Introducing

OPEN FARMING

GROWING OUR CAPACITIES TO FARM WISELY AND FEED OURSELVES WELL

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Who is the document for?

Impact investors.

Those who appreciate we still have much to learn from natural systems.

Those who understand that nothing less than systemic transformation will suffice. Now.

In this doc

What does Open Farming change?

Open Farming replaces innovators' monopoly rights under legal code with revenue share under software code.

How does it make its way into the world?

We prove the system profitably in partnership with ESG agri-food investors who lead investees to the Open Farming intellectual commons.

What's the immediate impact?

It enriches and illuminates the interconnectedness, grows the commonwealth of knowledge, and opens up contextualised innovation for everyone.

What's the ultimate outcome?

Open Farming helps make fresh, nutritious and affordable food available to everyone, everywhere, everyday — regeneratively.

The lay of the land

Current food production is extractive, wasteful, and harmful to human health[1].

The economic environment of today's eco-agri-food system is "distorted by significant externalities, both negative and positive, and a lack of awareness of dependency on natural, human and social capital."[2] Approximately a third of the world's topsoil has been degraded through the use of fertilisers, and over 90% could be degraded by 2050 at the current rate[3].

The OECD writes[4]:

> The collective global effort to mitigate GHG emissions in the agricultural sector has been weak. A continued lack of progress could lead to direct and indirect emissions from agriculture becoming the largest source of global emissions by mid-century as more rapid decarbonisation in other sectors is anticipated.

Ultimately, it's argued that farming is "the most destructive force ever to be unleashed by humans."[5] This is all the more concerning in light of the Stockholm Resilience Centre's observation that "all the sustainable development goals are directly or indirectly connected to sustainable and healthy food."[6]

Agriculture doesn't just represent a mitigation opportunity (smaller debit), it can also contribute to restoring, preserving, and enhancing (credit). A projection from 2014 to 2100 for example estimated the global soil organic carbon sequestration potential of agricultural land as ranging between 31 and 64 gigatonnes contingent on land use practices[7].

The variety of the global diet is reducing, precariously, to a 'Global Standard Diet' alongside the Global Standard Farm[8], and demand for food is growing with population growth. An estimated 815 million people were chronically undernourished in 2016[9], and an estimated 2.1 billion people were overweight or obese in 2013[10]. Malnutrition and diet are by far the biggest risk factors for the global burden of disease[11], and the Security Council of the United Nations officially acknowledges the link between hunger and conflict[12].

Yet despite all this the current trajectory for the system is just bigger 'big ag', aka corporate farming, and this does not serve any stakeholder well. A hegemony of companies could centralize farming, own it, and so propagate the mindset and modus operandi that got us into this situation in the first place.

Such a fate is signposted by the proprietary oligopolistic provision of information processes integral to digital farming. When the digital process of farming is owned by a few powerful IT companies, every farmer may be said to become a tenant farmer[13]. The same proprietary network effects that have played out on the web will leave farmers disempowered with little freedom to reverse course, making them ever more susceptible to corporate farming.

The eco-agri-food system is complex, and the consequences of the status quo grow worse with each passing year. The system is stuck in the mother of all Nash equilibria.

Root causes

The system is stuck. We have identified two related root causes.

Monopoly capitalism

Intellectual property (IP) rights, effectively a rebranding of monopoly rights, frustrates adoption and adaptation by design. In claiming property rights a party asserts by default that no-one else may apply or tweak its innovation, and this is frequently extended to encompass corresponding digital services. Only upon an upfront legal and commercial transaction may another party put the innovation to work under restrictions detailed in adhesion contracts.

This is business as normal.

> Property rights in patents and copyright make possible the creation of a scarcity of the products appropriated which could not otherwise be maintained.[14]

The English monopoly rights legislation of 1624 was a huge leap forward for incentivising innovation, but it's widely appreciated that the IP system is no longer fit for purpose[15],[16]. The situation is systemically harmful in the context of vital complex adaptive systems.

> … it is clear that the most grave crises facing present and future generations are the consequences of reductionism of complex systems. The vitality of living systems is found in their interrelationships.[17]

In propertising anti-rivalrous resources, IP undermines the ease of connectedness and any corresponding contextualised legibility that might assist collective sense-making, meaning-making, and the recursive actions characteristic of all living processes. The natural beneficial co-evolution of the system — of the essential properties of the whole that cannot be found in the parts — is hobbled.

IP is a malignant consequence of a series of unfortunate historic accidents and path dependencies. This 17th Century industrial age contrivance is woefully inadequate for the 21st Century knowledge age.

> While several conceptual models of food systems are available, they tend to present the food system as a relatively controllable or even static entity which has different components or domains. The reality is very different. … The scale and complexity are immense …[18]

We have understood the nature of complexity and the complexity of nature for many decades, and sensed it for millennia, yet our necessary recognition and embrace of complexity is sabotaged by monopoly capitalism. Monopoly capitalism is effectively anti-biomimetic, i.e. you won't find anything like it in natural systems, and this should ring alarm bells.

In short, *intellectual property* is a category error and, after four centuries, an upgrade is urgently needed.

The context of Open Farming may then be summed up with this pithy observation:

> In managing the commonwealth of nature, our big problem is that we tend to treat the truly scarce as if it were non-scarce.
>
> The opposite problem arises with the commonwealth of knowledge, in which we tend to treat what is truly not scarce as if it were.[19]

Open Farming addresses deep ecological challenges and opportunities epitomized by the first sentence by addressing the second, systemically.

Integrating "externalities"

While there are initiatives to better illuminate and recognise the poor systemic consequences economists refer to as externalities, there is no realistic or natural mechanism yet by which the information describing such consequences becomes integrated and so influential in our sense-making, meaning-making, and actions.

The website of the UN Food Systems Summit 2021 defines *food system* as the constellation of activities involved in producing, processing, transporting and consuming food.[23]

This is unfortunate. It is inaccurate.

Constellation is synonymous with *group* or *set*, and does not therefore capture the essential qualities of a system arising from interconnectedness, the very qualities from and through which systemic transformation arises.

One has to dive into the Food Systems Summit science reader[24] to find a rigorous and so helpful definition.

> Food systems embrace the entire range of actors and their interlinked value-adding activities …
>
> Conceptualising food systems entails defining systems boundaries and systems building blocks and linkages among them, while simultaneously being connected to neighbouring systems such as health, ecological, economy and governance, and the science and innovation systems.

Vital questions

How can we disseminate and contextualise the know-why, the know-how, and the corresponding technologies 1000x faster? And improve them faster too?

How can we integrate the information about the systemic consequences currently referred to as externalities?

How can we play to the cooperative nature of human community[20],[21] and the cooperative culture of the agriculture sector[22], while also deploying mechanisms to appeal to self-interest in line with system-interest and deny free riders?

Nature's way

Humanity has never aimed to change the global food system on the transformative scale now required and no single actor or breakthrough is likely to catalyse systems change[25]. Yet Open Farming can play a fundamental role founded on one straightforward conclusion — nothing about the global food system should be regarded as intellectual property (IP), as a monopolistic right, when we can now nurture a generative alternative together.

Open Farming replaces the agri-food system's most unnatural reliance on monopoly capitalism by nurturing the rich information flows you expect to see in natural systems, cultivating an intellectual commons (IC) and elevating cooperation to complement competition. Grounded in the complex interrelationships involving soil, food, human health, economics, technology, family, culture, organisation, land, place, biodiversity, and climate, Open Farming is dedicated to our collective and contextual wisdom and abilities to participate as nature. This encompasses the biomimetic qualities of decentralization. Free and effective enterprise is encouraged to flourish within the Open Farming ecosystem, at community and bioregional scales, decentralizing and enabling rather than centralizing and controlling (Figure 1).

> If one way be better than another, that you may be sure is nature's way.[26]

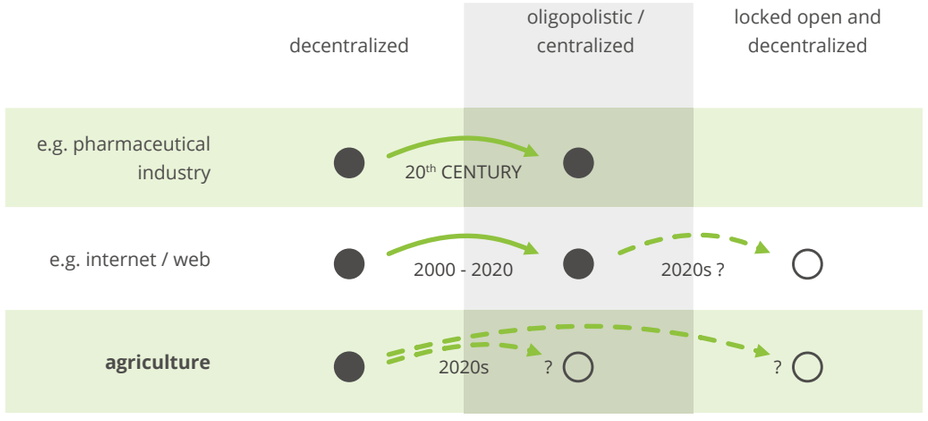

Figure 1. Where next? Oligopolistic / centralized? Or locked open and decentralized?

Open Farming vastly improves the richness and visibility of the information flows: informing the know-why and know-how; representing the technology and processes in all their requisite variety; arising from activities involving the applications of the technology and processes; and describing the agricultural, social, political, and environmental contexts. It breaks the four hundred year-old shackles of monopoly rights to the advantage of all stakeholders, including innovators. It expedites and amplifies research and development and its application. It makes the system more visible non-adversarially and expands stakeholder representation and participation. It enables communities to bring so-called externalities inside as soon as the multi-stakeholder consensus tips in favour of doing so. The richer the information flow and the wider the participation, the sooner this transition.

The system constitutes platform cooperativism[27], protocol cooperativism[28], and feedback infrastructure[29]. It combines competition and cooperation in a way we believe Adam Smith would approve[30].

A limited comparison with smartphone ecosystems can be made. Such ecosystems entail hardware, software, and services (data flow). No vendor nor customer can secure anywhere near the value absent the services. Similarly, it would be irrational for the farmer to operationalise hardware and software without the service to help make sense of the multiple variables to inform their decision making and farm plan — they simply won't be competitive nor the best custodians of the land they might otherwise be. And while the hardware and software peer licensing[31] will preclude the farmer joining a competing service, why would farmers show any preference for a third party service over their own cooperative?

Continuing the comparison with the smartphone market, Apple profits with iOS whereas Google profits because of Android[32]. The 'with' model is very well understood and dominates most markets. 'Because of' is fundamentally disruptive, driving network effects that compound it. Open Farming is 'because of'. Its non-proprietary network effects produce an open, decentralized, cooperative ecosystem with which traditional IP-based businesses can't compete. To remain competitive, they too will choose Open Farming.

Nature's way cont.

The architecture and process

The Open Farming Cooperative Co. is a federation of traditional and DAO farmer cooperatives. It provides the digital farming services to its members via FarmOS[33] (and equivalents) and secures the revenue-sharing process to help establish a system of cosmo-localism[34].

The system must serve both the competitive and cooperative nature of the ecosystem. We need the ecosystem to learn from the experiences of all farmers in their endeavours to grow a specific tomato crop sustainably for example, with appreciation for local contexts, and yet at the same time respect farmers' confidentiality.

The calculation of the amount owed by a farmer to all the innovators and service providers involved in production — the revenue-share — is private information. Open Farming Cooperative Co. does not need to know the accounts. The Cooperative just needs to know that the farmer has paid what's due when it's due, withholding information services otherwise. In other words, the Cooperative's system gets out of the way other than to necessarily frustrate free riders. The confidentiality of innovators and service providers may be similarly protected.

Innovation may be deployed in situations where the viability is insufficient to contribute a revenue share. This does not detract from the innovation business model. On the contrary, it helps subsistence farmers get by until their success takes them to a level of contributing.

The enabling Web3 technologies are abstracted away. We have all the social and technological know-how.

Figure 2. Delivering greater value for all stakeholders.

Nature's way cont.

System shift

Shifting the agri-food system from today's normal — away from its reliance on anti-biomimetic intellectual property and towards the regenerative, more natural, and more inclusive intellectual commons — requires leadership by example.

We are allying with the sector's ESG-motivated investors, community conveners, and thought leaders, helping them appreciate and support Open Farming.

We recognise this isn't a walk in the park. As the Yunus Centre team at Griffith University observes:

> … working through a systems lens runs counter to much of what we're used to … while there is a growing realisation that complex challenges require 'systems of interventions and system innovation', we are not yet investing with that mindset. … the mechanics of allocation remain largely the same, … growing portfolios of 'single point solutions'.[35]

As such, we are identifying investors and investor networks that are well along the path to working this out for themselves, such as the Good Food Finance Network, co-founded by our partner the EAT Foundation. The Network's Good Food Finance Facility is a financial and coordinating mechanism designed to drive investments that support the transformation of global food systems toward sustainability, equity, and resilience.

Open Farming is considered a significant contributor to the overall massive transformative purpose of this unprecedented strategy, subject to our securing funding and becoming a viable concern. The objective is for the Network's participants to make the transition from IP to the Open Farming intellectual commons a condition of future investments, and so lead their investees in the shift to the top right quadrant (Figure 3).

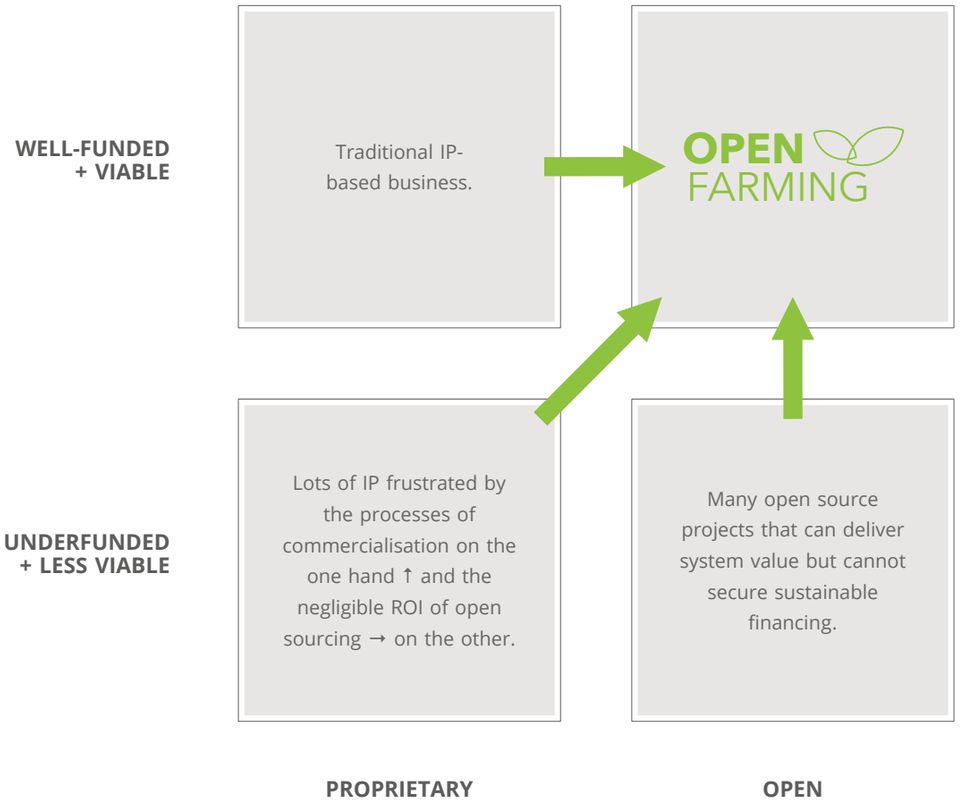

Figure 3. Establishing the top-right quadrant — open and viable.

Nature's way cont.

Motivation for a natural transition

Monopoly capitalism is entrenched. The structural properties of social systems are both medium and outcome of the practices they recursively organise[36] — or in plainer terms, it would be a futile exercise to ask one, or a hundred, or ten thousand farmers to subjugate profit-seeking as the guiding principle and adopt a more balanced set of metrics. Uptake would be miserable and would likely revert.

Quite simply, individuals cannot effect the change individually because the current system cannot value their efforts. The necessary transition requires some cooperation.

We don't have time to await a collective epiphany[37], and yet a mono-phase revolution is impossible; there is no techno-solutionist fast-track from zero to hero. As such, the renowned systems thinker Gregory Bateson leaned towards mechanism design, approaching system design so that its operation by and corresponding incentives offered to those involved are such that the system trends towards a desired state.

Open Farming is designed on this basis. Directed yet adaptive. Revolutionary yet evolutionary. Working with rather than against stakeholders' motivations at each stage.

We have designed for a natural, compelling transition (Figure 4). Different markets and bioregions will progress according to local contexts, and that is a strength not a weakness.

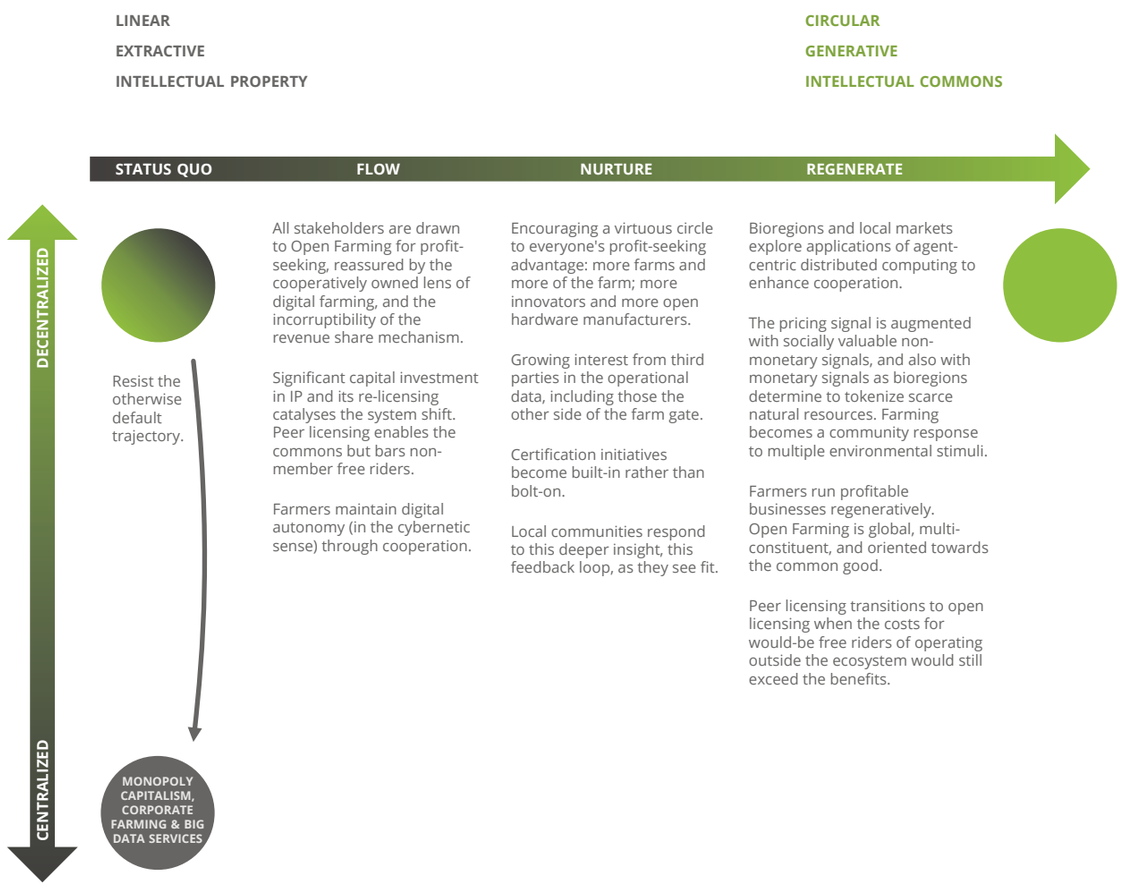

Figure 4. A natural transition.

Nature's way cont.

From the perspective of doughnut economics

> Humanity's 21st century challenge is to meet the needs of all within the means of the planet. … The Doughnut of social and planetary boundaries is a playfully serious approach to framing that challenge, and it acts as a compass for human progress this century.[38]

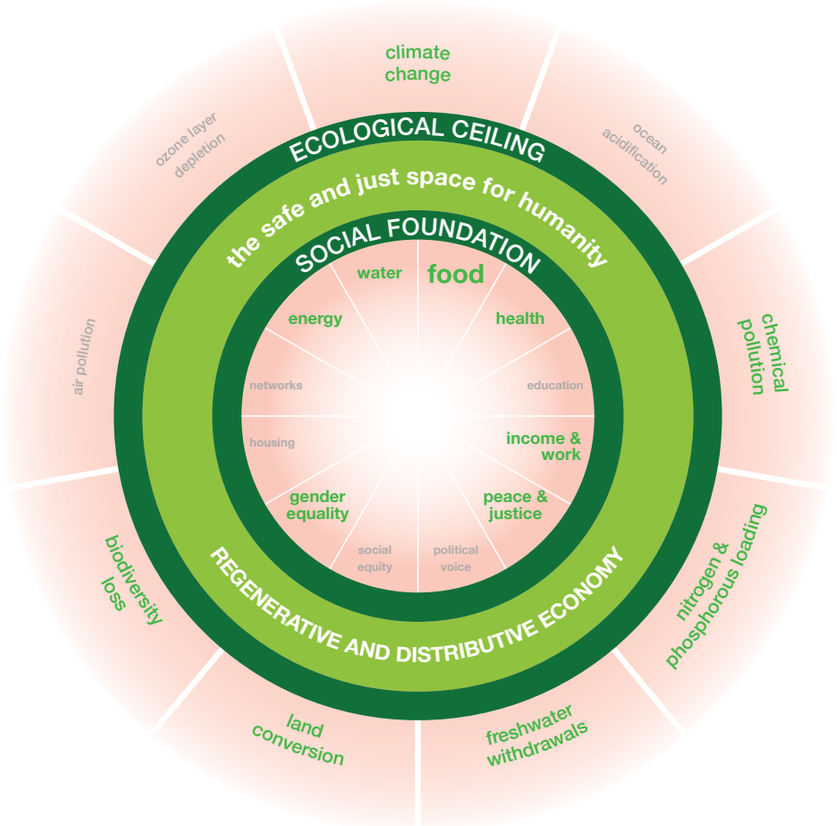

Figure 5. Open Farming helps improve those social dimensions and planetary boundaries of the doughnut shown here in green.

Supporting statements

Here are three authoritative appeals for the transformation Open Farming exists to realise (bold emphases added).

The Consultative Group for International Agricultural Research (CGIAR) Independent Science & Partnership Council (ISPC) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) note[39] that:

> A number of recent studies of current and future agriculture and food trends and challenges have argued that **component technology and piecemeal innovation will be inadequate to ensure sustainability** …
>
> The concept of an agri-food system has emerged … **Agri-food system innovation will involve rethinking how research and innovation are deployed to transform the social, economic and environmental performance of the agriculture and food system**.

The Intergovernmental Panel on Climate Change (IPCC) observes[40] that:

> … **actions to build individual and institutional capacity, accelerate knowledge transfer, enhance technology transfer and deployment, enable financial mechanisms**, implement early warning systems, undertake risk management and **address gaps in implementation and upscaling** [can be taken] to address desertification, land degradation and food security while supporting longer-term responses that enable adaptation and mitigation to climate change.

The International Panel of Experts on Sustainable Food Systems (IPES) warns specifically against further consolidation of corporate farming, concluding[41] that:

> **a shift towards diversified and decentralized innovation, locally-applicable knowledge and open access technologies — a new 'wide tech paradigm' — is urgently needed to harness the benefits of Big Data for all**.

Donella Meadows' leverage points [42]

6. The structure of information flows It's important that the missing feedback be restored to the right place and in compelling form.	Monopoly rights (aka intellectual property rights) frustrate the rich information flows that characterise a healthy ecology. Open Farming liberates and nurtures information flows in intellectual commons.
5. The rules of the system E.g. incentives, punishments, constraints.	Rules are challenged and changed when new information makes old rules look increasingly questionable, and when a new system accommodates a greater variety and ease of rule construction.
4. The power to self-organize system structure The ability to self-organize (add, change, evolve) is the strongest form of system resilience.	Open Farming inculcates both multi-level governance and cosmo-localism. Stir in richer information flows and fecund rule-forming affordances, and a dynamic holarchy is a more natural outcome.
3. The goals of the system Even people within systems don't often recognise what whole-system goal they are serving.	Whole-system goals are illuminated through agentic conversation (per rule-making and self-organizing) informed by rich, heterogeneous information flows and corresponding feedback loops.
2. The mindset or paradigm ... from shared social agreements about the nature of reality, come system goals and information flows, feedbacks, stocks, flows and everything else about systems.	The commons is a well-established paradigm, albeit subordinate to IP in narrow but vital, deep, and pervasive contexts. The paradigm will shift as soon as the intellectual commons becomes demonstrably superior.
1. The power to transcend paradigms ... to realise that NO paradigm is "true".	The etymology of *paradigm* is the Greek word for pattern. What is the pattern that connects? An intellectual commons makes it easier to explore the question and form novel hypotheses.

The shift

Farming under the IP paradigm	Open Farming intellectual commons
17th Century industrial age contrivance	21st Century knowledge age necessity
Information is propertized and constrained	Information is not propertized and flows naturally
Business model constrains adoption and adaption	Business model nurtures adoption and adaption
The system is perceived mechanistically	Illuminates and enacts interconnectedness and contexts
Participants act mechanistically	Participants guided to act systemically
So-called "externalities" live up to their name	So-called "externalities" become integrated
Collective intelligence and wisdom constrained	Collective intelligence and wisdom better able to flourish
Indigenous knowledge and wisdom excluded	Indigenous knowledge and wisdom integrated
Time and money wasted working around IP's defects	Time and money directed to generative cooperation

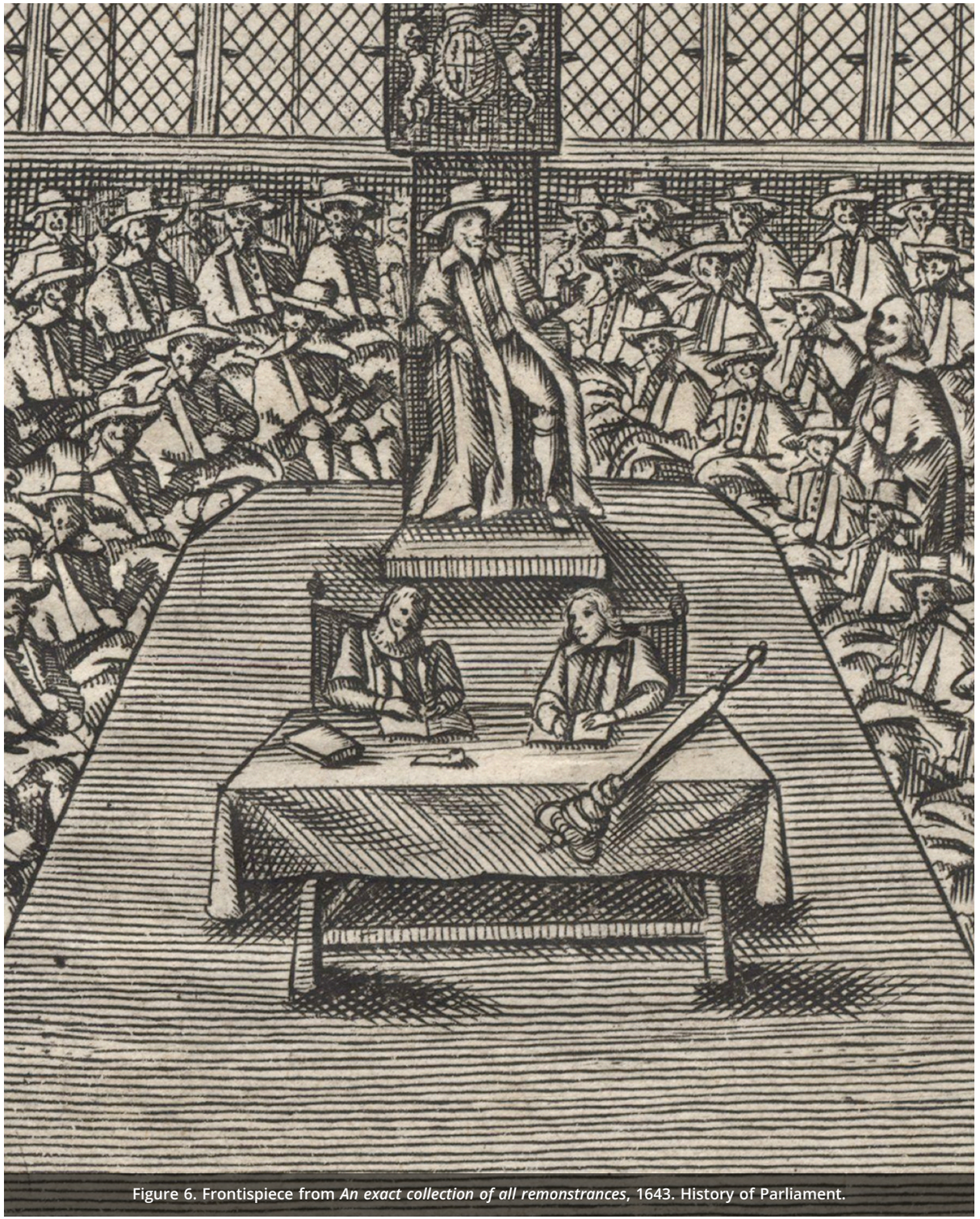

Figure 6. Frontispiece from *An exact collection of all remonstrances*, 1643. History of Parliament.

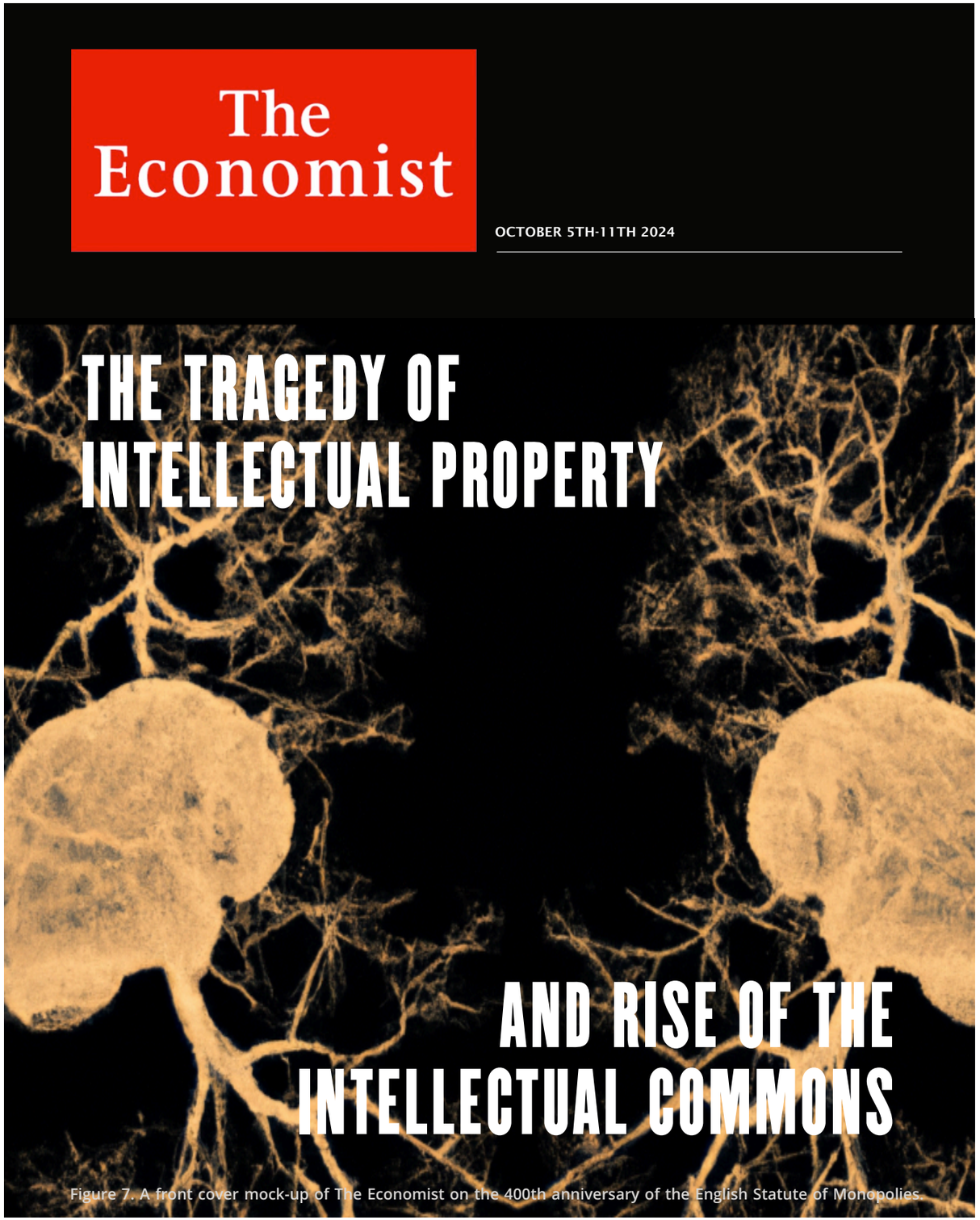

Figure 7. A front cover mock-up of The Economist on the 400th anniversary of the English Statute of Monopolies.

Partners

THE EAT FOUNDATION

An international foundation with three core partners: The Stordalen Foundation, the Stockholm Resilience Centre, and the Wellcome Trust.

EAT exists to: expand scientific knowledge on the interconnections between food, health, and environmental sustainability; spur innovation along the food value chain; and facilitate the development of evidence-based policies to radically transform the global food system to be able to deliver healthy, affordable diets to a growing world population within the planetary boundaries.

EAT co–founded the Good Food Finance Network with the UN Environment Programme and FAIRR, a $70tn ESG-motivated agri-food investment network. The Good Food Finance Network's Good Food Finance Facility will be the agri-food cornerstone of COP28 (December 2023), setting a new standard in the systemic application of finance.

eatforum.org

THE P2P FOUNDATION

Researching, cataloging and advocating for the potential of P2P and commons-based approaches. Sharing knowledge and developing tools to create common value and facilitate open, participatory input.

p2pfoundation.net

Partners cont.

WOLFE'S NECK CENTER FOR AGRICULTURE & THE ENVIRONMENT

A demonstration farm and educational resource center for innovative practices in regenerative agriculture, connecting farmers, eaters, and learners to the land and animals at the core of our food systems.

wolfesneck.org

THE INSTITUTE FOR THE COOPERATIVE DIGITAL ECONOMY

The only independent research institute dedicated to studying the cooperative digital economy. Building a body of knowledge that advances platform ownership and democratic governance.

platform.coop/about/icde

DIGITAL GREEN

A global development organization that empowers smallholder farmers to lift themselves out of poverty by harnessing the collective power of technology and grassroots-level partnerships.

digitalgreen.org

Partners cont.

OpenTEAM

OPEN TECHNOLOGY ECOSYSTEM FOR AGRICULTURAL MANAGEMENT

A collaborative community of farmers, ranchers, scientists, researchers, engineers, programmers and food companies committed to improving soil health and advancing agriculture's ability to become a solution to climate change through the co-development of an interoperable suite of tools.

openteam.community

farmOS

farmOS

A modular, extensible, web-based application for farm management, planning, and record keeping developed by a community of farmers, developers and researchers.

farmos.org

OPEN FOOD NETWORK

THE OPEN FOOD NETWORK

A global network of people and organisations working together to build a new food system. Together, we develop open and shared resources, knowledge and software to support a better food system.

openfoodnetwork.org

Structure

Open Farming Co.

The founding entity.

- Assembles the team and advisory board
- Develops the technical and legal code
- Defines the governance framework
- Encourages Open Farming adoption by ESG-motivated investors i.e. transitioning investees from IP to IC
- Attends to ecosystem / community development
- Establishes Open Farming Cooperative Co.

Open Farming Cooperative Co.

The farmers' cooperative; a federation of traditional and DAO cooperatives and associations. The platform cooperative providing digital farming services and securing the revenue-sharing process.

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