

Beating the bounds: how does ‘open source’ become a seed commons?

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In response to ongoing plant genetic enclosures, the Open Source Seed Initiative (OSSI) is creating a ‘protected commons’ for seed. It is a project, I argue, that reflects characteristics of a growing transnational commoning movement. From the Zapatistas to seed wars, such movements draw attention to commons not simply as a resource, but as a dynamic and evolving social activity: commoning. In the US, OSSI includes 38 plant breeders, 48 seed companies and 377 crop varieties. Yet challenges remain for OSSI to gain wider legitimacy for ‘freed seed’, to build trust in a moral pledge, and to establish fair guidelines for which people and which seed can participate in making the commons. Using the metaphor of ‘beating the bounds’ – a feudal practice of contesting enclosures – I ask how OSSI defends the commons in intersecting arenas. The first way is legal, as OSSI negotiates a move from contract law toward moral economy law. Next is epistemic, as an informal breeder network revitalizes farmer knowledge, while proving more structurally able and culturally equipped to lead commoning efforts. Finally, I reflect on the nature of boundary beating itself, aided by Global South movements. Seed sovereignty perspectives suggest room for a pluriverse of commons to grow.

Keywords: commons; seed sovereignty; open source; plant breeding; agroecology; intellectual property

1. Introduction

C.R. Lawn has lived the enclosures of seed. As founder of the Fedco seeds cooperative, he saw fungicide treatments become ubiquitous in the 1980s, and decided to stop selling treated seeds to protect worker health. In the 1990s, as genetically modified crops came online, he placed a moratorium on the technology out of concern for unknown consequences. Nine years later, when Monsanto bought out Seminis, Fedco’s largest supplier of vegetable seeds, the co-op began boycotting the company, because, Lawn explains, ‘we could not in good conscience sell their varieties’ (Lawn 2016). In 2015, Fedco took a stand against intellectual property when it stopped selling any seeds covered by utility patents. The patents, Lawn says, are part of a broader phenomenon: ‘We have privatized our common wealth in the hands of the few at the expense of the common good’.

C.R. Lawn and his Fedco growers and packers are not alone in these deliberate rejections of seed enclosures. They are part of a movement gaining traction in many parts of the world, Global North and South, that refuses to adopt the standard narrative: that agrobiodiversity is a natural resource best managed as private property; that innovation will not occur in the absence of patents, licenses and other intellectual property (IP) rights; that seeds are the result of individual ingenuity, rather than the collective and intergenerational knowledge that coevolves with plant genes, soils and climates. But from India to Peru,

France to the Philippines, seed sovereignty movements are now advancing a radical discourse of repossession, seeking to reclaim that which has been appropriated, privatized and separated from the everyday and practical experience of farmers and farmer–breeders.

This paper traces a novel expression of seed sovereignty that emerges from something old: the concept of a ‘commons’. Defined as social or natural resources not owned by anyone, but over which a community has shared and equal rights, the commons goes back many centuries in agrarian history, their enclosures marking a crucial juncture in the transition from feudalism to capitalism (Thompson 1975). Much scholarship has expanded the purview of such ‘primitive accumulation’, underlining its ongoing character, and generalizing its conceptual purchase across country and city, core and periphery, and intellectual and material territory (Harvey 2003; De Angelis 2004). Reviving the commons, then, can be understood as countermovements to reclaim this vast wealth. From MST land resettlers to Linux communities, worker-reclaimed companies to community gardens, sharing resources in common is making a comeback (Bollier and Helfrich 2015; Azzellini 2016).¹ Both emerging from and informing these social movements, theory of the commons has expanded from a strong traditional base in rural and natural resources to consider urban landscapes, infrastructure, digital spaces, and sites of social and cultural reproduction. Within this ‘new commons’ literature, knowledge and labor have been explicitly theorized *as* commons, and – some would argue – few commons can exist without either or both.

I add to the burgeoning new commons literature by looking at commons as a biocultural form, specifically in relation to seeds. Scholarly emphasis to date has been primarily on rules and institutions of resource management, following the principles of a well-governed commons (Ostrom 1990). My argument is that seeds afford the opportunity to shed light on the politics and practices of access to biological and cultural means of reproduction. We can consider how community rules, values and practices of making new seed varieties – or plant breeding – are at once driven by and shapers of particular geographical, ecological and climatic landscapes. We can explore how genetic diversity is produced and/or lost through histories of legal, scientific and biological dispossession.

Following recent contributions to commons scholarship, I emphasize commons as a living, dynamic field of practice – not simply a resource divided amongst people, but a social transformation developed in and through the practices of *commoning* (De Angelis 2004; Linebaugh 2008, 2014; Federici 2011; Bollier 2014). Moving from noun to verb, this formulation also puts greater emphasis on the people and communities intrinsic to the commons – not just on the water, but on the water protectors; not just on the seed, but on farmers, seed savers and plant breeders. These people, in community, must devise the protocols and practices intrinsic to producing, marketing and distributing resources as a collective subject. Where commons are being re-established (when they have been eroded or lost), communities must actively recruit participants, build their resources, and work to inculcate norms of cooperation, sharing and non-proprietary values. In this way, commoning helps us appreciate that commons do not just exist; they must be *produced* and *reproduced*, negotiated and renegotiated, learned about and labored over.

This paper traces the origins and early development of the Open Source Seed Initiative (OSSI), which seeks to ‘free the seed’. It is a project, I argue, that reflects the characteristics of a growing transnational commoning movement. Founded in 2012 by a small cohort of US-based public plant breeders, social scientists and non-governmental organization

¹MST is the *Movimento dos Trabalhadores Sem Terra*, or Landless Workers Movement, of Brazil.

(NGO) allies, OSSSI disavows traditional intellectual property rights. Instead, it proposes, plant genetic materials can be shared within a ‘protected commons’, with access rights guaranteed by a simple moral pledge. In the US, OSSSI now includes 38 breeders, 48 seed companies and 377 varieties. Yet challenges remain for OSSSI to gain wider legitimacy for ‘freed seed’, to build trust in a moral pledge, and to establish fair and just guidelines for what kinds of seed – and thus, which communities – can participate in making the commons. Boundaries are central to understanding commoning processes, as lines of inclusion and exclusion delimit what constitutes the resource and what does not, who participates in community and who does not, and which beliefs and values are reified – and which are not. Using OSSSI as an example, I consider boundary-making in terms of ‘beating of the bounds’, a contemporary take on the feudal practice of defending common territory through uprooting any visible fences, hedgerows or other medieval technologies of enclosure (Linebaugh 2008). I ask: How are OSSSI’s boundaries being beaten, and by whom? What are the different practices, material and immaterial, of defining and defending its perimeters? Whose seed knowledge is included and to what effect?

To begin, I lay out the theoretical precedents of commons theory. Taking a political ecology approach, I consider how OSSSI proposes a radical solution through commoning: the annihilation of exclusive property rights to crop genetic resources.² I explore how participants in OSSSI are beating the bounds in three related areas. First, I follow how OSSSI struggled with early boundary formation, self-organizing as a community with shared principles as it transitioned from a licensing approach to a moral economy pledge. Second, I trace patterns of redefining expertise, as OSSSI is reclaiming a commons around informal – not just formal – knowledge. Using Gramsci’s concept of ‘organic intellectuals’, I consider how OSSSI members are defending the commons through reaffirming subaltern vernaculars of breeding knowledge and practice. Finally, OSSSI is based in the US, with a commons particular to late-stage capitalism. But it does not exist in an epistemic or resource vacuum, and I examine how Southern civil society and indigenous movements have responded to open-source models, and what implications this boundary negotiation has for unified yet differentiated movements for commoning seeds. I conclude that beating the bounds plays a central part in shaping the ability of commons to coalesce, grow and endure.

²Since becoming aware of the OSSSI in 2013, I have done field research in Washington State and California visiting small-scale farms, extension stations, seed companies and public seed libraries that support local plant breeding and more equitable access to seed. In 2014, I visited OSSSI board member Alejandro Argumedo in Peru to learn about indigenous practices in Parque de la Papa, a coalition of five Quechua communities near Cuzco. Interviews with US-based OSSSI board members and affiliated freelance breeders were conducted in 2016 and 2017, and I distributed a survey about open-source seed to key seed sovereignty informants in Venezuela, India, Mexico, the US and Canada in late 2016. Follow-up interviews with civil-society groups deepened my understanding of peasant and indigenous concerns. Dates for primary interviews are included in the text below; all were accompanied by extensive follow-up correspondences. Document analysis was another important pillar of inquiry: I conducted a literature review on biotechnology and intellectual property laws for seed from 1930 to the present; reviewed the history of land-grant science and breeding; and studied texts on international governance frameworks for plant genetic resources. These provided a strong picture of ‘enclosures’ against which I could situate OSSSI and its open-source pledge. In addition to the aforementioned interviews, I analyzed the language and practices of freelance and professional breeders in a variety of media: trade press books, mail-order seed catalogs, seed cooperative and company websites, gardening blogs and popular science articles. I coded the discourses visible in all of these materials, providing the basis for a qualitative assessment of how dynamic resources, communities and social protocols configure OSSSI as a commoning practice.

2. Commons: from tragic herdsmen to cooperating commoners

For two generations, the very idea of the commons has been dismissed as a misguided way to manage resources: the so-called tragedy of the commons. It should come as no surprise, really. Affirming competition as the defining characteristic of human relations, Hardin's logic – spelled out in a 1968 essay – fit perfectly into then-congealing neoliberal designs. Yet starting in the 1970s, a young political scientist named Elinor Ostrom became interested in a heterodox question: what happens when communities cooperate to manage their resources? Gathering data on so-called 'common pool resources' (CPR) – those over which no one has private property rights – Ostrom's team surveyed the decisions and strategies that peoples around the world used to govern fisheries, forests, communal landholdings and other CPRs vulnerable to over-exploitation and free-riding. The overwhelming evidence pointed to communities working together to manage their resources sustainably. The key, Ostrom (1990, 29) wrote, was figuring out how to 'organize and govern themselves to obtain continuing joint benefits when all face temptations to free-ride, shirk, or otherwise act opportunistically'. By 1990, when *Governing the commons* was published, Ostrom had come to some conclusions about this social organization. Known as the eight design principles for governing a long-enduring commons, they have become the cornerstone for what is now a large field of commons scholarship. Ostrom suggests, for example, that commons must have clearly defined boundaries so that participants know who has authorized rights to use a resource. Similarly, rules for using a resource must take into account local conditions and must include limits on what can be taken and how.

A next generation of scholarship has built upon Ostrom's work to apply her principles to different forms of commons, including knowledge and intellectual commons (Bollier 2005; Benkler 2006; Madison et al. 2009), digital commons (Lessig 2004; Benkler 2006), cultural and civic commons (Bollier 2003; Benkler 2011), and state trustee and global commons (Barnes 2001; Vogler 2012). Yet Ostrom still operated within a highly institutional framework that left unchallenged some basic precepts about 'rational actors' and functionalist decision-making in the design of a commons. She did not treat macro-economic structures in depth, nor did she treat the micro-scale psychological dynamics or interpersonal relationships that might animate a commons. As Bollier puts it, Ostrom's scholarship laid the groundwork for a profound reconceptualization of economic analysis and the role of the commons in it – 'without taking the next step: political engagement' (Bollier 2016, 6).

The energy of the commons today is found in an eclectic cadre of activists, organizers, peasants and urban citizens who have embraced the commons as a paradigm for social change. The significant role of social movements in helping revitalize commons can be seen in a plethora of actions across the Global South since the late 1990s, often in response to trade liberalization and structural adjustment. Iconic examples include the Zapatista uprising in Chiapas (Federici 2011), anti-biopiracy movements in India (Shiva 1997) and Bolivian struggles against water privatization (Barlow and Clarke 2005). Demanding rights to land, water, seed and local decision-making authority, the commons is conceptually linked to food sovereignty struggles. In Europe and North America, commons movements take on a different character, emphasizing the reclamation of public services and spaces progressively privatized by the neoliberal state. Disappearance of the urban public square is one active site, with people working to revitalize city plazas, parks and other sites of non-commercial gathering. While the internet has certainly birthed many new commoning spaces – Wikipedia, Science Commons and Arxiv.org – many commoners are less interested in digital hubs than in cooperative sharing of clothing, food and work equipment.

From urban gardeners to net neutrality activists, the diversity of Global North commoning reflects the cosmopolitan reach of capital, which has sought to enclose all aspects of ‘industrial’ life, from health, education and transportation and to science, communications and even language.

But this is not to suggest a South/North commons divide with subsistence on one hand, and urban space and infrastructure on the other. The high-profile showdown at Standing Rock attests to the persistence of territorial struggles in the North, even while civilian protests in Argentina and Brazil underscore widespread fights for public education, healthcare and freedom from foreign ‘vulture funds’. In many cases, it is indigenous communities in both the North and South whose cosmovisions remind us of the oddity – and relative novelty – of private property. NoiseCat (2017) points out that although indigenous values, beliefs and practices are as diverse as indigenous people themselves, one thing they share is a notion of relations to nature profoundly at odds with Western ownership rights. Thus, as Cavanagh et al. (2002, 93) suggest, for indigenous cultures, it is not really a question of commons in the European sense; ‘it is more that all creatures – human as well as plant and animal – are directly related, equal, and with equal rights to exist in a fulfilling manner’.

Increasingly, social movement revivals of commons – old and new – turn our attention to the reality of commons as a dynamic, evolving social activity. As historian Peter Linebaugh underlines, there is no commons without the commoners, no commons without *commoning*. For Linebaugh, as for other neo/Marxist commons scholars, key to understanding the power of commons is understanding the social relations inherent in them. While enclosures promote inequalitarian relations ‘among the Have Lesses and the Have Mores’ (Linebaugh 2010), commoning resists such social divisions: by actively taking back control of expropriated social wealth of all types, they help create new social norms of sharing and cooperation to counter future enclosures. By cultivating a radical re-organization of language, ideas and knowledge, they make visible how enclosures are naturalized and cast as a normative good.

In practice, such repossession is never a *fait accompli*. As with primitive accumulation, commoning is always ongoing, necessarily adapting to changing environments and social conditions. A forest could experience a regime shift under climate change; forest-dwelling communities might expand or contract with urbanization. The rules, norms and practices of humans with their trees would need to adjust. This is why, Bollier suggests, commons are best understood as a three-part relationship:

a resource + a community + a set of social protocols

Rather than consider just the forest, and beyond evaluating the community as a thing, we must consider ‘a community that manages a resource by devising its own rules, traditions, and values. All three are needed’ (Bollier 2014, 6).

2.1. *Beating the bounds: a political ecology of commoning seed*

In this paper, I adopt Bollier’s tripartite scheme to analyze the OSSI. The ‘resource’ is agricultural seeds, atypical in commons scholarship for straddling the ‘natural resource’/‘cultural resource’ divide. The ‘community’ is the small cadre of social scientists, plant breeders, organic farmers and small seed companies who comprise OSSI, and who participate in various ways in producing, circulating and advocating ‘freed seed’. The ‘social protocols’ will be traced in the remainder of this paper, in an effort to

begin exploring the nonlinear and contested nature of commoning in practice. Such protocols include the moral economy pledge underwriting the OSSI commons, the methods and knowledge practices of informal plant breeding, and the contested rules of seed contribution, access and use. To explore how the social protocols of a commons are (re)negotiated, I anchor this analysis in political ecology, a field which begins on the assumption that politics are inevitably ecological, and environment is intrinsically political (Robbins 2012). Central to political ecology, Watts (2000) has proposed, is ‘a sensitivity to environmental politics as a process of cultural mobilization, and the ways in which such cultural practices – whether science, or traditional knowledge or discourses, or risk, or property rights – are contested, fought over and negotiated’ (259). As an account of commoning centered on struggles over intellectual property, the OSSI case adds to a heterogeneous scholarship that continues to fill in gaps left by early political ecology: groundbreaking studies on soil degradation which often did not scrutinize how people fight back against the circumstances of their own marginality. ‘Exogenous forces’ gestured to the world economy, but lacked focus on key areas such as market politics and property rights. Natural resources were often assumed to be simply ‘natural’, rather than socially and culturally produced. Not least, land managers – the fulcrum of classical analysis – were almost inevitably white males.

Political ecology has since sharpened attention to how language, power and knowledge construct nature – and stories about nature (Peet and Watts 1993; Escobar 1994/2011). It has extended from almost exclusively developing country settings into First World cases (Galt 2013); interrogated the role of women and people of color in making agrarian knowledge (Carney 2001); and underscored the primacy of locally contingent, ‘non-totalizing’ accounts of food system restructuring under global capitalism (Goodman and Watts 1997; Grossman 1998). If it was already understood that nature could be perceived in a variety of ways, scholars of indigenous political ecologies have folded perception into praxis, with extensive research on seed and subalternity in making agrobiodiversity (Zimmerer 1996; Graddy 2013). The OSSI commons – and my analysis of it – expands this body of work. Exploring an emergent moral economy in the US populated largely by women and first-world peasants, it is a place where informal and formal seed knowledges coalesce, hybridize and at times conflict. I am particularly interested in commoners’ negotiations and contestations – the practices which help delimit and defend a biocultural resource, as we will see below.

2.1.1. *‘Beating the bounds’*

In medieval times, according to historian Linebaugh (2008, 74), the British monarchy and forest bureaucracy would regularly ‘beat the bounds’ – perform ‘ceremonial walks about a territory for asserting and recoding its boundaries’. These walks were vital in mapping the complex and shifting geography of Crown holdings – and largely served to enlarge royal jurisdiction. But if perambulation was a kind of mapping, it was also an act of contestation. Peasants would walk the perimeters of a forest or piece of open field – ‘If they came upon a private fence or hedge that had enclosed the commons, the commoners would knock it down, re-establishing the integrity of their land’ (Bollier 2014, 138). Before physical maps (let alone Google maps) were ubiquitous, such boundary beating served several purposes: marking territory, policing borders, and serving as a public delineation of place and community identity (see Figure 1). The practice survived for centuries in Welsh and English parishes, where on special days of the year, processional parties would pass through the landscape, with men striking bounds with a stick – a willow branch known as a ‘wand’

“England is not a free people, till the poor that have no land,
have a free allowance to dig and labour the commons...”
Gerrard Winstanley, 1649



Figure 1. ‘Beating the bounds’ served medieval rulers as a means of ceremonially pacing grounds to map and ‘recode’ territory – and largely serving to expand the royal forest to the detriment of common fields. But walks could also be an assertion of popular right, even equality. Such was the case in 1744 when William Good urged that the annual perambulation become an anti-enclosure protest: ‘all tenants in the commonable woods in the forest have... an equal right of common with those that have houses and land of their own, and as good a right by custom, and the laws of the land, as the owners of the wood have to timber and underwoods’ (Hindle 2003, 52–53). (Illustration depicts Gerrard Winstanley and the Diggers, created for *Winstanley*, a 1975 film. Fair use rights).

– and even ‘bumping’ the heads of young boys against particular landmarks ‘so that they would remember’ (Khoo, Taylor, and Andreotti 2016).

To be clear, commoners in town and countryside were not at the time acting against the law, but rather in defense of it. Issued in 1217, the Charter of the Forest guaranteed the rights of commoners to use lands for farming, grazing, water and wood. Offering legal sanction to human rights that indigenous and peasant communities worldwide had long presupposed, this lesser known twin to the Magna Carta recognized usufruct rights of people to nature; access to public resources was necessary for livelihoods.

Yet the next 500 years saw waves of dispossession, peasant resistance and further dispossession in which commons were progressively separated from commoners’ hands. Tens of millions of acres shifted into private ownership between the fifteenth and eighteenth

centuries, displacing much of Britain's population, and feeding kilns of industrial factories with newly 'freed' labor. These annals, 'written in the letters of blood and fire', are familiar to Marxist historians (Marx 1977, 875). But sometimes glossed are the nuanced material and discursive practices of enclosing – the claims and counterclaims, the legal enforcements and re-enforcements that precipitated and shaped expropriative events. E.P. Thompson's landmark study of the Black Acts brings these into stark relief, as he builds a narrative from what Linebaugh might call boundary beating:

Numerous acts of claiming and reclaiming forest resources across several periods of political-economic change, including the making and breaking down of physical enclosures, passing new laws or enforcing old ones, killing deer, setting up informants and spies, posting notices, organizing, making appeals, donning of costumes, and, of course, 'blackening' – the application of black paste or paint to the face as a form of disguise. (Peluso 2017)

If we assume that boundary beating can apply to both commoning and enclosing, the term takes on a new valence and becomes double-edged. Beating the bounds in defense of the commons is to beat the bounds against enclosure, yet it also tends to re-activate bounds beaten *for* enclosures, sparking the antithesis of commoning pursuits. Thus, neither the privateers' nor the commoners' jobs are ever complete: against the fences, hedgerows and property laws, the unfencers, deerkillers and head bumpers will always beat to bring a commons back. Commoners in medieval Europe variously employed boundary beating as physical mapping of space, territorial defense and performative acts of community, collective memory and shared responsibility. It is in this multifaceted spirit that I look to how boundary beating is occurring around seed in old and new manifestations. As corporations build unprecedented oligopoly control over the formal seed supply, they are beating against anti-trust regulatory boundaries; they are erecting new IP 'hedgerows' for advanced genetic engineering; they are performing the 'feed the world' narrative to justify encroachments into informal seed. OSSI is proposing one approach to beat boundaries *for* the commoners instead of the kings. This is their story.

3. From open-source licenses to a moral economy pledge: beating legal boundaries

Pacing the stage energetically, rural sociologist Jack Kloppenburg laid out the seed crisis facing many a farmer today. Despite a wide variety of farming scales, customs and practices, he told an audience at the University of California, Berkeley, most growers – from Guatemalan campesinos to Iowa corn farmers – are experiencing one thing in common: they confront their seeds as industrial commodities. Rather than enjoy the freedom to replant from a previous season, they are structurally shackled to Monsanto or Dupont, with little choice but to purchase patented, high-priced non-renewable seed.

Well known to this academic audience as the author of *First the seed*, a landmark work on the history of biotechnology development (1492 to present), Kloppenburg has spent half a lifetime researching such problems. But this was a different, solutions-focused provocation. Seed movements worldwide are roundly condemning monopoly gene giants, the injustice of patenting and the rapid rollout of new GMOs. A more radical stance, he offered, might be to move from a defensive posture to an offensive one: not only to impede processes of dispossession, but to open up paths for repossession.

The OSSI was conceived as a project of repossession – a move to steal the proverbial goose back. Founded in 2012, its organizational structure includes a board of directors and a wider network of OSSI-affiliated public plant breeders, freelance breeders, small seed

companies and non-profit institutions. Many of the freelance breeders are also farmers and company-owners, blurring the conventional divisions of labor in US seed systems. In response to the past hundred years of seed enclosures, OSSSI's self-stated commitment is to 'promoting and maintaining of open access to plant genetic resources worldwide'. The Pledge promoted by OSSSI is an agreement by users to 'ensure that germplasm can be freely exchanged now and into the future' (Luby et al. 2015, 2485). But the Pledge at the heart of the OSSSI commons – and more importantly, OSSSI *commoning* – did not start out that way. It is the product of years of negotiations that illustrate the give-and-take of practical commoning, the disputes that shape a commons from inside and out, and how its boundaries can bend without breaking.

3.1. *Enclosing seed and agri-food systems*

The macro-economic picture against which OSSSI struggles has been detailed elsewhere (Kloppenburger 2014; Howard 2016; Luby et al. 2015; Montenegro de Wit 2017), and need not be rehearsed again here, except in broad strokes. Hybridization, developed since the 1930s, effected biological enclosures of seed to finance the growth of a robust private seed industry. The growth and elaboration of intellectual property rights since the 1930s – through legislation, treaties and US Supreme Court rulings – has made law into the 'handmaiden of biology', creating a legal mechanism for enclosures of seed. The 1961 establishment of the Union for the Protection of New Varieties of Plants (UPOV) in Europe, followed by the 1970 Plant Variety Protection Act (PVPA) in the United States, instituted exclusive plant breeders' rights (PBR) but with important exemptions: breeders could still use protected varieties for further breeding and research, and farmers were free to save, exchange and reproduce seed. Since 1985 (*Ex Parte Hibberd*), utility patents have become especially prevalent in the US, enabling the private sector to expand ownership of genes, gene sequences, tissues, seeds and whole plants. Unlike PVP, utility patents prohibit breeding, research and seed saving on a patented cultivar, crippling both farmers' and plant breeders' freedom to operate. Today, as Luby et al. (2015, 2482) note:

Commercial maize cultivars are generally protected by dozens of patents on specific traits, license agreements, contracts, and trade secrets, allowing developers to own and manage the intellectual property associated with their work. 'Bag tag' licenses and associated 'technology use/stewardship agreements' for modern maize cultivars specify that users cannot save, replant, use as a parent, or conduct research with the seed.³

Intellectual property incentives, in turn, have been a dominant factor in the consolidation of the seed industry over the past 30 years, a trend documented in powerful synergies among stronger IP protections, anemic anti-trust laws and the dominance of top firms 'at the expense of freely competitive industry' (Howard 2009, 2015). As of 2015, just six seed and chemical corporations – BASF, Bayer, Dow, DuPont, Monsanto, Syngenta – were collecting more than USD 65 billion annually from selling their seed traits, chemicals and biotechnologies (ETC 2015). Together they controlled 75 percent of the pesticide market, 63

³Although the big seed companies have traditionally focused on agronomic crops such as corn, cotton, canola and soybean, the IP regime they employ is now 'trickling down' to specialty crops – fruits, vegetables, nuts and horticultural crops – through a complex of patents, licenses and bag tags (Goldman interview, June 17, 2017).

percent of the seed market and more than 75 percent of private-sector research in crops and pesticides. With mergers now pending between Monsanto–Bayer, Dow–Dupont and Syngenta–ChemChina⁴, further consolidation appears imminent.

Such trends have had readily discernable impacts on US farmers' seed practices and habits. In what Howard (2009, 1269) dubs a seed 'treadmill', farmers have been locked into purchasing seed and associated inputs, rather than producing them endogenously. In the US, continues Howard,

the rate of saving corn seed fell to less than 5 percent by 1960 (Fernandez-Cornejo 2004). Rates of saving soybeans decreased from 63% in 1960 to 10% in 2001 (Mascarenhas and Busch 2006). Although seed saving and replanting is currently more common among wheat growers, just one-third of those recently surveyed in Washington State stated that they engaged in this practice (Jussaume and Glenna 2009).

The additive effects of seed, pesticide and fertilizer treadmills are to cultivate conditions ripe for farmer dispossession. Squeezed between, on one hand, purveyors of seeds, chemicals, machinery and fuel, and, on the other hand, traders and sellers of cheap processed food, the value accumulates elsewhere, leaving farmers little choice but to 'get big' (if they have the means) or 'get out'. Moreover, farmers attempting to switch to organic and agroecological practices are hamstrung: Even within the organic sector in the US, the vast majority of organic seed is bred conventionally – that is, selected under monoculture, high-input conditions not amenable to a diversified agroecosystem (Murphy et al. 2005; OSA 2016).

While this concentrated oligopoly structure is fully elaborated in many industrialized countries, seeds now offer the opportunity to transform agrarian political economies globally. Markets for many patented, genetically engineered crops are now saturated in the US, Canada, the European Union and Australia, pressing agrochemical firms into the periphery for new customers. Their target is tens of millions of peasant and small-scale farmers in the Global South who still save, replant, share, exchange and sell their own seeds.⁵ Toward enabling these enclosures, the UPOV convention has been a particularly influential instrument, frequently ushered in by/free trade agreements, development aid contracts, and an assortment of certification and marketing laws. Under earlier versions of UPOV (1961, 1978), farmers' saving, using and exchanging of seeds for non-commercial purposes were not expressly restricted – and as such, were generally accepted and permitted (Yoke Ling and Adams 2016). But in 1991, UPOV was revised to dramatically expand breeders' rights. Under the new 'optional exception' farmers can only save seeds of a protected variety on their own holdings – and even then, often requiring royalty payments to the rights-holder (Moore and Tymowski 2005; GRAIN 2015). Critics say that 'breeders' rights' are now highly comparable to patents, citing numerous documented cases in which violations of UPOV have been prosecuted with criminal punishment (Aistara 2011; GRAIN and LVC 2015; Smith and Bragdon 2016). On the horizon now are the Arusha Protocol, which will apply in 19 mainly anglophone African states, and the Asia Regional Comprehensive

⁴ChemChina and SinoChem recently announced plans for a \$100 billion merger in 2018. It will create the world's largest chemicals group, and will follow ChemChina's \$43 billion purchase of the Swiss agrochemicals leader Syngenta (Weinland 2017).

⁵An estimated 90 percent of the seeds that peasant farmers plant every year come from their own bins or are bartered with neighbors in local markets (McGuire and Sperling 2016).

Economic Partnership (RCEP),⁶ a mega-regional trade deal being negotiated among 16 countries across the Asia-Pacific. Both agreements will require countries to join UPOV '91, pass UPOV-like legislation or adopt laws approximating a patent regime.

As these dynamics suggest, seed enclosures tend to shift the boundaries between informal and formal seed systems. Scientists often make a distinction between formal and informal 'seed systems', or the totality of development, production, storage and diffusion of cultivars (Tripp 1997). Formal systems are comprised of public institutions and private industry engaged in scientific plant breeding, while informal or farmers' systems depend on farmers' knowledge and customary law (Almekinders and Louwaars 1999). Legal and regulatory processes are profoundly important in delineating informal/formal boundaries (Wattnem 2016). In addition to the well-characterized functions of intellectual property law (Kloppenborg 1988/2004; Aoki 2008, 2009; Howard 2015), many non-IPR rules are weakening – or even criminalizing – informal seed markets and subordinating farmers' seed systems to industrial capital (GRAIN and LVC 2015). Keepers of knowledge in the two systems are distinct: professional biologists and geneticists are often the recognized experts in the formal sector: they 'create', 'improve' and 'innovate' seed. In the informal sector, it is farmers and their communities who hold expertise, and who are often 'custodians' of seeds which belong to the Earth (Tapia and Tobin 2013; African Biodiversity Network, and Gaia Foundation 2016). Cultural and affective linkages to seed vary kaleidoscopically both within and across the formal and informal divide, but because of their long history in cultivating genetic resources, many peasant and indigenous breeders speak in terms of memory, ancestry, territory and collective 'biocultural heritage'. Researchers tend to speak instead of trait novelty and breeding lineage, their language and concerns coming to reflect the standards of 'distinct', 'uniform' and 'stable' (DUS) engrained in seed certification and marketing laws (Aistara 2011; Wattnem 2016).

Through the aforementioned sites and processes of enclosure, informal seed systems have undergirded the rise and expansion of modern agri-food economies, but are often displaced and undermined by them (Mooney 1983; GAFF 2016). These patterns reach far back: eighteenth- and nineteenth-century bioprospecting to build colonial collections and plantation economies; nineteenth- to twenty-first-century professionalization of plant breeding and Green Revolution crop improvement; twentieth- and twenty-first-century privatization of seed through interlinked innovations of science and law. Collectively these 'long enclosures' have differentiated 'elite' germplasm from peasant seed, redrawn global flows of germplasm value, and leveraged science and policy to inscribe enclosures within formal institutions – from the land-grant complex to UPOV – that create and govern genetic resources. OSSII represents the radical idea, then, that unenclosing seed can shift the relations of the formal to the informal, pivoting the flow of capital, power and legitimacy in the other direction.

3.2. *The digital commons inspiration*

As suggested by its name, the Open Source Seed Initiative drew crucial inspiration from a field often considered remote from farmers' concerns: computer science. In the early

⁶RCEP will include the 10 members of the Association of Southeast Asian Nations (ASEAN): Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. It will also include six regional partners with extant ASEAN free trade agreements: Australia, China, India, New Zealand, Japan and South Korea. It will affect an estimated 3.5 billion people and 12 percent of world trade (GRAIN 2016).

1980s, MIT professor Richard Stallman was among the first to recognize that proprietary software could restrict people's ability to access and use software – and, thus, to innovate. Stallman's stroke of genius was inverting the copyright license, using intellectual property to make software contractually *non*-proprietary. He called his invention the General Public License, or GPL. Sometimes called 'copyleft', this innovation is today celebrated as a 'landmark 'hack' around copyright law' (Bollier 2014, 117). It ensures everyone the freedom to copy, modify or distribute a program as they see fit, as long as they apply the same copyleft license to their creation. In this way, the free license propagates, making more and more software shareable and legally protected. It achieves a 'viral' character.

In the 1990s, GPL was combined with another breakthrough, GNU/Linux, to form the world's first free and open-source software platform, now used by millions of web servers and corporations including IBM and Oracle. The success of this digital commons was a key inspiration for OSSI's development. Frank Morton, a freelance breeder and owner of Wild Garden Seed, explains it this way:

I first heard of 'open source' from my Linux-loving son, Taj, sometime before he created our website at age 13. That was 2003, so I guess this Open Source Seed notion has been rattling my cage for over a decade. But that is about all, because I have never been able to create the legal mechanism in my head that would allow me to share or market an original open-pollinated seed variety to others without the real possibility that some bad actor could patent it out from under me. (Morton 2014, 147)

Morton and other small-scale freelance breeders have been releasing their seed into the public domain for decades, allowing others to freely use their seed and its derivatives (Deppe interview, August 20, 2016). Yet the reality remains that if a breeder's original varieties are not protected by a utility patent or PVP, then they can be scooped up and protected with IP by someone else. Organic vegetable breeders like Morton have so far avoided such bioprospecting, 'sailing by', as he puts it, with only a few varieties pirated from him. But he does not consider himself 'out of the woods', since the imminent threat is not theft of whole varieties, but the patenting of individual traits. After the US Supreme Court declared in *JEM Ag Supply v. Pioneer Hi-Bred* in 2001 that 'novel traits' of plants could be subject to utility patenting, the gates burst wide open for enclosures at the genetic level. As a result, many naturally occurring plant traits, and traits developed in the public sector, have seen a flurry of patents filed for claims on ownership. Red lettuce colors, broccoli adapted for ease of harvest, carrots with increased lycopene content – the list goes on, says Morton. Despite this gene grab occurring beneath their feet, Morton and several like-minded farmer–breeders have found the easy solution extremely unpalatable:

So does that mean we should hoard our beans, lock 'em up with PVP and patents? Not allow others to see, breed, or make comparisons to our stuff? That's no fun, and you can't get started in plant breeding with an attitude like that. (Morton 2014, 147)

In April 2010, Morton joined Kloppenburg, University of Wisconsin breeder Irwin Goldman and a handful of others in Madison, Wisconsin, to explore prospects for developing an open-source seed (pers. comm., Kloppenburg, December 7, 2016). This meeting generated much enthusiasm, leading to a second meeting in Minneapolis in early 2011. By then, the commoners had expanded to include several more public university breeders, additional farmer-breeders, one organic seed company, representatives from Northern and

Southern indigenous communities, and the institutional support of a few non-profits, including the Organic Seed Alliance, a prominent US advocacy and education network (Luby et al. 2015). They called themselves the ‘Open Source Seed Initiative’, and began outlining how their commons would operate. As the members would later write, they needed to discuss principles and objectives – but more importantly, they needed a course of *action*. The priority task was determined to be creation of a legally defensible, open-source license for plant germplasm. Kloppenburg framed the objectives of the new initiative thusly:

Modeled on the legal arrangements successfully deployed by the free and open source software movement, OSSSI hopes that its licenses might undergird the creation of a ‘protected commons’ populated by farmers and plant breeders whose materials would be freely available and widely exchanged but would be protected from appropriation by those who would monopolize them. (Kloppenburg 2014, 1226)

3.3. *Limitations of licensing a commons*

Looking back on ‘OSSSI phase 1’ it is perhaps easy to see how problems emerged. Those familiar with copyright law might have predicted that roadblocks would occur when applying copyright to biological life. It is also easy to fathom how transmitting a legally defensible license on seed packets might be cumbersome. Yet these things were not immediately obvious. It took two years of active negotiating – inside and outside OSSSI – for the OSSSI commoners to learn several lessons about their resource, their community and their social protocols. For about 15 months, OSSSI labored intensively to make the licenses work. It held lengthy meetings with OSSSI’s *pro bono* lawyers. It gathered feedback from seed sovereignty allies internationally. It listened to US-based small-scale farmers and breeders whom the licenses were principally intended to serve (Luby, Kloppenburg and Goldman interviews). Kloppenburg appealed to other scholars with an impassioned paper arguing how the ‘tools of the master’ – licenses based on contract law – might ultimately be wielded against the dominant social formation and in support of seed sovereignty (Kloppenburg 2014). By 2014, however, it was evident that the licensing approach had reached an impasse. Their lawyers could – and indeed did – craft two forms of open-source seed licenses. But unlike software code, for which the code-writer automatically receives copyright protection, the creation of novel genetic sequences does not immediately grant the plant breeder an analogous right. This made the ‘copylefting’ of seeds a more onerous legal maneuver.

Dense and intricately worded licenses solved the problem in theory, and would have been legally defensible. But in practice they brought a bundle of contradictions. After all, a license is a contract which licensees must be enabled to read in full. For OSSSI, this meant figuring out how to affix eight-page contracts onto 3×4 inch packets of seeds (Deppe interview, August 20, 2016; Kloppenburg et al. 2014). It meant devising language technical enough to make the licenses robust in court proceedings, without making them unintelligible to farmers and breeders. In the end, OSSSI’s farmer affiliates were put off by tactics that, from their perspective, only resembled those of ‘gene giants’ like Monsanto. OSSSI’s seed companies felt likewise: even if shorter licenses could be developed, the approach would repel rather than attract their customers. Such feedback from their core constituents told OSSSI that a license would most likely fail to propagate for more than a few generations. Distrust in this particular commoning practice would undermine OSSSI’s entire *raison d’être* since gone would be the likelihood of going ‘viral’.

With the licenses being snubbed from many directions, OSSSI encountered yet another dilemma, this one within its breeding community. OSSSI's plant breeders as a whole felt dedicated to a goal of 'maximally unencumbered flow of plant genetic resources' (Kloppenburger et al. 2014, 145). Yet within the group a rift had developed. In designing the licenses, some breeders had argued in favor of completely 'freed' seed, while others had felt that breeders need to be rewarded monetarily for their efforts. The result was that OSSSI had opted to pursue two different open-source licenses: one for completely non-proprietary seed (a 'free seed license'), the other for payment-bearing use (a 'royalty-bearing' license). In the end, as we will see, royalties became a non-issue, but the debate revealed deep uncertainties in the OSSSI project. What were its rules, traditions and values? Who would be included and excluded from this still-congealing commons?

For many public university breeders like Irwin Goldman, working in a land-grant setting has come to mean tightly restricted 'freedom to operate' (Goldman interview, 06/17/2016). It demands negotiating patent thickets in order to obtain necessary breeding materials; it requires strict adherence to university licensing arrangements; it implies that plant breeding in the public sector is increasingly disciplined by what is valuable to private-sector interests. For Goldman, commoning via OSSSI represented a chance to take a radically different approach. Other public breeders, however, were less comfortable departing from the royalty system – and who could blame them? With declining levels of state support, public breeders now often rely partially on royalty revenue for maintenance of their programs (Deppe interview, August 20, 2016; Kloppenburger 2014). Locked into a system that produces dependency on proprietary knowledge, these breeders rejected any commons rules that would not require royalty payments.

OSSSI nearly collapsed under the weight of this early dissension. The solution to the breeders' dilemma – two tracks of licenses – had produced an arcane legalese still unpalatable to the users of seed. Several breeders peeled off, leaving just five or six people in the core committee. The Organic Seed Alliance, which had been hoping to generate revenues from royalty-bearing licenses, decided to pull its support. For several months, the remaining members struggled with the disappointment of likely defeat (Kloppenburger et al. 2014).

The holdouts had, however, effectively (if not intentionally) self-selected as commoners with more aligned values and social protocols. Among themselves, they recognized that the royalty-bearing license was too similar to forms of IPR it sought to replace. Royalties aside, they appreciated problems ensconced in the licensing approach writ large: how lack of trust in the license among small-scale, local farmers, breeders and seed companies would doom the sharing from the start. If these people were to become OSSSI-affiliated growers and sellers – in essence, its network of future commoners – gaining their trust was more important than allaying the concerns of lawyers and royalty-seekers. The solution emerged as elegant and clear: they had to terminate the pursuit of licenses.

At this impasse, the OSSSI group was learning several things about their commons as resource, community and social practice: first, that biological germplasm is not so easily modeled on digital software; second, that defining social protocols, in this case licenses, could reveal fracture lines between members that undermined the integrity of the commons; and, third, that one way of resolving tensions is to re-organize. Social protocols that mimicked the behaviors of seed giants could achieve legality and certainly more profit, but at the expense of social trust. OSSSI took a leap and decided to abandon the anti-commons that licenses had come to represent.

3.4. *The pledge: a turn to informal seed law*

The pivotal moment, says Frank Morton, was going back to first principles: ‘What is the purpose of the OSSSI endeavor and why are we doing this?’ At a late summer meeting in 2013 in Washington state, the assembled participants decided to walk back from legal airtightness, and shifted their emphasis instead to a moral and ethical plane: ‘Our most central concern’, explains Morton, ‘is that the users of seed must never restrict the use of seed by others to create new varieties and adapt seed for the benefit of future generations’ (Morton 2014, 148). In place of a license, the community crafted a pledge that reads:

You have the freedom to use these OSSSI seeds in any way you choose. In return, you pledge not to restrict others’ use of these seeds or their derivatives by patents or other means, and to include this Pledge with any transfer of these seeds or their derivatives.

This Pledge is the new social protocol that propagates with every packet of OSSSI seed today. It presages a reorganization of the OSSSI commons into what E.P. Thompson might recognize as a ‘moral economy’. In observing periodic peasant uprisings over the price of bread, Thompson understood that their revolts were less about poor people starving than about beating the bounds of a besieged way of life. The ‘men and women in the crowd’, he wrote, ‘were informed by the belief that they were defending traditional rights and customs; and, in general, that they were supported by the wider consensus of the community’ (Thompson 1971, 78).

Similarly, the Pledge affirms a seed system structured more by the welfare of its community than by the mandates of commodity production. ‘With this Pledge’, OSSSI’s leaders propose, ‘OSSSI appeals to the ethical and social norms that link plant breeders, seed companies, farmers, gardeners, and eaters’ (Luby et al. 2015, 2486). These words, appearing in the peer-reviewed journal *Crop Science*, appealed to fellow plant breeders who face similar constraints on access to, and sharing of, seed in the dominant social order. A moral economic system, they suggested, involves revitalizing practices of germplasm exchange, ‘unencumbered by complex legal agreements’. It involves ‘recognizing and honoring the historic and collective contributions of farmers and plant breeders to the generation and maintenance of the existing pool of crop genetic material’ (Luby et al. 2015, 2486). The farmer–breeders have made their own appeals in defense of the moral economy’s customary rights. As Frank Morton puts it pithily, ‘Farmers should always be able to replant their seed’ (Morton 2014, 247).

The Pledge itself carries over the central premise envisioned with the license attempt – that is, it functions as a ‘protected commons’ insofar as materials are freely available and widely exchanged but are protected from appropriation by those who would monopolize them. This protection is guaranteed by a moral agreement, rather than contract law, giving it legitimacy based on the community rather than on the state. Passed along with each seed packet, the Pledge protects four basic freedoms:

1. The freedom to save or grow seed for replanting or for any other purpose.
2. The freedom to share, trade or sell seeds to others.
3. The freedom to trial and study seed and to share or publish information about it.
4. The freedom to select or adapt the seed, make crosses with it, or use it to breed new lines and varieties.

Such an agreement, of course, requires a few more specifications. Firstly, the ‘freed seed’ is not equivalent to *free* seed, meaning that OSSI recognizes that their farmers rely on income from seed production, that small-scale businesses can help rebuild local seed economies, and that breeders also merit some compensation for their work. For these reasons, OSSI is not out to set seed free from price, which is neither feasible in the current US political economy context nor desirable for people whose livelihoods depend, at least in part, upon its exchange value. Thus, OSSI enables farmers, breeders and companies to sell their seed for whatever price they wish, but they cannot prevent any other person from multiplying and using the seeds on their farms or in their own breeding programs. Similarly, breeders and farmers are not restricted from entering into ‘benefit sharing’ arrangements with a seller; for example, they could contract with a seed producer to multiply seed of an open-source variety and both parties could share in the revenue generated from sale of those seeds. What a breeder cannot do, however, is charge a royalty that propagates through generations of that seed’s reproduction, or that applies to the creation of derivative varieties (Goldman interview, June 17, 2016; see [Figure 2](#)).

Secondly, the Pledge is radically free from the vantage point of *access* to seeds within the protected commons – the only restriction being the inability to restrict others – but it implements careful and particular rules around *eligibility* – that is, how seed enters into the commons and achieves protected status in the first place. A seed variety enters the OSSI commons through being submitted (or ‘pledged’) by a freelance or professional breeder. This person, in turn, becomes part of the OSSI breeder community. Yet submission is contingent on certain specifications, which can be pooled into two broad categories, biological and social (Luby interview, July 21, 2016). Biologically, the variety, population or propagating material must be considered ‘novel’, that is, recognized as unique and selected from a heterogeneous genetic background. Socially, there must be an individual breeder, co-breeder or agent with the authority to pledge the new variety. Importantly, these rules are minimum, not sufficient, requirements, which leads to a third and related point: OSSI retains the right of refusal. If a breeder at Bayer, for example, offers to pledge a new genetically engineered variety, the commoners can refuse it – and they already have.⁷ Indeed, OSSI has decided that for ethical and political reasons, it will not currently accept any genetically engineered seeds (see [osseeds.org](#)). Finally, it bears emphasizing that the moral economy underpinned by the OSSI Pledge is a commitment by all recipients of OSSI seed to *propagate* the Pledge. The freedoms, restrictions, rights and obligations must be passed along to anyone to whom the Pledge is transferred (Luby et al. 2015).⁸

Although these submission guidelines have themselves raised some issues, as we will soon see, they provide defense against unauthorized pledging, biopiracy and other unsanctioned contributions to the commons. Bound by the Pledge, the OSSI commoners have now grown to a membership of 38 plant breeders, 48 seed companies and more than 377 pledged

⁷Bayer North America has approached OSSI about pledging genetically engineered lines. Because of such proposals, OSSI has taken the following position: while it cannot discourage seed corporations from open-sourcing their own products, it can refuse their entry into the OSSI commons.

⁸These decisions concerning seed exclusion/inclusion are made by OSSI’s Variety Review Committee comprising three board members who are breeders. They review each application according to OSSI’s policies, which in turn have been approved by the entire board. Depending on the issue (e.g. policy on GMOs or hybrids), the Committee has long discussions over several meetings. OSSI is a 501(C)3 with formal bylaws that structure their decision-making. So far, they have made decisions entirely by consensus, reflected in unanimous votes when a formal vote is called for (Kloppenburg interview, December 7, 2016).

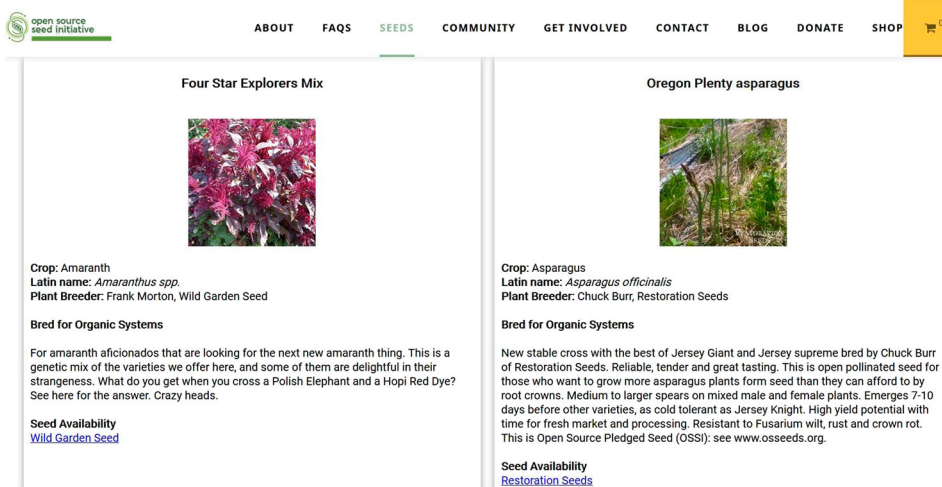


Figure 2. The OSSI website functions in several ways to ‘beat the bounds’ for a seed commons. First, it helps achieve visibility for the initiative, with colorful and descriptive pages for the pledged seeds (above), the breeders, and the seed company partners. Second, it affirms a chain of custody which protects OSSI seed against unauthorized use. The only way to obtain Pledged seed such as ‘Four Stars Explorers Mix’ is through OSSI channels. The OSSI logo (left corner, above) travels with each packet of pledged seed, such that any ‘Four Stars Explorers’ found without the logo or Pledge can be identified as illicitly obtained. Third, although OSSI does not sell any seed directly, the online databases enable breeders, farmers, and gardeners to recognize and access OSSI seed, supporting a decentralized network of seed commoning. Taken together, these activities help build legitimacy for the Pledge, beating the bounds against appropriation. As Kloppenburg says, even if OSSI cannot sue bad actors, ‘we can shame them’ (interview, December 7, 2016).

varieties. Efforts to extend a seed commons are ongoing in Germany, India, Ethiopia and Kenya, where communities are adapting OSSI to their local needs. Venezuela’s landmark Ley de Semillas (Seed Law) was loosely inspired by OSSI, though the Bolivarian law implements a licenses approach, known as *licencias para semilla libres* (Ley de Semillas 2015). The media has discovered OSSI too, with features in the *Virginia Quarterly*, *Ensa Magazine* and *Civil Eats*, among others. If success is partially measured in name recognition, then OSSI is gaining ground.

Nonetheless, most scholarly and journalistic treatments of OSSI have centered on its importance as an alternative to restrictive IP. OSSI has been lucidly depicted as ‘Linux for Lettuce’ (Hamilton 2014) and a ‘campaign’ to change seed governance (Charles 2014). I contend that OSSI foreshadows much more. In revitalizing plant breeding knowledge, reconceiving property laws, and inculcating norms and values of common rights, OSSI poses a challenge not just to patents, but to the ‘long enclosures’ of seed knowledge and rights dispossession. It represents, if OSSI is successful, a new ethic of commoning seed – and, perhaps, a catalytic point around which commoning social and economic life can grow.

4. Redefining expertise: organic intellectuals in commoning

On 17 April 2014 – in solidarity with La Via Campesina (LVC)’s International Day of Struggle in Defense of Peasants’ and Farmers’ Seeds – OSSI made its first open-source seed release. Seven breeders from public universities, local seed companies and small

farms committed to releasing 37 cultivars of 14 crop species under the OSSI pledge (Luby et al. 2015). Of the seven in this original community, the majority were professional public breeders, affiliated with land grant schools such as Washington State University and the University of Wisconsin–Madison. Soon, however, it became apparent that the center of gravity of the OSSI community was shifting: away from the formal sector of universities, labs and extension, and toward the informal sector of independent farmer– and gardener–breeders. As of September 2017, of 38 OSSI affiliated breeders, only about eight are connected to universities. The rest are ‘freelancers’ – self-taught and self-employed in practice if not always in name. As a group, these informal breeders have contributed all but 16 of the total 377 pledged varieties (Luby interview, October 22, 2017). OSSI’s bounds have been ‘recoded’, to use Linebaugh’s terms, around an incipient paradigm of freelance expertise.

For millennia –12,000 years, give or take – farmers have been the main practitioners of plant breeding. But multiple enclosures have progressively severed this relation: after the rise of scientific plant breeding in the early twentieth century, land-grant institutions popularized and instituted top-down ‘technology transfer’, while disseminating enclosed Green Revolution hybrid-chemical packages. As explored above, imposition of these biologically enclosed seeds, coupled with the legal enclosures of IPR, further distanced farmers from the ability and rights to save, replant and renew. Unsurprisingly, few farmers in the US today reuse seed, let alone attempt to breed. They have been structurally removed from the breeding practice, and epistemically marginalized as holders of breeding expertise.

From this perspective, it may seem surprising that farmer–breeders have led the ‘commoning’ in the OSSI commons. From another angle, however, it makes complete sense that they are in the vanguard. Freelance breeding networks, after all, were not born in 2014; quietly, in the shadow of the corporate food system, many subaltern seed saving, exchange and breeding networks already have a stronger grip on the cultures and practices of commoning. This extant grassroots network has provided a very different baseline from which freelance breeders engage with OSSI. For example, in terms of IP, freelancers have long been releasing their new varieties in the public domain. Although plant variety protection (PVP) is available to small-scale breeders, it is generally too expensive to be economically worthwhile. More importantly, says Deppe, many in her circles simply do not believe in the concept of IPR. Patents are often considered ‘immoral’, she says, and inconsistent with an understanding of seed as the heritage of humankind (Deppe 1993/2000, 14 and interview, August 20, 2016). David Podoll of Prairie Road Organic Seed in North Dakota corroborates Deppe’s words: ‘Seeds are a sacred thing. Everything we have now is built on farmers selecting seeds for millennia. All of that genetic diversity is a great gift. Seeds should not be owned, patented, or controlled’ (Podoll 2014).

But if the Pledge slid into a value system to which freelancers were already accustomed, for the professional land-grant breeders, OSSI presents a much greater departure. Encircled by patents, trade secrets, licensing arrangements and university-negotiated material transfer agreements, it has become second nature within universities to treat seed as proprietary knowledge; each ‘new’ breed is valorized as a product of individual innovation, ignoring any concept of genetic heritage or breeding as a collective endeavor. Such logic, moreover, is institutionalized and dutifully leveraged: since the Bayh–Dole Act of 1980, universities have increasingly raised funds by patenting and commercially licensing publicly funded research. The irony, for public-sector breeders vis-à-vis OSSI, is almost too complete: threatened by the enclosures of public research, universities have been forced to enclose the efforts of public breeding work. Insofar as OSSI opens up these enclosures, a pledged variety represents not only a potential loss of capital for universities, but a

challenge to the entire for-profit model of public–private partnerships keeping them afloat (see [Figure 3](#)).

Even OSSI did not anticipate the strength of these dynamics. In 2014, when the initiative first launched, many observers guessed rightly that private industry would ignore or impugn it. For example, a spokesperson from the Seed Industry Trade Association said they would probably avoid pledged seed, ‘because then we’d... have limited potential to recoup the investment’ (Charles 2014). OSSI leaders initially believed the initiative would be more significant for plant breeders, especially at universities. Goldman told NPR’s Dan Charles that he expected many public-sector breeders would join the open-source effort. But as it turns out, Goldman told me, the use of OSSI germplasm poses a huge pragmatic challenge: because derivatives of OSSI seeds are also open source, the university would not be able to claim IP rights over, say, the product of a cross between university-owned germplasm and OSSI-pledged germplasm. ‘This means that as a breeder, I would have to have two separate breeding programs: one for OSSI and a “protected” program for the university’. So while breeders from University of Wisconsin-Madison, the University of Minnesota and Washington State have been instrumental to OSSI’s formation, they have been less vital to its ongoing growth. For all the reasons sketched above – scientific culture, structural lock-ins, the challenges of managing a separate breeding program – the university system has not been a particularly fertile space for the commons to grow.



Figure 3. On his farm in Oregon, freelance breeder Frank Morton (left) shows that on-farm breeding remains a vibrant practice. Here, he collects seed caps from lettuce plants with ‘intensely red cap bracts’. This red cap color, he explains, corresponds well to leaf color, and ‘by this state of growth, the relative health, fitness, and fecundity of the plant is easy to judge all at once’ (pers. comm.). The next generation of seeds will be mostly uniform for color and fitness, with many choices remaining for lettuce shape, flavor and texture. Morton prefers breeding outdoors because ‘gardens’, he says, ‘are where the knowledge lives’. Claire Luby (right), now executive director of OSSI, conducted her PhD work on carrots. Collecting seed from every commercially available cultivar she could find in the US – 142 in all – she was interested in mixing populations to explore novel combinations. In addition, she grew concerned with intellectual property rights. In 2014 alone, 15 patents were filed for carrot varieties, primarily by one company. Luby’s project soon became a more ambitious endeavor to map this patent thicket and the operating space in carrot breeding. Today, she is releasing much of her work as open source, including these ‘Wisconsin Open Source Composite’ carrot populations, whose selection results she is documenting here. This effort, Luby hopes, will help keep carrot diversity accessible to university and freelance breeders alike. (Image Credits: Karen Morton (left); Irwin Goldman (right)).

We saw previously that OSSIs early growth was marked by ‘beating the bounds’ around the Pledge: defending the common’s perimeters with a non-IPR system of access, use and exchange. But even the Pledge – ‘the restriction to end all restrictions’, as Deppe puts it – was in a profound sense only the very beginning (Deppe interview, August 20, 2016). As of 2014, OSSIs had begun releasing pledged varieties, a watershed moment in the IPR domain. Yet in order for the commons to flourish, it had to go further: to rekindle a knowledge of what to do with ‘freed seed’. For most US farmers, this knowledge is buried under years of being out of practice; under layers of taken-for-granted wisdom about quality and expertise; under the exigencies of efficiency (it is often much cheaper to buy seed than use land to grow seed). No one in OSSIs believes these issues are easy to solve, but neither are they immutable.

4.1. *The freelance breeders*

In a short two-part piece in *The Prison Notebooks*, Gramsci wrote of two kinds of intellectuals. ‘Traditional intellectuals’ are commonly identified by social position – learned people like religious clerics and scientists. However, he suggested, traditional intellectuals are not really a certain group of people, nor is there intrinsically intellectual activity. Rather, he recognized that ‘all men are intellectuals’, potentially, but not all are intellectuals by social function (Gramsci 1971/2010, 9). What matters is how their activities take place ‘within the general complex of social relations’ (8). Men of letters, philosophers and clergy function with a certain classless aura, representing their work as a historical continuity that transcends political and economic change. However, Gramsci argued, this *itself* is an ideological move. By occluding their deep attachments to various historical class formations (e.g. the clergy’s attachment to the landed aristocracy), they obscure the deeply political nature of Western religious and scientific reason, naturalize existing social relations, and manufacture the consent that Gramsci considered crucial for hegemony.

Organic intellectuals, by contrast, are people such as peasants from the countryside or mechanics in factories who come out of their own class activities to become those who provide information on better ways of doing things (Nowak and Prashad 2016). Because organic intellectuals emerge within or alongside subaltern communities, they are better able to listen and learn *with* (rather than speak and teach *to*) their peoples, while articulating the relationship between their social group and society as a whole. This double fluency gives organic intellectuals a particularly salient role in helping transform popularly held ‘common sense’ – a contradictory and disempowering consciousness – into ‘good sense’, a more sophisticated understanding of the world. Importantly for Gramsci, then, organic intellectuals are not just the opposite of traditional intellectuals; they ‘think and act *elsewhere and in other ways* than the traditional intellectual’ (F.T. 2017, emphasis in the original). With moorings in lived experience and everyday life – and because there is no pretense of impartiality to class interests – they are supple in moving people toward radically subversive activity.

Carol Deppe (Fertile Valley Seeds), Frank Morton (Wild Garden Seed), Jonathan Spero (Lupine Knoll), Roberta Bailey (Fedco Seeds) and Joseph Lofthouse (Lofthouse Farms) are just a few of the plant breeders who illustrate an unsung organic intellectualism in the US. They comprise a quietly expanding movement of ‘freelance’ organic plant breeders, a term they’ve coined to replace ‘amateur’ in recognition of their expertise (Deppe interview, August 20, 2016). Self-taught and fiercely Do-It-Yourself, they are generally less driven by money than curiosity, less driven by expanding patent portfolios than self-renewal. To get along, many operate small direct-to-consumer companies, earning income from

selling seed breeding materials and finished varieties. They tend to specialize in open pollinated seed, or ‘OPs’, (free from enclosures of hybridization), and in varieties specifically adapted to low external-input organic systems (free from enclosures of chemical–gene lock-ins). Geographically, the freelancers form a diffuse network, with a notable hotspot in Washington and Oregon and single farm-company outposts in Virginia, Illinois, Maine, Michigan, New York, Utah, England and Australia, among others. They are, of course, distinct from one another in important ways, and their entries into breeding range from subsistence farming to restaurant supplying to interests in landrace conservation. Some are lone seedsmen and seedswomen; a few participate in production commons like Fedco Seeds. Some are relative newcomers to breeding, while others have been at it for almost 50 years. Together they are developing organic, OP and locally adapted crops for resilient agriculture – local breeds for local needs.

It is this polyglot freelance community that has become, I argue, the spiritual and practical heart of the OSSI commons. Some of this informalization can be measured in numbers: the 28 freelance community members out of 37, the 96 percent of pledges, a near-balance of board seats. Other facets, however, are less quantifiable. Here, I focus on the epistemic transition: how informal breeding knowledge is being re-appropriated and re-legitimized, as this cadre of organic intellectuals beats new boundaries – epistemic and material – around who makes and remakes seed and who controls the shape of seed. I now offer two brief portraits of OSSI-affiliated freelance breeders as illustrative of the ‘commoning’ character that animates this freelance community.

4.2. *Beating the bounds for DIY breeding knowledge*

Carol Deppe, like many amateur breeders, fell into her new trade by accident. A Harvard-trained biologist with more than 20 years of working in genetics, she learned plant breeding on her own, mostly poking around in a small Oregon plot. Deppe was already accustomed to working with plants as an avid gardener, but prior to her retirement she had never experimented much beyond simple selection. Deppe warmed to the prospect of developing new grains and legumes to fortify her diet, locally adapted to her own garden’s climate. More importantly, she recognized that university breeders – ‘traditional intellectuals’ of the plant breeding world – were simply not developing the vegetable varieties she wanted or needed. ‘The U guys just try to produce whatever the biggest seed company around wants, and focus on the biggest crops, and big varieties rather than appropriate diversity’, she told me. By contrast, ‘we freelance plant breeders pretty much all breed with local adaptation being first and foremost’ (interview August 30, 2016).

Just as Gramsci argued that organic intellectuals must transcend assimilation – ‘teaching’ people by installing them in dominant educational institutions often dissolves the very moorings through which their knowledge is organically held – Deppe’s teachings have suffused through the gardening community mostly in the form of popular writings. She is the author of *Breed your own vegetable varieties: the gardener’s and farmer’s guide to plant breeding and seed saving*, and *The resilient gardener: food production and self-reliance in uncertain times*, among other publications. An organic articulation is visible across these works in the way Deppe shares her knowledge, navigating an expert/lay divide. She defies the common sense that farmers are not expert enough to be breeders, opening *Breed your own* with the simple dictum: ‘Every gardener should be a plant breeder’ (Deppe 1999/2000, 3). First drafted in 1993, when Deppe herself was learning how to breed, the narrative follows the contours of her own discovery process, which has the uncanny effect of leveling the playing field of expertise.

She also does not offer a polemic against corporate control of the food system. Instead, she appeals to her audience with *their* own concerns: Why can't they find seeds for their gardens? What happened to all the garden varieties that were once available? The problem, she suggests, is economies of scale. Small-scale gardeners purchase seed in small quantities compared to commercial growers, so it will rarely be in a large seed company's interests to carry local varieties – they simply cannot profit from developing small-holder breeds. Another reason melds political economy with agroecology: professional outfits develop crops for compatibility with input-intensive, monoculture regimes. They seldom focus on organic varieties that have been bred to thrive in biodiverse, low-input conditions, she explains. As Deppe unfurls her own pursuit of answers to questions about seed access, she continuously foregrounds not an individual identity, but a *social* identity – as a gardener–educator, breeder–food grower and member of grassroots seed networks. It is this identity that gives her lessons purchase toward demonstrating that 'everyone is a philosopher, and that it is not a question of introducing from scratch a scientific form of thought into everyone's life, but of renovating and making "critical" an already existing activity' (Gramsci 1971/2010, 331).

Yet in the context of a transformative movement, words should also carry through to activity and practice – the Gramscian 'philosophy of praxis'. Plant breeding, to be clear, is intrinsically practical. This characteristic has greased the subordination of 'applied' plant breeding to 'basic' plant sciences perceived as more scientifically elite. Deppe beats back against these hierarchies, with an identity that combines a Harvard PhD with soil-based expertise, and with practices that fortify the freelance breeding sector, the rabble-class of an already snubbed field. Concretely, this takes shape in praxis that minimizes the more arcane theoretical trappings of crop improvement in favor of concrete advice. On choosing a project: pick something delicious because mistakes will be many – and 'you can eat your mistakes' (Deppe 1993/2000, 3). On finding germplasm: her go-to's are mail-order catalogs, US gene banks, the Seed Savers Exchange and personal connections. And of course, before you even start a breeding project: 'How much space do you need? How much time?' (Deppe 1993/2000, 17) Answer: Breeding can be done on any scale; intricate projects can take years of planning and follow-through, but simpler ones can yield results in just a year or two. Answer: Space requirements depend, but if your project needs exceed your property, ask your neighbors for a spare patch of backyard. Land can be commoned too! Simultaneously, for the more technically advanced or biologically curious, there is much to explore in Deppe's texts: Mendelian theory, experiments in wild relative crossing, and not least a chapter-length 60-point checklist in *Breed your own* for designing variety trials and conducting plot-to-plate research.

Today, Deppe sits on the board of OSSI, holding workshops and offering advice on how to begin pledging seed. Most days, however, she can be found 'out in the field' in Oregon and managing orders for her own small business, Fertile Valley Seeds (FVS). The 2017 FVS Catalog was a major achievement, as it includes one of the most extensive listings of OSSI-pledged seed, bred either by Deppe herself or by one of 10 other OSSI-associated plant breeders (Roberta Bailey, Anne Berblinger, Glenn Drowns, Hank Keogh, Craig Lehoullier, Joseph Lofthouse, Frank Morton, Dave Podoll, Jonathan Spero and Don Tipping). Something larger than a listing is afoot here, Luby explains, which has not touched this community in several generations. 'Pledging their cultivars to the initiative results in acknowledgement of their work, formal registration of their cultivars, and a measure of protection against unauthorized and unrecompensated multiplication and sale of their material' (Luby et al. 2016, 286). That may be what the

breeders get, but Deppe and her fellow freelancers are quick to amplify to ‘we’. ‘When you buy these varieties’, Deppe writes (2017, 3), ‘you are helping to create and support an alternate model of control of seeds – one in which we, the people, have full rights to the seed we buy, and can save, share, replant, or sell it, and even use it to breed new varieties of our own’.

4.3. *Promiscuous pollination of landrace knowledge*

Joseph Lofthouse is a self-described subsistence farmer, specializing in landrace breeding. He grew up on a farm in northern Utah, gardening and milking a cow on a farm first established by his grandfather’s grandfather, more than 150 years ago. Before the Green Revolution, a variety of local wheat developed by Lofthouse senior was the most widely planted wheat in northern Utah and Southern Idaho. Lofthouse junior still grows that wheat today, alongside others varieties he has coaxed back from ancient origins. Rather than ‘depend on faraway distant mega-companies for seeds’, he told me, he decided to restore the age-old practice of creating his own (interview, November 12, 2016). But ‘create’ is an uncomfortable word for Lofthouse, who tends to defer to his ancestors when he speaks – tipping his language to their collective endeavors in contributing to the stuff of seed. For the OSSI paperwork he fills out to pledge seeds, Lofthouse admits that the individual breedership requirements are vexing. He sometimes signs ‘10K’, by which he means ‘10,000 years’ worth of illiterate plant breeders who created this variety’.

For Lofthouse, who took a vow of poverty 17 years ago, there is simultaneous freedom and security in subsistence breeding. Freedom from the bland taste and nutritional vacuum of industrial food; security in the stability of harvests that may not yield maxima but are steadier over time. Freedom, in turn, from food *insecurity*, which also fosters emancipation from the power that corporations and the state have over farmers. As Lofthouse told me:

I’m kind of an anarchist, and so what corporations do, or what governments do doesn’t really matter to me, because I’m going to grow my seeds the same way I always grow my seeds. If some corporation comes in and says that they own my seeds or whatever, I’ll still just keep growing my seeds, because I’ve lived in poverty for decades and I have nothing they can take from me. So, I mean, they have no power. (interview, November 12, 2016)

For Lofthouse, the ability to renew one’s means of reproduction is material, philosophical and very practical. It is also a deeply subversive way of doing things, which is why his story is instructive for the seed commons. Gramsci noted that traditional intellectuals don’t just exist: they *become* elites, gaining access to privilege precisely because their intellectual labor serves to reinforce that group’s dominance (Gramsci 1932). A more robust definition of an organic intellectual, then, is not merely an ‘opposite’ force to the traditional thinker. It is also someone who helps us see profoundly ‘elsewhere’ and ‘other ways’ of doing things. Lofthouse’s organic intellectualism emerges less as conscious politicization than in the trappings of everyday existence: through inhabiting an unusual space for intellectual work (the subsistence-smallholder slot in US society), through practicing breeding in places remote from biotech labs and university extension stations, and through making these ‘de facto’ normal/natural sites of intellectual work.

Traditional crops are the key to Lofthouse’s breeding strategy. Continuing the legacy of peasant farmers, Lofthouse works with landrace varieties, crops with high genetic variability purposefully maintained as a diverse gene pool to enable their adaptation to harsh conditions (see Figure 4). Mesopotamian wheats, Mayan maizes and other landraces become

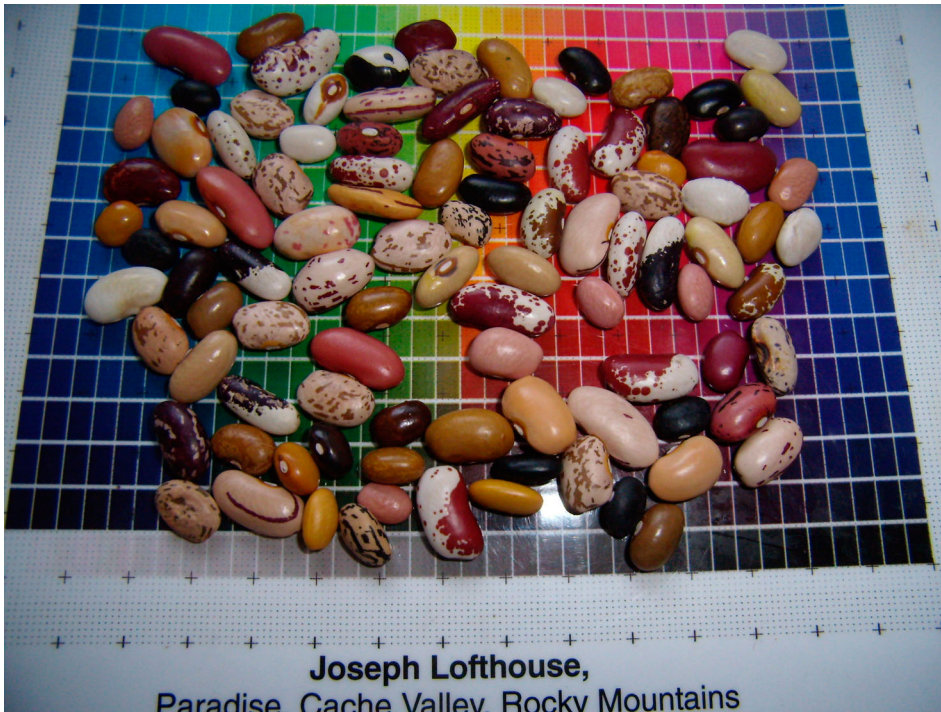


Figure 4. ‘Lofthouse Landrace Dry Beans’ is a landrace containing hundreds of varieties. Bred to mature quickly in a cold mountain valley, explains Lofthouse, the mixture contains old heirlooms as well as new segregating hybrids. The beans mature in 75 to 90 days, and are specially selected for non-mechanized harvest: ‘human scale techniques like beating with a stick or stomping feet’ (pers. comm.). They are delicious in chili, bean soup and refried beans – and when used in soups, the mixture means that some beans stay firm while others dissolve to make a rich broth. From cooks to farmers, the variety, says Lofthouse, is a marvel. ‘There is so much diversity that something is likely to do well anywhere that it is grown’. (interview Lofthouse, April 20, 2017) Lofthouse Landrace Dry Beans are OSSI Pledged and selected for subsistence-level growing without pesticides or fertilizers (Credit: Joseph Lofthouse).

attached to a locale over long periods of acclimatizing to territorially specific conditions: climate, soil, insects, water, people. In Lofthouse’s case, Paradise, Utah, demands that seeds can thrive in a cold arid climate of ‘irrigated desert, super-dry air, sunlight-drenched, cold radiant-cooled nights, short-season, and high-altitude clayish, limestone-based lake-bottom soil’ – to name just a few of the ecological considerations (Lofthouse 2017a). Lofthouse is also highly discerning about characteristics he selects for – and against – on the social side:

Home gardeners, plant breeders, and small-scale market growers who welcome diversity of shape, taste, texture, color, size, and maturity dates may love my seeds. My seeds are unsuitable for commercial farms or large operations that require uniformity, predictability, or stability. (2017a)

Landrace breeding is attractive, Lofthouse says, because it means cultivating an intimate relationship between a location, a farmer and a population of genetically diverse seed. But while landraces are still cultivated in many parts of the Global South, they are much rarer in the US and Europe, and access to landraces is limited.

This is where ‘promiscuous pollination’ comes in, a method that allows plants to swap pollen freely rather than restrict who mates with whom. Using this technique in 2009 to develop a new cantaloupe landrace, Lofthouse began by gathering 90 different varieties of cantaloupe over a three-year period (Lofthouse 2017b). The seeds came from his own farm, from surrounding farms, and from online mail orders. He then planted these together to make an original ‘mass cross’ – without, he emphasizes, keeping track of which varieties went where. The seed produced by this mass cross were the beginnings of a new melon landrace. From there, it was a practice of observation and culling. Some varieties were entirely destroyed by soil microbes before they germinated. Some grew slowly and did not produce any fruit. Others grew passably and yielded a small bit of fruit before first frost, while still others grew vigorously, producing loads of melons that ripened on the vine well before the cold came in. Importantly, a collaborator in the valley did the exact same thing. They swapped seeds over the years and produced ‘Lofthouse–Oliveron Landrace Muskmelon’.

For Lofthouse, promiscuous pollination has come to mean many things: food sovereignty at a time when corporations control and constrain the food supply; the chance to collaborate with other farmers in the valley; embedding agroecology as the core of his commons practice. ‘When I plant genetically diverse crops and allow them to promiscuously pollinate’, Lofthouse muses, ‘they are creating lots of variation in taste, texture, color, and odor. When I save seeds from specific plants that taste best to me, I am moving the population in the direction of what tastes best to me and to my community’ (Lofthouse 2016).

Of course, there are wrinkles in this story that Lofthouse is quick to point out. Unlike Deppe, for example, he is not particularly blown away by the ‘restriction to end all restrictions’ of the OSSSI Pledge. ‘It has no teeth’, he suggested to me, implying that the Pledge will be ignored by large corporations who will do what they will (interview, November 12, 2016). The power of OSSSI, for a subsistence farmer like Lofthouse, has been less about protection against free appropriation than about the commons community. He values the social relations that come through the open-source network: where breeders can troubleshoot problems together; where one person’s harvest becomes another’s parent material; where word of mouth carries customers from one trusted seed supplier to another. Deppe corroborates this view, telling me that OSSSI is helping bring dispersed freelance breeders into a more close-knit network, under the label, pledge and recognition of a protected commons.

5. OSSSI and the global seed system

5.1. *Southern resistance, epistemic divides*

Re-legitimizing the farmer as an expert in breeding, as explored above, could turn out to be one of OSSSI’s most important contributions to seed sovereignty, intellectual property notwithstanding. But the Initiative has received some pushback from civil-society groups, including organizations such as the ETC Group, GRAIN and LVC, whose research and advocacy on seed, biotechnology and intellectual property carry much influence in global NGO and peasant networks. In 2015, for example, a report by GRAIN and LVC openly critiqued open-source licenses as ‘tools of intellectual property’ and ‘not necessarily appropriate for seeds or for small farmers’ (GRAIN and LVC 2015, 43). Meanwhile, however, other seed freedom advocates in Europe, Asia and Africa have sought OSSSI’s advice and partnership. These responses, coming from disparate corners of the world,

illustrate that ‘beating the bounds’ is an inside/outside practice: continually negotiated rules within the community are never isolated from broader social forces – whether in the form of corporate gene giants or seed sovereignty allies.

From the very start, OSSI has been interested in how open source will play out globally because of ongoing geopolitical ‘seed wars’ (cf. Aoki 2008). To begin gauging the pulse of Global South civil-society organizations, in 2011 Kloppenburg attended the fourth meeting of the International Plant Treaty in Bali, Indonesia. The elder LVC members, Kloppenburg recalls, thought the idea of open source ‘was appalling’ – though younger, often English-speaking colleagues were more interested. Two years later, Kloppenburg flew to Mexico City to introduce OSSI to potential allies. ETC Group and GRAIN representatives, he told me, expressed serious misgivings about the utility of an open-source approach for indigenous and peasant communities. Back in Madison, Kloppenburg reported back to his OSSI colleagues, summarizing the feedback he had received. ‘We can expect to encounter these viewpoints among a wide range of NGOs both in the Global South and to some extent in Europe’, he told them. ‘These perspectives will materially shape not only how we implement OSSI in the US, but also the prospects and advisability of catalyzing the emergence of an OSSI “South” initiative ... We need to understand these concerns and think them through’.

According to GRAIN and ETC group, this disconnect is not only a divide between OSSI on the one hand and indigenous and peasant communities on the other. It is the more generalized problem of people who maintain the possibility of reducing social and ecological relations to *things*. Especially in agriculture, an activist says, ‘what we call seeds, as you well know, is a vast thread of social relations’ (interview (January 13, 2017); see also Vera-Herrera 2016). For GRAIN, then, the point is that the attempt to codify seed reproduction is itself dangerously reductive. ‘How’, he asked me, ‘can we get into a contract the vast complexity of life? Seeds change with every interaction they have with humans, that is, whenever they are planted. We can envisage this relation as a never-ending conversation between peasants and seeds, so a seed variety can never be standardized’.

Several related concerns, OSSI learned, grew from this basic epistemic disjuncture: First was that the logic of digital information systems cannot be applied to living systems such as plants – and not only because plants have independent subjectivity and integrity which must be respected ‘as things’, but because seeds are complex processes that entangle social and biological life. Second, much scientific manipulation disrespects the scale of transformations it imposes, and propels changes that, in nature, would likely not happen at that rate, if at all. Genetic modification of seeds is paradigmatic of this manipulation, which purports to achieve precision at the nucleotide level while still largely ignorant of genetic background effects, epigenetic factors and how gene expression is mediated by the environment. Finally, ‘positive law’ as developed by Western capitalist societies tends not to respect customary law, and efforts to translate customary arrangements into positive law often undermine them. Any attempt by OSSI to build contractual licenses would therefore follow in this paradigm – likely displacing the very types of ‘vernacular law’ (cf. Illich, 1981) upon which commoning thrives.

Strictly speaking, the positive law approach was abandoned by OSSI in late 2013, only months after this meeting in Mexico. Responding to both US and international feedback, OSSI terminated its pursuit of contractual licenses in favor of the Pledge – also a form of customary law. The objections of potential Global South allies, Kloppenburg explained to me, appear to turn not on OSSI’s overall objectives, but specifically on the *method* – that is, the use of a license as a performative vehicle. OSSI had been warned that a license ‘is

“prima facie” a form of ownership, that no form of ownership should be used or applied to living beings and that a royalty-bearing license is simply another form of PBR’ (Kloppenburg 2014).

Yet GRAIN and ETC Group insist that their objection is not simply methodological. In asymmetries wrought variously by botanical hunters, gene bankers, patenters and free traders, peoples of the South have continuously shared ‘in common’ what is theirs, only to confront as patented commodities the ‘improved’ derivatives of stolen seed. The concerns of GRAIN and others indicate the possibility of this power inequity continuing to flourish through open-source practices, rather than being fundamentally challenged by them. While a subtler form of codification than a legal license, a pledge imposes a fictive and only temporary ‘snapshot’ of seed – epistemically if not materially alienating it from the ecological and social relations inherent in the food web. Thus, despite what Vera-Herrera describes as ‘laudable’ moves to abandon the license, he and others remain concerned that OSSI continues to treat seeds as things, instead of social relations.

Meanwhile, the digital association of ‘open source’ is certainly one that OSSI will contend with, particularly among peasant and indigenous communities skeptical of technological solutions. Technically, the ‘logic of information systems’ Vera-Herrera spoke of fell away early on in OSSI’s formation, when they learned that software copyright – and, hence, copyleft – could not be neatly applied to biological seed. As inspiration, however, the digital link persists, and ‘open source’ carries with it strong connotations of techno-progressive, globally linked and radical freedoms: to use, study, share and modify as users sees fit. To be fair, the hackers who inspired GNU/Linux, biolinux and, in turn, OSSI are a subaltern culture not to be conflated with Silicon Valley elites. Yet some optimistic assumptions are shared. One is equity in access. Chander and Sunder (2004) caution that in theory, open-source models should result in a situation where all parties reap equal benefits of a commons-based approach to informational resources. But usually ignored are the *distributional* consequences. Differing relative knowledge, power, wealth, access and ability, they argue, may render some communities better able to exploit the ‘open’ resources in an open-source model.

Another assumption of open source concerns mobility and fungibility. Information should be free to move, to share, to mix and remix, untethered from any particular community, ecosystem, culture or place. Seed sovereignty movements often apprehend seeds as rooted, culturally and territorially. Their genetic makeup reflects coevolving relationships among plants, animals, water and earth in particular territories. Seed moves, but within certain delimited spaces whose boundaries are constructed through the sovereign rights and relations of local peoples. Such rooted ‘localism’ exists in an uneasy tension with the open-source ‘globalism’, and while these tensions also exist within food sovereignty itself (see Iles and Montenegro de Wit 2015; Schiavoni 2017), movement skepticism of unrestrained seed freedom makes full sense in light of colonial and liberal histories.

Yet in my conversations with informants, it was not even the open-source issue that seemed to elicit most concern. Rather, it was a habit of thought that Vera-Herrera described as a ‘radical monopoly’ embedded in the underlying structure of the Pledge. Ivan Illich depicted the radical monopoly as a process that occurs when industrial thinking manages to assume a monopoly of any formulation, notion, idea or concept. As a result, people are cognitively boxed in: they cannot imagine changing habits of thinking or doing; they continue to reproduce an industrialized point of view even if they seek to create an alternative. With respect to OSSI, the guidelines for entering the commons – i.e.

‘pledging seed’ – may create a kind of cognitive box with requirements for novelty and individual authority. As a reminder, OSSI asks that a variety, population or propagating material must be ‘new’, and that there must be an individual breeder, co-breeder or agent with the authority to pledge it. These criteria were developed by OSSI with awareness that they constitutively exclude certain types of seed – heirloom varieties, for example, which are available from multiple resources and seldom associated with a particular breeder. They also exclude most indigenous varieties, which are rarely considered biologically ‘new’ by indigenous communities, nor are they subject to individual authority (Luby interview, February 27, 2017). Indigenous landraces and many peasant varieties have instead been adapted iteratively through farmer mass selection, with no clear delineation between today’s trait novelty and generations of prior novelties. Cultivated over millennia of agrarian stewardship, they tend to be considered the product of intergenerational knowledge transfer, such that no individual agent could possibly lay claim to – let alone pledge – an indigenous or peasant seed.

Positive law does not recognize this subtlety, GRAIN and its allies argue, and the Pledge (though better than the license) continues to inscribe Western-scientific thinking. To be clear, the current OSSI guidelines do not exclude indigenous persons from pledging a crop variety. Simple selection – that is, farmers’ longstanding process of saving and replanting seed – can produce a variety that biologists would recognize as ‘novel’ if done in a directed fashion. A farmer meticulously saving seeds with certain traits may very well isolate a distinctive variety from a heterogeneous population. In addition, indigenous farmers are fully capable of cross-breeding plants, much as professionals do, to develop progeny with previously unseen variations. Nevertheless, these qualifications – describing what native communities *could* do in order to fulfill the OSSI criteria – mostly serve to illustrate the absurdity of forcing farmers to fit commons guidelines rather than vice versa. Entering into OSSI, then, might well contravene the values, beliefs and logics central to indigenous and peasant peoples’ own experiences of seed commoning – threatening the basis through which their own seed knowledge is organically held.

5.2. *Inclusions/exclusions at the commons edge*

Unfortunately, this paradox is not so easily fixed by relaxing the OSSI commons rules. An argument can be made that heirlooms and indigenous varieties are particularly vulnerable to enclosure and therefore are especially in need of a ‘protected commons’. But if the Pledge guidelines were amended so as to include indigenous and heirloom varieties, OSSI risks inadvertently becoming the bioprospector – since what gives OSSI the right to decide who among the countless cultivators of Brandywines or Cherokee Purples should have the authority to pledge them? And why should OSSI allow one Navajo or Pueblo farmer to pledge a corn variety that belongs not to her individually (as she herself believes) but to her territory, community and ancestry? To be seen as enabling biopiracy – which remains one of the most deeply resented expressions of colonial and imperialist ‘gene grabbing’ – makes evident why OSSI would hesitate to relax guidelines on pledging heirloom and native varieties. ‘It has to be something novel’, Kloppenburg told me; ‘Otherwise, we look like bad pirates too’.⁹

⁹Another reason OSSI requires that seeds be ‘new’ is that it avoids IP infringement. As Kloppenburg describes, ‘Because we get novel material, the only way you can get it is through our channels, our

OSSI has, of course, investigated workarounds. In the case of heirlooms, they did so only to find that in addition to problems of uncertain origin, uncertain identities became an issue: heirloom varieties have many synonyms, opening up the chance for accidental duplication and inadvertent pledging of someone else's seed. With indigenous cultivars, the variables are even more complex, given communal, ancestral and often sacred relations to seed. Importantly, OSSI did not act alone but consulted with grassroots partners, including Seed Savers Exchange who preferred that OSSI not include heirlooms, at least for the time being. Similarly, early consultations with indigenous growers in the US, Peru and Southeast Asia indicated these communities' preference for a 'wait and see' approach. For indigenous peoples especially, the concern is not only about perpetrating theft. It is also uncertainty over whether OSSI is vulnerable to being stolen *from*. Will the Pledge, as a moral economic construct, be respected by seed corporations and other proprietary interests? Will Lofthouse's concerns that the Pledge 'has no teeth' sap the legitimacy through which a 'protected' commons is protected?

OSSI's hope is that Monsanto, Syngenta and other agri-chemical companies will simply steer clear of the open-source commons, because although corporations have access to OSSI materials, they cannot, under the Pledge, patent OSSI seed or any derivative product. Thus, breeding or engineering with OSSI germplasm is theoretically possible, but runs counter to these companies' core business models. Indeed, in *Plant Breeding Reviews*, a team of Monsanto researchers hinted that they have little interest in tangling with open-source seed, writing that if enforceable, OSSI represents 'one of the most restrictive forms of access' from their perspective (Butruille et al. 2015). Another possibility, of course, is that agribusiness giants will simply defy the Pledge, and proceed to illicitly privatize germplasm obtained as commons. Kloppenburg doubts that corporate piracy is likely at present, mostly because the gene giants do not need or want the resources that populate OSSI – things like organic amaranth, OP Sovereign carrots, and Purple Peacock broccoli. But the relative value of this commons for corporations could change as OSSI expands, and certainly would grow more valuable for 'trait mining' with the addition of indigenous races and varieties. Thus, from the vantage point of peasant and native communities, beating the bounds for inclusion in OSSI remains double-edged. It seems unjust to exclude the very seed varieties most susceptible to enclosure from a commons specifically designed to thwart appropriation. Yet a commons may further endanger vulnerable people's seeds if it pools them together under a Pledge that is still untested. With the legitimacy of the Pledge still largely hypothetical, a justifiable concern is that bioprospecting could occur not by exclusion from the commons but because of it.

OSSI is well aware of contradictions latent in the OSSI model. The ability to radically free seed depends upon the Pledge, which requires recognition of individual authority and scientific novelty. Western norms of property and innovation, then, remain a filter through which people and seeds must pass in order to be commoned. When asked about this paradox, Kloppenburg is quick to acknowledge the irony and move past it:

You use the tools of the master if you can, any way you do it. We try and free the seed as much as we can. To do that, we are working within a particular regime – capitalism or US law. We are working with that as we can. Just as the people in open-source software are.

chain of custody. It's one of our breeders who's pledged it'. By the same rationale, the chain of custody protects OSSI seed from unauthorized use. 'If you've seen that variety out there and it doesn't have the OSSI logo on it, or it doesn't say OSSI pledge, then someone's taking it in a way that they shouldn't have taken it' (interview, December 7, 2016).

Herein lies the rub – the Pledge, by Kloppenburg’s own reckoning, is still a type of master’s tool, perhaps less hammer-like than the license but nonetheless a hegemon’s scalpel. OSSI believes that this pragmatism is important in local context: when surrounded by US capitalism and US law, an inside strategy begins with carving out ethical markets for freed (not free) seed, and whittling seed freedoms mediated by the moral Pledge. By the same token, social movement concerns suggest that the Pledge may have difficulty slicing through the discursive formation of which it is a part. If for Escobar (1994/2011), the wiliness of ‘development’ was the construction of discursive fields in which ‘only certain things can be said, or even imagined’, from the perspective of LVC, GRAIN, ETC Group and a broad consortium of seed sovereignty allies, open source could reproduce a radical monopoly of reductionist, liberal thinking – even while its well-intentioned advocates speak of seed freedom.

5.3. *From commoning seed, to seeding many commons*

These contestations have led to a realization that the Pledge inevitably reflects the social negotiation of only some types of commoners and some types of seeds. OSSI formed, at the outset, in resistance to external boundary beating: capital incessantly vying for greater imposition of intellectual property rights. But allies can also beat the bounds from the outside. In this case, social movements contested the cosmovisions underlying the Pledge, illuminating that perhaps more localized forms of OSSIs can support local sovereignty for seed.

Rather than beat its own bounds into a pulp of contradictions and possible routes to enclosure, OSSI is now taking an alternate approach to working with indigenous and peasant seed systems worldwide: it is attempting to ‘seed’ other local commons. The approach is simple, exemplary of what Escobar calls the ‘pluriverse’ of commons knowledge and practice (Escobar 2015). OSSI will share its experiences, struggles and stories with other communities; it will offer inspiration over formulation, tested strategies and solutions rather than a body of unified theory. In this fashion, OSSI also alleviates pressure on the US initiative, nascent as it is, to incorporate a galaxy of heterogeneous seed cultures into a singular Pledge.

In India, for example, the Centre for Sustainable Agriculture (CSA) has adapted the OSSI model to the conditions of Hyderabad and its rural villages (see Figure 5). An open-source seed program helps farmers preserve seeds for traditional foods and supports participatory breeding projects to develop rice, eggplant and millets that meet local needs (CSA-India 2014). Similarly, the German organization AgriCulture and Ecology is launching an EU-appropriate open-source system. In this case, the breeders and biodynamic farmers are designing formal licenses, not unlike those abandoned by OSSI. The Germans feel the licenses are feasible in their highly legalistic culture, and may be more robust as an antidote to the onerous EU Common Catalog. (In India, CSA is coupling legal licenses with an OSSI-like pledge). Meanwhile, Ethiopian farmers and breeders recently held a four-day meeting on ‘Open Source Seed Systems for Africa’, and plans are in the works for an OSSI-indigenous platform specific to native communities.

Kloppenburg emphasizes that ‘OSSI is not a model. It’s not even an exemplar’. What it is, he suggests, is ‘a concrete enactment of certain principles that anyone else can pick up and run with in their place’. With this ethos, OSSI seeks to promote a pluriverse of seed commons rather than establish or oversee a universal archetype, which would never succeed agroecologically or politically. This approach is also congruent with what Bollier suggests is most important now: ‘to form and expand a wider circle of actual



Figure 5. Patents and ‘bag tag’ licenses restrict farmers’ rights to save, replant, breed and exchange. Now pervasive in corn, soybean, sugarbeet, and cottonseed in the US, similar restrictions are being aggressively promoted in developing countries. OSSSI was created to counterbalance this trend. The Pledge which travels with each seed packet (left) gives farmers and breeders freedom to use seed in any way they choose, so long as they do not restrict others from the same freedoms. A group in India has recently developed their own open-source material transfer agreement (right), inspired by the OSSSI Pledge. In this way, OSSSI hopes to inspire a pluriverse of locally adapted and locally governed seed commons (Image Credits: OSSSI (left); Open Access India (right)).

functioning commons that can serve as “staging areas” for building a new vision for the future, a new cultural ethic, a political constituency’ (Bollier 2014, 170).

6. Conclusion

In this contribution, I traced the efforts of one new project to resist the long colonial and capitalist enclosures of seed. ‘Beating the bounds’ is an active mode of resistance undertaken by members of the Open Source Seed Initiative in an attempt to repossess their seeds. I argued that such boundary beating moves us beyond the static ‘commons’ and into the active form of *commoning*: the living practices of making rules, negotiating protocols and re-evaluating the principles through which a commons adheres. By focusing on knowledge, I followed these social practices through three related stories, from experimenting with legal structures to affirming plant breeding knowledge to articulating with the global seed system.

Boundary beating, we discovered, has worked to reconfigure the relationship between formal and informal seed laws and structures. In turning from legal licenses to the Pledge, OSSSI abandoned, on one hand, the power of legal enforcement by the state, thus gaining, on the other, the power of a moral economy defended by commoners. As a result, the commoners themselves reconstituted: with both formal securities and constraints of licenses gone, the Pledge attracted and supported breeders, farmers and companies committed to a more radical notion of freed seed.

We saw how this reorganization into a moral economy proved more conducive for some knowledge-makers than for others. OSSSI has been populated principally by a freelance breeding community that is less constrained by institutional lock-ins, less accustomed to proprietary knowledge and more able, structurally and culturally, to participate in pledging their seed. People like Carol Deppe, Joseph Lofthouse and Frank Morton, I argued, are breathing life into plant breeding as a practice of organic intellectuals. Though their heterogeneous farms, educations and habits defy broad generalization, in that diversity they may

be infusing OSSI – and perhaps eventually the broader US food system – with epistemic resilience.

Finally, in considering the larger global seed system, we found that boundaries can be beaten from the outside as firmly as from within. Global seed sovereignty movements have expressed discomfort with some aspects of open-source seeds: the digital logic of the premise, the tendency of Western science to manipulate nature beyond its knowledge, and the positive law that underwrites an open-source model. These concerns, moreover, did not fall away with the abandonment of a license approach, contrary to what OSSI initially believed. The lingering critique was a sense that even the Pledge contains buried liberal epistemologies, that somehow this moral economy treats seeds as things rather than as social relations.

I believe (but cannot prove), however, that seed sovereignty movements of the South may find much affinity with the freelance breeders of OSSI and the US more generally. These freelancers do not appear to view seeds as rootless data, mineable genetic resources or fungible commodities. ‘Open source seed isn’t inherently rootless or inherently not rootless’, Deppe suggests. ‘Caring about place, about local adaptation – that’s a value’ (interview, August 22, 2016). GRAIN and LVC have been justifiably concerned that the freedom of open source becomes conflated with ‘free markets’ in which ‘anyone, and especially large companies, can grab seeds wherever they want, and where communities lose all control’ (GRAIN and LVC 2015, 42). Yet in the end, these seed sovereignty groups’ affirmation that ‘We need rules over seeds’ is not so very different from the freelancers’ convictions. ‘The issue’, Deppe contends, ‘is an *unregulated* commons that seed privatizers can plunder [i.e. public domain], or a *protected* commons, that they can’t [i.e. open source]’. Most unregulated commons fail, she believes, especially when the population is large enough and the resource is valuable enough. ‘Seed sovereignty is all about a seed commons’, she told me.

Insofar as seed sovereignty movements seek to achieve common rights – to save and replant, to share and exchange seed, to breed new varieties of seed, and to participate in making policy decisions over seed – I see more alignments than frictions between OSSI and many sovereignty movements. At least the rubbings are smaller than the synergies, which could be traction for a pluriverse of commoning to grow. And this, to borrow from the essayist Rebecca Solnit, matters especially now, in times of systemic crisis. We are not slaves to Hardin’s tragedy of individualism and selfish conceit. ‘We’re beautifully, anarchistically resourceful, communitarian, full of mutual aid, in the moments after a disaster’ (Solnit 2017). So then the question becomes: Do we understand our own power? Can commoners exercise it, build on it, make something permanent out of it, hang onto it, do the slow, painstaking work of rebuilding a society? Like the OSSI commoners, I suggest that it is not a given. It will take much boundary-beating work. But in that activity, there are real possibilities of taking dominant structures apart and watching them collapse. There are real possibilities for commoned seed to grow.

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