: an open-membership, shared policy system built with the flexibility and ongoing adaptability of local governance in mind.

While the city is still referred to colloquially as Vancouver and more recently as K'emk'emeláy, a Squamish Nation term meaning the "Place of Many Maple Trees,"¹ the city's legally recognized global identifier is much longer: Cascadia Bioregion::Pacific Northwest Coastal Forest Ecoregion::Capilano-Seymour-Coquitlam Watershed::Vancouver. Though in the day-to-day the new naming convention is rarely used beyond the watershed level, it was adopted by cities in the network to provide more geographical context as they transitioned from traditional political boundaries to much less rigid bioregional ones. The convention supported this transition by making explicit the ecological constraints they needed to operate under during the peak of the polycrisis.

"The Bio-Regional Protocol was officially acknowledged by cities that were part of the North and South American Continental Network in 2032, and was later activated at the Global Network level in 2035, after we iterated a bit more on its design," explains Noa Jaylen, a protocol designer who was part of a randomly selected, rotating cohort of local residents chosen to inform the protocol's design in the 2030s.

Vancouver is a part of the Cascadia Bioregion, an area that stretches from southern Alaska all the way down to Mendocino, California, and

east into Wyoming's Yellowstone Caldera. The bioregion contains 75 ecoregions. Common to all the cities within it are not country or state, but rather soil composition, climate patterns, and unique flora and fauna distributions.



"The need to prevent a regional water war² really pushed the whole initiative forward. By doing away with absolute borders in favor of permeable, overlapping ones based on actual resource constraints, the protocol created a new kind of political common ground. But this time through place, instead of in spite of it. Ultimately, it made natural resource management more efficient and localised by giving every jurisdiction, no matter the scale, responsibility for the bioregion's resource management," says Jaylen.

In the decade before the Bio-Regional Protocol was adopted by cities in the network, digitally-enabled online communities were also reinventing governance and state. These communities would buy up territories across the world and implement a membership structure that was purely values-based rather than geographic. Many members and supporters were digital nomads who believed in cross-cultural collaboration and usually had high-paying and fully-remote jobs that allowed them to travel year round.

In addition to the Global Protocol Network, these geographically unbound techno-utopian states were the other major alternative, it was the next logical step for them to create a distributed network of territories they could

claim citizenship to based on values-alignment,” Jaylen continues.

“But what they forgot was that our physical space, the land, shapes our values and tastes, and in turn our values and tastes shape the land. They’re two sides of the same coin and a blank slate approach that ignores this usually does more harm than good.”



Jaylen, who was previously an ecologist before their current work in protocol design, was part of a biocultural research team that sequenced the DNA of coastal grizzly bears in 2021. The study discovered that the genetic makeup of bears in the region were split into three distinct groups. However, the geographic distribution of these groups failed to map onto any physical features like waterways or mountain ranges that would otherwise encourage or limit bear mobility.

“We tried river systems, mountain ranges, and nothing,” says Jaylen, shaking their head. “Bears are generally all-terrain mammals, so it made sense that a wide river or mountain wouldn’t hinder their mobility. What did correlate, however, were Indigenous language families.³ When we overlaid the two it was a striking, but unsurprising, overlap, with bears being more genetically similar within the area of a language family, than those living outside of it. The correlation really came down to resource needs and use. The bears were content to stick to geographies that were resource-rich enough to meet their needs; as were the people. The same resources that shaped grizzly bear genetic distribution, also shaped humans. I’m glad we chose to honor that connection to place instead of

distributing it away across the digital ether, but that’s not to say we don’t travel or communicate digitally anymore, it’s actually a core part of what keeps the Bio-regional Protocol and the Global Protocol Network itself functioning,” says Jaylen.

The city is frequently in touch with other cities located in the Cascadia Bioregion, including Wallamt River Basin::Portland (known as Willamette River Basin until 2033 at which point the community voted to revert to the older Indigenous name) which experiences similar dual issues of drought and flooding, and South Western River Basin:Cork, previously known as Cork, Ireland.

Vancouver’s interest in Cork, though a very different geographic context, is their approach to saltwater intrusion and Coastal Disaster Protocol (CDP), which involves a triple bottom-line approach involving nature-based solutions. More specifically it is a protocol for managing coastal disaster events, with a first approach leveraging blue-green infrastructure, such as seaweed farms and clam gardens.

“We’ve reached peak melt and are about halfway to seeing stable sea levels,⁴ so we know that these water heights won’t be increasing as fast as before anymore. That said, even a slight rise in sea level has an exponential increase in effect when it comes to storms and flood events so we need to be vigilant,” Jaylen explains.

Cork has been experimenting with seaweed cultivation to reduce wave energy before it reaches their waterfront and are seeing good results. As per the protocol, they’ve open-sourced their equipment files so any city, both inside and outside the network, can use them.

“I’m in touch with a local makerspace to see how we should go about making a few tweaks to their designs. Cork has mostly *Laminaria hyperborea*, or cuvie as they call it, on their coasts, whereas ours are mostly bull kelp, *Nereocystis leutkeana*. They have slightly different effects on wave attenuation which we need to account for if this is going to work here. We can’t just copy and paste.”

The CDP was recently activated globally as a Core Protocol by a local, bioregional, and global vote of confidence. Previously, even without Core Protocol status it was still available for any city within and outside the network to adopt and modify as part of their own set of governing protocols or general

governance through a platform known as the Global Protocol Marketplace.

As a Core Protocol, the CDP now lays out an expanded framework designed to help cities replace lost cultivable land due to salt-water intrusion, attenuate waves, build new shoreline through natural habitat building, support sustainable mariculture, and expand inland river systems—the latter being an addition put forward by the Cascadia Bioregion's

coastal cities from their own experimentation in restoring buried rivers.

"Each city focuses on learning through the lens of their respective geographies, while the network as a whole is focused on sharing that knowledge with others. Being place-bound and by extension history-bound isn't a constraint for us anymore, it's a valuable differentiator that we leverage to come up with better solutions," explains Jaylen. △

A Half-Built House

In addition to co-designing protocol policy, the cities within the network are also working to refine physical resource coordination and redistribution, especially during times of need, across all geographic levels.

"Almost 45% of Vancouver's food is grown in-house," says Luciene Otieno, an urban farmer who oversees part of the Strathcona neighborhood's urban farms. By in-house, Otieno means within the city itself. This was thanks to better watershed management enabled by the Bio-Regional Protocol paired with an approach to growing food informed by ancient Ts'msyen and Coast Salish food gardens⁵ that were rediscovered along the coast almost fifty years ago.

They gesture to the converted grass lawns and boulevards that overflow with licorice fern, wild chamomile and salal berry bushes; all climate-adapted native plants grown from locally harvested seed and interplanted with other edible heat-loving flora like cucumbers, tomatoes, and strawberries.

Along with three other stewards, Otieno manages everything from seed collection to the distribution of produce. Deliveries from the block's farms go to small local businesses who provide pickup locations for neighborhoods. The farms, unlike those found in the region's more rural areas, are not your typical rectangular patch of land. The "fields" weave in and out of alleyways, sidewalks, and yards embedded within the neighborhood's other infrastructure.

Proscribed by the city's local implementation of the core Food Systems Protocol (FSP), the farms and their stewardship model are replicated block by block across the city and

merge up through the neighborhood, watershed, ecoregion, and bioregion.

"Researchers had no idea what they were looking at for the longest time. They couldn't figure out why certain parts of the forest had unusually high biodiversity counts," says Alex Livingstone, who spends their time between their hometown of Lake Cowichan First Nation on Vancouver Island, and Vancouver, where she works as one of many community consultants to guide the ongoing implementation of the FSP.



It wasn't until Indigenous communities came in as collaborators and were later funded through a process that gave them full control of long-term fund allocation and distribution,⁶ that it was discovered these biodiversity hotspots were a result of human hands and have since been re-adopted as an industry standard.

Fruit trees, berry bushes, and other edible and medicinal plants were interplanted within

the forest. Almost 250 years later, these managed forests continued to not only exist but attract twice the number of animals and pollinators than non-stewarded areas.

"It is a wonderful example of human beings giving more than they take. I think the discovery of these integrated farms alleviated a lot of shame our generation, which was bombarded with climate doomerism, had internalised around environmental destruction. It opened up the possibility that maybe we aren't all that bad as a species, that maybe we could follow our instinct to make things better, and do it well," recounts Livingstone.



"It was a revelation. By simply living our lives and meeting our needs, we could, in fact, help other life thrive. Before, we either wiped out existing ecosystems to make room for agriculture, forestry activities, or whatever else we needed or we kept 'natural' areas completely off limits to any kind of human activity and made it completely sterile. Both were equally bad approaches. Nature doesn't need conquering, but it doesn't need to be abandoned either. A healthy ecosystem needs us as much as we need it," they continue.

The neighborhood, which was once prone to higher-than-normal heating risks, known as the urban heat island effect, now has one of the coolest microclimates in the city.

"Core FSP functions as a half-built house. Provided with a global barebones framework, each jurisdiction makes its own local copy, makes some tweaks, and then goes about filling it in and decorating to meet their community's tastes and needs," Livingstone explains.

The local version of FSP that Otieno and Livingstone support is one of many stemming

out of the core FSP, which lays out the protocols' purpose, policies, and scaffolding that allows it to function as intended and decreases friction in activating it at the local level. In this case, one such core policy, known as a sub-protocol, is the Urban Rewilding Protocol (URP). URP oversees the need to set aside a certain fraction of urban land specifically for native plants and pollinators.

The URP sub-protocol lays out guidelines to encourage things like pollination, natural pest control, and soil restoration. The exact ratio of plants for pollination to plants for harvest, native or otherwise, is left up to each jurisdiction to decide.

While the sub-protocol is better positioned to assume responsibility for creating a general solution and governance framework due to the global information sharing network it pulls from, it assumes that cities know their own context better than any other governing body would, and so the governance and implementation specifics are left to city residents to decide.

Each jurisdiction that has implemented the protocol is alerted through the protocol marketplace if a change is made to the core FSP and has the option to merge the new changes. Similarly, if a local implementation makes any core changes, they have the option to push the changes up to the core level. While these downward merges and upward pushes aren't always accepted by every city in the network or integrated into the core protocol, they are still accessible to any jurisdiction.

"So far, the best approach we've seen to adopting core protocols is, after some initial deliberation, having everyone adopt the same modified version of the core in the first two years while iteratively gathering community feedback. By the end of the second year, we get a decent sense of what changes people are wanting across the board, which we then integrate into the city-wide implementation of the protocol."

Some changes are specific to certain areas or communities within the city, in which case each block and neighborhood is given full control of how they want to modify their version of the city-wide protocol," says Livingstone.

"We use the city's modified core implementation, to stay on the same page and keep that common goal in mind. The same logic also applies for any core protocol. Cities in the

Global Protocol Network use them as a common meeting ground, whether it's through data sharing, resource matching, or update

requests; it's there as a place we can all return to despite any differences in how we each go about achieving that goal for ourselves." △

Fists or Festivals

In the 2030s, food and labor shortages disrupted and ultimately halted global agricultural imports. Commercial agriculture increasingly produced food with more mass, but very little nutritional content.⁷ The city, like many others around the world, was forced to relocalize agriculture and make better use of what was already available.

"It was ridiculous," says Luciano Otieno. "We would import 99 million kilos of onions from California⁸ into the province, while farmers here were having to sell their onions in distant markets, having been blocked from local markets. It's mind-blowing that we ever thought a supply chain like that was a reasonable way to feed ourselves."

Otieno was one of many urban farmers who, even before the agricultural collapse, was converting lawns in the city into a patchwork of farms.

"We were trodding along slowly back then, didn't produce a lot, but it was enough and satisfying too. We kept about fifty families fed every month. We partnered with food banks. We taught kids how to grow their own food and that it wasn't a good thing they could get apples whenever they wanted at the grocery store, that apples actually have a season when they're best, and that season is worth waiting for. It was preparing children to understand what real food should look and taste like and take apart the black box that's agriculture to most kids. They barely understood the amount of work it took to grow food so readily available to them, all season, so of course they never needed to care," says Otieno.

"Then, all of a sudden, food prices skyrocketed and there was barely any fresh produce in the stores. That was when we got moving. We knew we had to act fast before some band-aid food stamp or rationing program was implemented or, a different kind of worse, some technology company swooping in to offer universal basic income in exchange for sticking a data-collection device inside your head."

"This was also when people took our work more seriously," continues Otieno, "it wasn't just happy-go-lucky gardening anymore. We were keeping people alive and fed. Growing food, being able to mend things, maintain things, all the stuff that was offloaded to the blue-collar workforce, to women, to mothers especially, all the tasks that were underpaid, ignored, and neglected by society and the economy, all this stuff suddenly took the forefront and were in demand."

"For the first time in a while, people realised that maintenance, all that glue work and care work, was actually what kept people alive, that kept the entire system running," Otieno recounts.

The first thing Otieno and their cooperative of urban farmers did was round up the neighborhood and go knocking door-to-door, speaking with residents and apartment managers in their three closest neighborhoods.

"We got folks together and explained what we had been doing and how it could help. A lot of it was convincing people to let us use their lawns or rooftops."



"If a city councillor or the police force didn't like what we were doing with the urban farms or wanted to fine us for violating any existing

rules, I called them ‘expired rules’ since they no longer served our needs. It wasn’t just one big farm in one place they had to deal with, but thousands distributed across the entire city, with new ones popping up every week. If they wanted to stop us, they’d have to take each one down, one by one. That’s how we shifted power from city government to city residents, by distributing it to everyone so that we could put that power to work freely. No one person held the key to the farm network’s operations, we all did.”



Otieno says their goal was to scale horizontally, staying small and duplicating as they expanded, and to have no central authority. A local steward runs each site and they maintain consistent communication between them. As Otieno put it, “they needed this to grow rhizomatically⁹ if it was going to scale to the level it needed to.”

Topu Salenta, a community organizer who acts as a liaison for expanding Otieno’s urban farm cooperative, says, “Questions started coming up like, ‘What can we grow that we will keep over winter? How much spinach are people eating per week right now and is it the produce that delivers the most nutrients and yield for our needs right now? What’s our Plan B if this block gets washed out by winter flooding again?’ There were a lot of questions to answer, and even more answers to question. Honestly, most of the time and work went into that initial coordination. I think we signed on at least forty new yards in the first few days and had about seventy people sign up to help with planting and conversions by the end of the week.”

Per the city-wide implementation of the FSP, approximately 35% of each neighborhoods’ land, rooftops included, is reserved for growing food. An additional 10% is dedicated to native pollinating plants that support local biodiversity, counter pests and disease, and naturally pollinate crops. Of this food growing space, half is set aside for the basics, which are inventoried and distributed at the city-level: beans, millet, sorghum, potatoes, squash, garlic, chickens, and a number of berry bushes like cranberries, wild blackberries and oregon grape, which also doubles as fencing for many buildings.

The remaining half is left open for each neighborhood to decide what they would like to grow and distribute. The distribution occurs at annual neighborhood festivals in November. For three full weeks, food, art, storytelling, and music is combined with roundtables, surveys, workshops, and talks to address last year’s pain points, changes needed to protocol infrastructure, and community needs and discoveries.

While the city has found that protocolized governance works for them, it is largely dependent on two things: trust between neighbors and neighborhoods and consistent and expansive public engagement, which due to the scale of the endeavor must be community-led and managed with the help of technical tools. “In 2039, we amended the city-wide FSP so that 10% of the neighborhood’s custom produce harvest also goes to a weekly farmers market. This was an addition to Vancouver’s FSP after community feedback was received that people should be able to access different produce markets in case their own didn’t have what they were looking for,” says Otieno. “Of course, some people still want to use household gardens or have access to private plots at the community gardens to can grow what they want. The purpose of this is to make growing food an accessible and shared activity.”

Now each neighborhood holds a weekly market where community members and a rotating selection of the city’s 22 neighborhoods set up stalls to sell the neighborhood’s produce and items like perogies, jams, and sauces. This modification to the FSP enables each neighborhood to preserve its own food signature, while easily sharing it with the rest of the city and remaining flexible for those with different tastes, regardless of where they live.

"We naturally accept diversity in art and music. We celebrate these differences because it's what makes an artist unique. However, the same was hard to say for the public engagement world," says Salenta, who pushed for amendments to the city's Urban Farming bylaw. In its original version it was prohibitive for them and many other urban farmers to scale their operations and restricted their produce sales. It took years of advocacy to see changes approved by the city council at the time.

"Back then, public input hearings were not only the most tedious few hours of your life, you also left them feeling hopeless about the good in other people," explains Otieno. "Even if you found the time in your schedule to set

aside five hours, it was something most of us dreaded going to."

"We figured that community engagement and civic participation should be something to look forward to, something to celebrate," says Otieno. "That's when Topu spearheaded the idea for a city-wide festival in addition to the data collection already happening through the protocol's technical infrastructure. Don't get me wrong, it's still hard, there's a lot of facilitation work and emotional calibration involved, but at least now I can say it's a time of year I genuinely look forward to. It brings the whole city closer together and gives us a clearer vision of what we want the year ahead to feel like." △

Playing with Legos

In addition to large-scale community input and deliberation, central to protocolized governance is a data-sharing agreement between and within cities.

"It's a way for the cities in the Global Protocol Network to sense each other and their needs without always having to explicitly ask for help," says Rainah Das, who helps build and maintain the FSP's technological infrastructure.

"We've all agreed to share certain data, such as around natural hazards at the global scale, where it's important we redistribute resources quickly to a part of the network in need of urgent help and be on the lookout for any cascading effects. Other agreements look like data shared between neighborhoods to keep track of the total amount of produce grown at the city-scale and to make sure they're still on track to feeding every resident. Things like health data use a more private data-sharing agreement, and usually this is under the patient's control to decide who they want to share what with," says Das, referring to how data is managed by the city's FSP and medical system, known as the Planetary Health Protocol.¹⁰

Each Protocol also has an associated collection of apps and technical tools that support the protocol's implementation and coordination needs at scale. These are also housed in the Global Protocol Marketplace, along with

the policy infrastructure. The key is that each app is composable and interoperable, meaning that they are able to share users and data, and can be copied and run anywhere, by anyone. These features allow protocols to integrate seamlessly with each other when necessary.

"It's kind of like legos," says Das, "each app is a different lego piece with different colors, shapes and sizes. Some are super simple, others are really complex, but they can all still attach to each other if we want them to. An app can be a single lego piece or it could be made of multiple. Taken altogether though, each protocol's technological infrastructure is one big lego sculpture that's made up of smaller pieces that we can add and remove, or generally shift around as we see fit."

Das compares the technological infrastructure for Core Protocols to the specific lego pieces that do the most in holding the sculpture together, usually the inner lego blocks that serve in an important load-bearing capacity within the larger piece. The technical term for this design is called supermodularity, which Das says restricts most failures or issues to subcomponents, rather than turning into cascading failure events.

"They're harder to reach and see sometimes because of the role they play in keeping the protocol running, but if push comes to shove, they're removable and can still be shifted around and updated," they explain.

The interoperability and composability of the technical protocol infrastructure extends globally. A key aspect of this is the fact that all apps are open-source. Anyone can make a copy of an app in the Global Protocol Marketplace, and simplify it or improve it for their needs. Depending on the scope of changes made and with a vote of confidence from other app maintainers and the wider community that puts the technological infrastructure to use in practice, sometimes these changes are greenlighted to be integrated into the Core Protocol's app(s).



Das, who also acts as a translator between the technological and policy infrastructure for the FSP, explains that the policy system is also modular in its structure, just using a different medium. Like the protocol's apps, the policy components of protocols are also interoperable and composable.

The interoperability allows for a seamless transfer of users and data between apps and cities, while the composability comes into play when any aspect of the protocol becomes shared infrastructure that can be combined together or taken apart. Together they allow for the protocol's apps and policy to be cloned, improved or modified for a specific need, and re-deployed by anyone, anywhere. On the FSPs policy infrastructure, Das says it's composed of a collection of sub-protocols, such as the Urban Rewilding Protocol, that lays out how much land should be set aside for growing native plants for pollinators.

Another sub-protocol core to the FSP is the Produce Inventory Protocol which uses produce and general sales data to determine which foods people are buying and how much needs to be grown or processed every year to meet demand. With this information, various governance protocols are used to separate these foods into Base produce and Specific produce. Base produce is food that's grown by every neighborhood and/or outsourced to nearby rural farms to meet the city's basic needs. Specific produce, on the other hand, is a growing list unique to every neighborhood and contains plants they will grow specifically for themselves, and allocate a percentage of to the farmer's markets.

"My mother was an urban planner and I still remember her complaining about having to write bylaws from scratch, even when other cities had already written exactly what they needed." Bylaws in this context refer to local-level laws usually written by city planners and passed by city council vote. These laws dictated parking space requirements, where urban farms were allowed to operate and at what hours of the day, whether affordable multi-family housing could be built in a certain lot and what the buildings in the area should look like to maintain visual cohesion on a street. Taken together, bylaws governed the shape, form and limits of the activities and physical infrastructure in cities, and in many instances, hadn't been updated in decades in addition to being black-boxed to preserve special interests.

"Copying was such a taboo back then, less so in the software world, especially in open-source, but outside of those bubbles it wasn't considered acceptable. People were still romanticising the idea of the lone genius or decision-maker," recounts Das.

"It wasn't until we were forced to work together during the collapse that folks realized ideas were meant to be shared and modified; that it was ok to edit and improve upon them. It's how any new innovation is made and it's how societies were able to survive rapid change in the past; by sharing what worked and what didn't with each other and iterating on those solutions," they continue. ▲

Uncovering Value Flows

My parents weren't happy when I told them I was going to dig around in the dirt and pull weeds for a living. I think I was 26 at the time," says Connie Santos, who led the design of the Urban Rewilding Protocol (URP), now integrated into the FSP, and oversees the selection and planting of native plants interspersed throughout every neighborhood's urban farm network.

"We came from a lineage of small-scale farmers in the Philippines and so my parents came here wanting something more for their kids. Imagine their shock when this is what I ended up wanting to do," says Santos chuckling.

Santos, now in their early 70s, began their career as a data engineer before deciding to start their own landscape restoration company in the early 2020s. They started by converting small areas of urban space, like tree pits and boulevard strips, into functioning ecological landscapes.

"A lot of awesome native plants looked like weeds to most people. Kids could easily recognize a thousand commercial brands, but not even ten plants in their neighborhood. The trick was to include signs of care in our designs; could be as simple as some nice blue-stone edging around the bed, but something that said that this neglected area 'with weeds' growing in it was cared about by someone gave the plants more legitimacy. The amazing thing was that it worked, despite the plant-blindness society at the time was experiencing at the time or the messiness of the actual design."

"When people see signs of care, it makes them question why a 'weed' would be looked after, and actually think about what it is they're seeing instead of walking right past. That was all we were going for when we first started," says Santos.

Within the first year of full-time operations, the company soon expanded to front and back yards and within a few years was hired to help support the greenspace design of Indigenous-led master-planned communities along the city's waterfront.

"The team chose our plants carefully and looked at our designs as an ecological community embedded within a human ecology. We would always ask ourselves, 'what are the

chances this will make it the next 10 years and do so with minimal hand-holding from us?'" says Santos. The company's work centred on stewardship over maintenance of natural spaces, and thinking about self-sustenance of the endeavor. It also used previous planted areas as a natural nursery to source plants and seeds for their projects in the year ahead.

"We're standing on the shoulders of giants," says Otieno referring to Santos. "Most people thought Connie was just gardening and making some money off of it when they first started, but what they were actually doing was restoring soils and biodiversity, while also creating a flywheel-like economy for rewilding. Without those years of restored land and increased native pollinator species, we never would have been able to build the urban farm network as fast as we did," Otieno continues.

"Her previous clients were also much more open to us using their land to grow food than other people in the city were. In a way she had already formed a community of supporters who were more inclined to support similar efforts that came later, not just the urban farms, but initiatives with serious economic and health consequences like the mutual credit system and the planetary healthcare model too. It's these kinds of overlapping community-building efforts that really saved us, you could say we hit the ground running because of it," explains Otieno.

"My parents' job was to build up enough safety, financially and socially, to survive here, and because of that, it became my job, my duty, to self-actualize . . . that's something they never had the privilege of doing," says Santos. "But that's something I could do, if I kept being a bit stubborn, and if I refused to accept the consistent 9 to 5 desk-job or going into the medical field as the only options available to me. Watching the beginnings of the polycrisis, I decided I didn't have that liberty anymore, and regardless, I realised that safe now wasn't always going to be safe in the future, and through my new work self-actualization quickly turned into a continuous process of community-actualization,¹¹" they continue.

The unease Santos felt was common in the late 2020's. With layoffs and general discontent spreading through the workforce, especially among those early in their careers, a

shift to more community-grounded work and self-employment was inevitable in the decade to come.

"What wasn't happening at the same time, or as fast as it needed to, was people having their basic needs met while working multiple jobs and contributing to their community. Most of this work, work that directly benefited the community especially, was done unpaid, solely on a volunteer basis," explains Dru Hui, an experimental filmmaker, self-taught economist and currency designer who was living in Montreal at the time.



"It did happen eventually, but not how most people imagined it would, through Universal Basic Income and what not. Instead, it happened with a cultural shift started by the indie and underground artist community that was occurring simultaneously. It was an unlocking of coordination ability, and a realisation that organising was more powerful and effective in fulfilling our basic needs than monetary wealth alone. Our goal was to create a proof-of-concept economic system that made work valuable, though not necessarily profitable.¹²"

Hui was part of the wave of economic experimentation that began within communal houses and free residency programs in various cities across the world. In North America, Montreal's artist and New York's anarchist communities led the wave of people experimenting with needing less in monetary wealth, but providing more for each other through non-monetary means. These communities served as fully functioning prototypes, demonstrating that a debt-less, money-less

existence could flourish within cities, which at the time were seen as the belly of the beast that was capitalism, and yet still operate outside of this economic system.

With each successive financial crash, these proofs of concept became more mainstream, filling in the gaps where financialization had failed. Almost three decades later, Hui put forth a proposal for each protocol to be assigned its own currency to keep track of the specific kind of value it enables and how it moves through a region. Still in pilot and experimentation phase, Hui and their team, who are situated across the Cascadia Bioregion, will be working on consolidating their learnings during local trials. Next steps will be to expand the proposal to the continental level, with the end goal of having currencies be adopted at the global level, as a new core protocol.

"The Food Systems Protocol uses AGRI credits to keep track of work hours spent planting and harvesting among other activities and is also the currency used to buy and sell any kind of food item, raw or processed. Directly tied to the AGRI currency, is the WATER currency that is employed by the Water Management Protocol. In turn, WATER is influenced directly by WSHED, RVR, and AQIFR currencies which track the health of water bodies in the region and how various restoration efforts in the region are faring."

According to Hui, each protocol is assigned its own currency and has specific dependencies on the health of other currencies. "If a river is contaminated, its currency value decreases and the flow may be stopped until it's safe again. When this happens, it's a sign to us that there's a value flow blockage that needs to be addressed properly before its unblocked or healthy currency value is assigned again," says Hui.

Hui explains that the agricultural system governed by the Food Systems Protocol creates a completely different kind of value that requires its own specific inputs, than the building construction system or communal care system, which are governed by their own protocols and use their own inputs. A one-size-fits-all currency, like the money that was previously in use, doesn't capture the whole picture or the needs of people, the currency users. Instead, different currencies are employed to track and measure each of these unique forms of value and make their

flow paths more visible and transparent as they flow through the city in the form of transactions.

"These currencies are a tool to make previously invisible work, like carework, visible again. It's like watching a river system from a satellite view. We can now see where a certain value, let's say housing, is being distributed across the city fully, and where there are blocks and it begins to overflow or stagnate in one place or within one person or organization," says Hui.

"It's used to realign our economy to actual value again. People don't work just for the sake of working anymore. Bullshit jobs, as they used to call them, just aren't monetarily viable within a currency system that's asset-backed by tangible and intangible forms of value," they continue. "I don't think I need much else except for good food, good company to take care of and be cared for by, and the occasional challenge of being stuck between a rock and a hard place, but the list of valuable things could go on." Δ

Zero-Sum Games

Together, all the currencies in use feed into Vancouver's local currency, called kelem. Along with other cities in the bioregion, kelem influences the value of the bioregional currency, CSCDIA, which Vancouverites use when visiting other localities within the bioregion. This is thanks to the pilot Currency Protocol, as well as the Mutual Credit Protocol, known as the MCP, that governs the regional gift economy system.

"The MCP is an accounting protocol that was adopted after the 2032 bank megacrash. When the financial sector collapsed under its own weight, people mostly went back to barter systems. Some communities, those which already had enough trust between them, adopted the earliest economic behavior, called gift economies.¹³ It's something most groups of friends naturally have, but to do it at the scale we wanted to at the time, we needed a credit-based system of exchange," says Caro Velez, an alternative economist and advisor on the design team for the pilot Currency Protocol.

During the 2032 megacrash, garden members developed a pen-and-paper mutual credit system that was later used to inform the MCP Protocol and test its pain points before being piloted across the neighborhood, and eventually the entire region, on the way to being adopted as a Core Protocol.

Velez describes the MCP as a way to acknowledge that value has been created and received within a gift-based economy. It's a simple balance of accounts that keeps track of transactions, but going both ways. Each person starts off at 0 in their accounts, but have

a limit on how much they can credit to others. In every transaction someone is credited x amount of currency and the other's account is debited x amount and both parties sign off on the exchange for it to go through.

"This system actually fits nicely within the plural currency approach that Dru is testing," Velez says, "We set the credit limit for everyone at the city's monthly living wage,¹⁴ which is 900 kelem, so everyone's initial range is -900 to +900 in how much they can receive—credit to others, and give—be credited from others. That's just our base credit though; through a combination of social reputation in the community, current needs or situation, and how much a person engages with and uses the mutual credit network, the credit limit expands. Instead of rewarding spending and the taking on of debt, like credit scores used to do, our system rewards trust-building and community contributions that are verified by the actual community," says Velez.

They provide an example of the MCP in action: "if I want to buy a shirt for 10 TXTILE (the currency used to track textiles and fabric), then the seller makes a note to change their account balance by +10, and, assuming I haven't bought or sold anything else, I would make a note to change my account balance by -10, from 900 down to 890."

In Velez's pen-and-paper system, manual transaction agreement sign-offs were needed; with the MCP, all transactions are set as agreed upon by default. However, all parties involved in the transaction are given the option to change or cancel the agreement both before and after transactions are made, given that

there are valid concerns and reasonable modifications. This is enabled through the integration of multiple conflict resolution protocols within the MCP.

"What's happening here is that every person now has the power to act like a bank. The difference is instead of issuing money, I get to issue an IOU that only counts for something if both parties in the transaction acknowledge it and accept the terms. When I buy that shirt, I don't give the seller 10 TXTILE, instead they make a note that they are owed 10 TXTILE so their account now tracks a change in IOU of +10. And I make a note that I owe 10 TXTILE through my account that tracks an IOU change of -10," explains Velez.



"No coins are being passed around, only people keeping track of IOU's which means, if there's enough trust and engagement between people in the network, at any time the network's total transactions approximately cancel each other out. It's a zero-sum game that we actually do want to be playing in this case," says Velez, "this way nobody needs to go into interest-accruing debt because all parties in all transactions acknowledge their IOU's, so the total balance between all parties will be around zero."

The MCP isn't without its challenges, however. For starters, a minimum threshold has to be met for number of participants and variety of the goods and services being exchanged. Without a critical capacity, it becomes difficult to keep the checks and balances averaging. Furthermore, the whole system relies on trust. Without it, the IOU-based system fails

as people become unsure if the value they've given to others will be returned when they're in need.

"Currency, whether it's an item, credits, or money, is only useful if it's changing hands, if it keeps being gifted," says Velez. "When it gets hoarded by a few people or if the flow of it gets blocked from continuously circulating through the system, then that flywheel starts to break down, and we're no longer able to meet each other's or our own needs. That's when people start to look elsewhere, usually in places where there is less trust. It's also when and why money and debt were first adopted by people, to govern exchanges between people they didn't know . . . and didn't trust."

"By the time 2030 rolled around we became a 'mongrel' city," recounts Otieno. "We were all just a bunch of strangers living side by side, unused to living so close together and with no good opportunities for connection. It was diversity gone wrong, because no one knew each other," they continue.

"It's funny, after the banks and our ag industry collapsed, there was a switch. Once people were forced to help each other and realized that they could feed themselves and feed their neighbors, they began wondering why they hadn't done it before. It was like a factory reset was initiated within the community, altruism became people's default setting again."

"And all we had to do was start talking to each other, go through the awkwardness of seeing each other consistently, and meeting each other over and over again at that common ground that survival created for us, despite our differences," recounts Otieno. "It felt like a light was finally turned on in the room and we could all see each other's faces, clear as day after a long, long time in the dark."

In 2002, an ecological experiment was initiated in what was then Jena, Germany, to better understand plant diversity and its effects on ecosystem functioning. It was the longest-running and most well-known biodiversity experiment in the world.¹⁵ After hundreds of trials accounting for all kinds of conditions, it was found that areas that had a higher diversity and density of plants consistently created better-functioning and more stable ecosystems.

"The Jena experiment validated the fact that each individual plant's health and the ecological community it was a part of would actually be better for having more mouths to feed, not burdened by it as we would typically think

would be the case. Each individual became more efficient at not only taking in resources and making use of less, but also in sharing more resources. It's even more counterintuitive that this was found to be especially true when resources were scarce or when the community was in danger from pests, drought or otherwise," explains Otieno.

The study showed there were some conditions to the benefits of diversity, however, which only began to take effect when at least four functional groups or different plant species were present and increased as the number of plants in each species increased. When this minimum diversity threshold was met, researchers saw it triggered a change in the behavior of the fungal network that supported the nutrient and water uptake of the plants towards mutualism, rather than competition

or parasitism seen in less diverse and dense plantings.

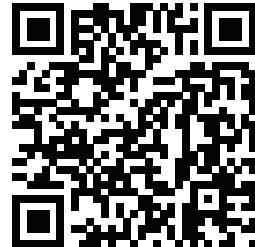
Otieno looks around at the street gardens teeming with end-of-summer life, "there aren't any clear cut borders or boundaries around here anymore, it's all a bit messy and undefined." They shrug. "But, it's messy with intent; it's messy, because it works." △

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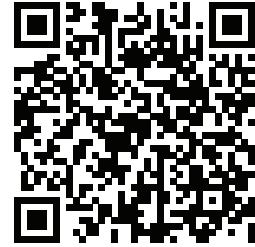
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