

1 Article

2 The case for studying non-market food systems

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9 **Abstract:** Markets dominate the world's food systems. Today's food systems fail to realize the
10 normative foundations of ecological economics: justice, sustainability, efficiency, and value
11 pluralism. I argue that markets, as an institution for governing food systems, hinder the realization
12 of these objectives. Markets allocate food toward money, not hunger. They encourage shifting costs
13 on others, including nonhuman nature. They rarely signal unsustainability, and in many ways cause
14 it. They do not resemble the efficient markets of economic theory. They organize food systems
15 according to exchange value at the expense of all other social, cultural, spiritual, moral, and
16 environmental values. I argue that food systems can approach the objectives of ecological economics
17 roughly to the degree that they subordinate market mechanisms to social institutions that embody
18 those values. But such "embedding" processes, whether through creating state policy or alternative
19 markets, face steep barriers and can only partially remedy food markets' inherent shortcomings.
20 Thus, ecological economists should also study, promote, and theorize non-market food systems.

21 **Keywords:** ecological economics; markets; embeddedness; justice; sustainability; efficiency; values

22

23 1. Introduction

24 Food production uses about 40 percent of the land on earth, releases a quarter of all greenhouse gas
25 emissions, and irrigates with nine-tenths of the world's water consumption [1–3]. It drives
26 deforestation, toxification, eutrophication, freshwater scarcity, species extinctions, and climate
27 change, all of which threaten humanity's collective ability to feed ourselves in the future [4–6].
28 Worse yet, global food systems do not even adequately feed humanity today. An estimated 821
29 million humans suffer from chronic food deprivation and at least a billion more experience hunger
30 because of unequal distribution within households, high-activity livelihoods, seasonal food
31 insecurity, micronutrient deficiencies, or intestinal parasites that inhibit absorption [7–9].
32 Meanwhile, 9 percent of global crop calories feed biofuel refineries and other industrial processes
33 instead of humans. Another 36 percent feed livestock capable of digesting wild foods that humans
34 cannot, who return fewer than one-tenth of those crop calories back to humans in the form of meat,
35 eggs, and dairy [10]. And around one-quarter of global edible food calories, or one-third of the mass
36 of food production, ends up wasted [11,12]. One-eighth of the world's adults are obese while more
37 than one-fifth of children under five suffer from stunted growth as a result of undernourishment
38 [7]. Hunger exists amid plenty, want amid waste. Food systems ransack ecosystems and fail to meet
39 a basic human need. They are rightly already a priority for ecological economics research.

40 Markets govern much of global food systems. Moral philosopher Michael Sandel [13,14] calls for a
41 public debate about where markets serve the public good and where they do not. He argues that we
42 need moral reasoning, not just economics, to decide which social interactions and practices should
43 be governed by market mechanisms. This debate has dealt with whether markets should govern
44 immigration, friendship, queues, medical treatment, university admissions, and the distribution of

45 human organs, wombs, and blood [15–17]. Within ecological economics, lively disputes deliberate
46 the ethics and effectiveness of using markets and market-based instruments to address
47 environmental issues, with particular attention to monetary valuation of ecosystem services [18–21].
48 Jean-David and Julien-François Gerber [22] have argued that immunizing society from market
49 dependence in general – decommodification – should be a foundation of ecological economics. Yet,
50 whether markets for food serve the public good is a question that has been absent from ecological
51 economics’ research agenda. This article aims to spark this line of inquiry by decisively taking the
52 negative position.

53 Non-market food systems, similarly, have received little systematic attention as an alternative. A
54 meticulous online search yielded just 19 articles about non-market food systems published in the
55 journal *Ecological Economics*.¹ Other disciplines – anthropology in particular [42] – have studied
56 non-market food systems, mostly in traditional societies, somewhat disconnectedly from the
57 critique of markets. Yet people everywhere and at all times garden, hunt, fish, forage, and glean
58 food that is not for sale. Food sharing is a universal human trait [43]. Humans share food within
59 families more than any other mammal and between unrelated individuals in complex patterns
60 unique among all organisms [44]. Even in the cores of neoliberal capitalism, where markets
61 mediate most economic activity, people produce food to share, gift, and consume within the
62 household. Some of these non-market food systems may serve the public good better than markets,
63 or as a complement to markets. Others may not. Non-market food systems deserve careful study to
64 learn, together with their participants, about how they might promote the public good. This article,
65 then, also makes the case for studying non-market food systems.

66 I begin by offering a definition of markets and reviewing some typologies of markets. Ecological
67 economists, I speculate, have neglected to question markets for food or study non-market food
68 systems because food is inherently rivalrous, made excludable by coercive institutions, and
69 produced for sale in global, complex, path-dependent, power-laden systems. Yet these reasons do
70 not suffice to make market food systems desirable; nor do they warrant omitting non-market food
71 systems from the research agenda of ecological economics. I draw on diverse literatures to argue
72 that markets inhibit progress toward justice, sustainability, efficiency, and pluralism – the
73 normative ends of ecological economics – in food systems. Next, I critically examine common
74 proposals to remedy the shortcomings of food markets: regulating or supplementing markets
75 through the state and constructing alternative, “ethical” food markets. I argue that food systems can
76 approach the objectives of ecological economics roughly to the degree that they subordinate market
77 mechanisms to social institutions with other logics and values. Therefore, food systems entirely
78 without markets are, at the very least, worthy of consideration. By way of conclusion, I propose
79 some preliminary, imprecise outlines of a program for empirical investigation, practical action, and
80 theory building in the realm of non-market food systems.

¹ Using Web of Science, I searched for *Ecological Economics* articles that had both the topic “food” and at least one other topic keyword associated with non-market economies: “non-market” (1 result); variants of the words “gift” (gift*, 1); variants of “sharing” (shar*, 23); “subsistence” (13); “informal” (1); “reciprocity” (1); “home garden” (1); “self-reliance” (2); and several other search terms that returned zero results. I then read article abstracts to determine which focused primarily or partially on non-market food systems. I discarded duplicates and research whose only contribution was to place imaginary monetary values on non-market things. This yielded ten articles [23–32]. A Web of Science search using only the topic “subsistence” (54 results) yielded five more articles about non-market food systems [33–37]. I identified three more articles via Google Scholar with the search terms “ecological economics,” “food,” and “gift” [38–40]. Searching for “ecological economics,” “food,” and “sharing” produced one more [41]. Of the 19 total articles identified, 11 focus on the Global South, 6 on the Global North (one of which studies an indigenous community in the arctic), 1 on ancient civilizations, and 1 on pre-settlement indigenous societies in North America. Nine look at wild-harvested food, 7 at agriculture and husbandry, and 3 include some of both. Thirteen are empirical papers, 4 are reviews or historical research, and 2 are modeling studies.

81 2. On markets

82 A market is an institution that enables buying and selling through prices. This institution can be a
83 physical space, a shared ritual, a set of norms, or any combination thereof. The preceding definition
84 combines all three ways that theorists have defined what a market is [45]: based on what it looks
85 like (prices, in this case), what it does (enables buying and selling), and what institutions or
86 assemblages underlie it (a physical space, shared ritual, and/or set of norms). Myriad other
87 definitions based on different observational, functional, and structural factors exist.² There is no
88 “correct” definition of a market. Any delineation is valuable only insofar as it is useful for the
89 purpose at hand. Mine will work well to distinguish market from non-market food systems because
90 prices imply specified, generally repeatable terms of trade. This excludes communal sharing, many
91 centralized redistribution systems, non-simultaneous reciprocal gift exchange, and, I suspect, most
92 barter.

93 There are many types of markets. Many typologies of markets, in fact. Neoclassical economics treats
94 markets as relatively homogenous institutions. Economics textbooks tend to distinguish between
95 types of markets based only on how they deviate from the theoretical ideal of perfect competition in
96 a self-regulating market system generating socially optimal equilibria. Markets are “distorted” in
97 the case of natural monopolies, common-pool resources, public goods, and the ubiquitous benefits
98 and harms to others not involved in the transaction. Heterodox economists and other social
99 scientists have proposed further market typologies based on completeness of contracts, the roles of
100 participants, and other aspects that make real markets differ from market theory [47,48]. By
101 contrast, classical political economists such as Adam Smith [49], David Ricardo [50], and Karl Marx
102 [51] differentiated their theorizing about markets based on what was being bought and sold: goods,
103 land, labor, and credit have different characteristics and different people buy and sell them in much
104 different contexts and through different institutions. Echoing these thinkers’ concerns, Karl Polanyi
105 [52] argued that labor and land could never be governed entirely by markets because real people
106 and ecosystems are not produced for sale and have needs that markets cannot meet or account for.
107 But this arrangement is exactly what was desired by early 19th-century capitalists, who needed
108 steady access to workers and inputs, and by economists, who urged the establishment of these
109 markets for factors of production in order to discipline the poor and organize society in service of
110 industry [50,53,54]. Classical economists theorized and promoted an all-encompassing self-
111 regulating market system even as they admitted that land, labor, and money differed in important
112 ways from other commodities. Polanyi called these fictitious commodities. He and other scholars of
113 economic anthropology also conceptually separated external markets for trading between
114 communities from internal markets for trading within them; societies without all-encompassing
115 market systems do not have the latter, internal type of markets, but instead rely on systems of
116 reciprocity, redistribution, and self-production to meet needs and desires within communities
117 [55,56].

118 Polanyi saw a fundamental distinction between markets embedded in social institutions and the
119 disembodied markets of an all-encompassing market economy that can only work properly – that
120 is, self-regulate according to economic theory – when all other cultural and political governance
121 mechanisms are subordinated to it. That is, the market system requires disembedding markets from
122 social institutions, such that the market itself provides the set of rules guiding economic behavior
123 and decision making. States intentionally disembed markets by forcibly creating markets for labor,
124 land, and most everything else. Yet people and other beings fight back against full subjection to the
125 whims of the market. Fully disembodied markets would destroy society and nature, Polanyi
126 argues. So societies regulate, constrain, modify, and escape markets to retain the influence of non-
127 market norms and values. This re-embedding counter-movement thus subordinates the market to

² Many market theorists, however, somehow neglect to define the thing they study (see Rosenbaum 2000; Lie 1997).

128 other social institutions. One could inexactly place all markets on a spectrum between embedded
129 and disembodied. Since markets can be thought of as patterns of behavior that follow
130 institutionalized rules, markets embedded in non-market social institutions are extremely diverse,
131 while increasingly disembodied markets more and more closely resemble the ultimately
132 unrealizable theoretical ideal of the self-regulating market system. This suggests that the
133 disembodied – really *less*-embedded – markets of a market economy represent a purer form of
134 market, freer from the muddying influences of particular cultures and places.

135 Markets for foods are in many ways their own type. Food is a human physiological necessity,
136 without which we do not exist. Foods are organisms that comprise the ecosystems of which we
137 form a part. Food is the basis of rituals in every culture. Markets for other things that are essential,
138 ecological, or culturally important share some of the characteristics of food markets I describe
139 below. Some aspects of food markets apply to virtually all markets. Therefore, many of the
140 hypotheses and contentions I make below can inform a research agenda questioning whether
141 markets serve the public good in the case of not just food but any chosen good or service, especially
142 other essential, ecological, and culturally important resources such as housing, water, or medicines.

143 Food markets are also quite diverse. Again, diversity corresponds with embeddedness: local,
144 weekly marketplaces each have their own norms and quirks, while markets for agricultural
145 commodities like wheat are global and rather homogenous. But even market food exchange that is
146 highly embedded in social relations – farmers selling raw milk at negotiated prices to their
147 neighbors, for example – cannot necessarily be considered a spontaneous or fully autonomous
148 phenomenon because internal markets for things like food exist only where states have turned land
149 and labor into commodities by enclosing commons and destroying social institutions of reciprocity
150 and redistribution [52]. Yet ecological economics has tended to treat food markets as essentially
151 inevitable. Why have food markets hardly been questioned? How have non-market food systems
152 escaped careful consideration?

153 3. Food markets seem inevitable

154 Ecological economists have neglected to systematically evaluate the desirability of food markets or
155 develop any coherent body of knowledge on non-market food systems for sets of reasons that
156 overlap considerably. Therefore, I combine my conjectured motives for omitting these two areas of
157 inquiry – or lacks of motives for studying them, as it were – into a single list.

158 First, food is a private good according to economic theory [57]. This is because food is rival and
159 excludable. It is rival because you cannot eat food I eat. It is excludable because legal institutions
160 backed by the threat of violence can prevent you from taking food that is my property. A systematic
161 review of English-language academic texts since 1900 found nearly 50,000 references to food as a
162 commodity or private good and just 179 to food as a commons or public good [58]. Authors
163 overwhelmingly referred to “food *as*” a commodity, commons, or public good but wrote that “food
164 *is*” a private good, suggesting that scholarly understandings of food have been dominated by
165 neoclassical economic thinking. According to economists, such goods *should* be traded in markets.
166 Supposedly costly non-market governance mechanisms should be “saved” for things are non-rival,
167 non-excludable, or both. Moreover, the study of economics in general has confined itself to the
168 study of markets [46].

169 Second, food is actually produced for market, unlike labor, land, money, and most ecosystem
170 services [52]. “Following Polanyi’s scheme, some commodities are not fictitious; they are produced
171 for sale and exchange. There is no problem with valuing tomatoes with money” [18]. Food itself
172 and most factors required to produce it can be and have been private property [59]. In fact, history
173 suggests that the fictitious commodification of land and labor (which are not produced for sale)

174 triggered the widespread development of food markets. Thus, food itself is produced for market at
175 least in part because of the creation of markets for things that are not.

176 Third, ecological economists may believe that markets are the least bad of all options for governing
177 food systems. Food systems are complex, and markets simplify exchange and obviate continual
178 deliberations. Coordinating production and distribution across space and time is difficult without
179 markets [18]. Markets have existed before and outside of capitalism [52]. This all contributes to the
180 seemingly pervasive belief that markets and central planning are the only two options for
181 coordinating economic activity in large-scale societies [60]. Maybe scholars are unable to imagine
182 widespread, desirable, non-market, non-state food systems, and thus discount existing examples as
183 uninteresting or not useful in thinking about systemic alternatives. Or maybe they can envision
184 such systems but consider them unrealistic or bound to fail.

185 Fourth, the omission may be pragmatic. The hunger and ecological destruction in the food system
186 are urgent and economic institutions exhibit considerable path dependence [61]. Authors may feel
187 compelled to propose remedies that can be implemented in today's capitalist world. More to the
188 point, researchers may be trying to come up with solutions that are attractive to actors in positions
189 to enact sweeping changes; they may be pandering to people in power with politically palatable
190 reforms. Ecological economists tend to carry out research that is relevant to designing government
191 policies and programs. Findings about non-market food systems will often seem relevant only to
192 their participants.

193 Finally, the beneficiaries and proponents of market food systems have political power in the
194 academy and in society. Some parts of this phenomenon feel rather innocent. Market exchange of
195 food eludes examination perhaps because buying and selling food feels natural; most people trade
196 money for food in the marketplace almost daily in the urban areas where universities are located.
197 Similarly, non-market food systems might be cast as hobbies or marginal sources of nutrition
198 because this is how prominent scholars experience them. Research tends to reflect the worldviews
199 researchers have been trained to accept and adopt, both in their academic formation and through
200 life experience [62]. I explain below how market food systems serve and reinforce the dominant
201 systems of power, which play an outsize role in determining research agendas – and, indirectly,
202 findings – through state and philanthropic disbursement of funds as well as the institutions that
203 assign academic prestige. Social facts cannot be separated from values [63], and interrogating
204 market food systems or exploring non-market ones may well uncover facts that threaten the values
205 of those in power.

206 To sum up: food is a rival good that political institutions make excludable. It is produced
207 intentionally for sale in markets that would be quite difficult to abolish or replace. These are
208 necessary but not sufficient criteria for justifying the ecological-economic desirability of market
209 food systems. They in no way refute the call to systematically analyze, encourage, and theorize non-
210 market food systems. Indeed, the role of uneven power relations in setting research agendas
211 suggests that ecological economics' purported normative orientation toward justice might by itself
212 motivate studying food systems without markets.

213 4. Methods

214 In what follows, I assess the desirability of market-based food systems according to a set of
215 objectives derived from Daly and Farley's [64] three goals for ecological economics – justice,
216 sustainability, and efficiency³ – plus another foundation of the discipline: the incommensurability

³ I invert Daly and Farley's [64] order of the first two of these objectives, placing justice before sustainability, to facilitate the flow of my argument and to reflect an emerging shift in the priorities of the young scholars who will become next generation's ecological economists. The graduate students funded by the Economics for the Anthropocene project, a three-university research and training

217 of values [63,65]. For the latter, I examine markets' effect on the plurality of values in food systems;
218 since values are incommensurable, governance must take each into account separately. This scheme
219 loosely draws on the criteria for deciding whether to accept monetary valuations of resources or
220 ecosystem services proposed by Kallis and colleagues [18]. I occasionally use the term "desirable"
221 in this article as a shorthand for just, sustainable, efficient, and value-plural. One might consider
222 this ecological economics' rubric for whether markets meet Sandel's requirement that they serve the
223 public good.

224 My argument is decidedly one-sided. For the reader interested in reviewing the theoretical
225 advantages and well-rehearsed defenses of markets, any elementary economics textbook will do.
226 My purpose is to synthesize theory and evidence from diverse disciplines to call food markets'
227 desirability into question. Some of the arguments to come refer to characteristics and consequences
228 specific to the disembedded markets of a market system. If we suppose that markets have some
229 generalizable properties, functions, or at least regularities beyond the content of the definition I
230 have proposed, then it follows that markets would exhibit these characteristics in proportion to the
231 extent that a society subordinates other institutions to the rules of the market. The
232 disembeddedness of markets vaguely corresponds to the "marketness" of food systems, or of
233 society [66]. We see evidence for the generalizability of markets in the fact that capitalist markets in
234 the neoliberal era, when seemingly everything is for sale, display far less variability than those of
235 traditional and tribal societies, where markets are limited to special purposes and are subject to
236 strict norms regarding what can be traded, when, where, how, between whom, how much, and at
237 what terms of trade. Thus, this assessment refers mainly to the generalities of the former.

238 However, since no market fully realizes the impossible ideal of disembeddedness, my contentions
239 capture *tendencies in the disembedding process*. That is, as non-market social institutions are
240 increasingly subordinated to markets, those markets increasingly resemble the markets I describe in
241 the next four sections (on justice, sustainability, efficiency, and value pluralism). Because
242 neoclassical economic theory portrays imaginary, perfectly disembedded markets, my assessment
243 draws several insights from it. Yet I rely more on the critical conceptions of markets from heterodox
244 schools of thought and other social sciences. In actually existing market economies, unlike in
245 theory, markets have money and they include not just producers and consumers but participants
246 whose sole aim is to increase their initial stock of money through buying and selling – merchants,
247 capitalists, and speculators, namely [67]. Because markets are political and cultural institutions
248 involving interactions between real human beings, I incorporate understandings of markets from
249 political economy, history, anthropology, evolutionary biology, psychology, sociology, and
250 behavioral sciences.⁴ Food markets necessarily involve human-ecosystem interactions; so the
251 following sections also employ findings from agroecology, earth systems science, political ecology,
252 conservation biology, and other environmental sciences.

253 My approach is one of critical realism. This meta-theoretical position in the social sciences calls for
254 identifying and illuminating the structures and mechanisms – those of markets, in this case – that
255 play a part in producing phenomena of interest, such as the injustice and unsustainability of the
256 world's food systems [68]. The responsibility of markets for creating, or at least facilitating the
257 creation of, the undesirable state of today's food systems has been severely underestimated, or at a
258 minimum underexplored. As a preanalytic vision, critical realism posits an objective reality that
259 humans can know, but never with full accuracy or certainty [63]. This assessment of food markets is

initiative in which I am a student, have continually pushed for greater emphasis on justice in the program's curriculum and mission since its inception in 2014. To be sure, Daly and Farley's [64] focus on sustainability reflects an ethical obligation akin to justice toward future generations and non-human beings.

⁴ Interestingly, though, markets in experimental settings – which might be as close as science can get to studying a fully disembedded market – somewhat corroborate neoclassical theory's much-maligned assumptions about human economic behavior: markets do make people self-interested, calculating, and insatiable.

260 transdisciplinary because molecules, cells, brains, organisms, societies, ecosystems, earth systems,
261 and so on are ontologically different, and so must be studied by a plurality of sciences. Moreover,
262 different, at times incompatible, ways of knowing, approaches to inquiry, and even beliefs about
263 reality can each be useful for forming tentatively reliable understandings of diverse facets of a
264 world that is ultimately unknowable. They can challenge or substantiate each other's truth claims,
265 or create new knowledge together. The research agenda I propose thus encompasses plural
266 philosophical perspectives. Multiple methodologies are needed to study if, when, where, why, and
267 how market and non-market food systems serve the public good.

268 5. Results

269 5.1. Food markets are unjust

270 Markets are procedurally unjust because they give actors say over economic decision making in
271 proportion to their purchasing power and access to capital for investment. This allots power to the
272 wealthy. Markets warp food systems, and entire economies, toward what rich people want. They
273 are political institutions. Where economic inequality exists, markets are undemocratic since they
274 operate on the principle of one dollar, one vote. They remove collectively important choices from
275 the realm of public deliberation and decision making, handing the reins directly to property owners
276 [69]. Additionally, market power, incomplete contracts, non-clearing markets, and other conditions
277 can make one party to an exchange dominant over another [47]. These power imbalances can
278 undermine the voluntariness of exchange [14]. In the case of food, exchange is rarely fully
279 voluntary: one cannot choose to refrain from eating, and non-market options are often limited.
280 Food producers cannot choose to refrain from selling, either. They must accept market prices in
281 exchange for their produce to maintain their livelihoods and pay for inputs: land, water, labor,
282 chemicals, seeds, and labor, in the case of farming. In economic terms, the bargaining power of
283 parties with perfectly inelastic demand or supply is functionally eliminated. Involuntary exchange
284 is ripe for exploitation.

285 Markets create distributive injustice, too. They channel benefits to actors in proportion to their
286 purchasing power, which does not accurately reflect their needs, their equal share, or even their
287 contributions to society.⁵ Markets do not distinguish between luxury and sufficiency; food goes to
288 whoever can and will pay the market price. This systematically punishes markets' poorest and most
289 marginalized participants. Many people cannot afford enough market food to meet their basic
290 nutritional needs. Meanwhile, others pay to overeat, waste food, and direct edible crops to livestock
291 and biofuel production [59]. Not just the quantity but the quality of food is distributed unjustly: the
292 world's urban poor eat addictive, unhealthful, ultra-processed food-like products manufactured
293 from cheap cash crops, when they eat at all [71]

294 Markets tend to exacerbate economic inequality over time, making distribution increasingly unjust.
295 Economies of scale favor bigger farms, distributors, retailers, and input producers over smaller
296 ones. These big players consolidate their power through a self-reinforcing feedback loop: large
297 retailers prefer to source from large wholesalers, who buy from large processing firms, who
298 contract with large commodity traders, who buy from large industrial farms, who get their inputs
299 from large transnational chemical corporations. This simplifies administration and decreases the
300 costs of regulatory compliance. It also puts up barriers to market entry for smaller enterprises, who
301 must compete with oligopolies and oligopsonies of transnational corporations. Independent
302 producers get squeezed at both ends by powerful megafirms, constraining smallholders' revenue
303 and farmworkers' wages [59]. Power dynamics in bargaining favor wealthier actors. Farmworkers,
304 for example, risk being fired when they demand decent pay and humane working conditions.

⁵ These correspond to the three most typical principles of distributive social justice: need, equality, and equity [70].

305 Historically, income inequalities have risen sharply when protections have been removed from
306 market economies, such as during the neoliberal era of the last four decades [72,73]. Inequalities
307 within countries are at levels not reached since the early 1930s, and inequalities between countries
308 remain high despite, or perhaps because of, the globalization of markets [74]. Finally, market
309 settings might make people more comfortable with distributive injustice than they otherwise would
310 be. Across cultures, framing economic experiments as markets leads participants to quickly
311 converge on highly unequal equilibria [75].

312 Market settings promote behavior that produces injustice by forcing people to try to maximize what
313 they get and minimize what they give [76]. This encourages an antagonistic ethic. Merely
314 prompting people to think about money makes them offer less help to others, ask for less help from
315 others, and be generally less cooperative, caring, and warm in experiments (Vohs et al. 2006; Vohs
316 2015). In market settings, people tend to reallocate their time and effort from relational investments
317 like trust and community to general investments like their own education [79]. Markets can even
318 trigger moral decay. Some research suggests that markets make people act more selfishly [80].
319 Market settings seem to enable people to justify actions that in other settings would be unjustifiable
320 [81,82]. The pressures of competition, in particular, can bring about a proliferation of unethical
321 behavior [83]. In an economic experiment involving lab rats, auction markets made people
322 significantly more willing to let a rat die for a given sum of money compared to an individual, non-
323 market condition [84]. In the real world, nearly everyone purchases market food from industrial
324 systems that brutalize domesticated animals, drench ecosystems in poison, and undercompensate
325 vulnerable humans working in often appalling conditions. None of this should be surprising. In a
326 market that resembles that of economics textbooks, such as buying fruit from one of many vendors,
327 actors are in a psychological environment characterized by anonymity, self-regard, mobility,
328 independence, isolation, and calculation [47]. Some sociologists suggest, after all, that markets are
329 to some extent a performance of economic theory [85]. Markets affect behavior beyond the
330 marketplace, too, because they are cultural institutions. Our activity in markets contributes greatly
331 to making us who we are. Markets create people [86].

332 Markets create people who are more likely to tolerate and generate injustice. Markets reduce local
333 material interdependence, social solidarity, and practices of generosity, since buyers and sellers
334 need not know or care about each other or remember previous transactions [86–88]. To the extent
335 that markets' extrinsic rewards affect people's motives to act responsibly, they probably crowd out
336 intrinsic motivations [89–91]. Because the tasks we perform influence the people we become, the
337 fact that markets ask so little of us ethically suggests a reduction in both the salience of moral
338 concerns and the capacity for moral reasoning [47,79]. Indeed, experiments have found that
339 institutions that align individual and collective incentives – as do markets, in theory – create a
340 barrier to learning altruistic behavior and moral reasoning [92]. It is not necessarily a good thing to
341 economize on solidarity, empathy, communication, generosity, and collective decision making.
342 These are not scarce, rivalrous resources but muscles to be trained [14]. Markets contribute to their
343 weakening. "If gifts make friends, friends make gifts," wrote Marshall Sahlins [55] of his
344 experiences in tribal society. If strangers make market exchanges, then market exchanges make
345 strangers, added Sam Bowles (1991).

346 Markets might make societies more unjust for evolutionary reasons as well. Natural selection has
347 acted on human evolution at the group level primarily, including by promoting cooperative
348 cultural adaptations [93]. Human social groups transmit culture via sets of norms regarding what is
349 and is not acceptable behavior [94]. Economic institutions can affect cultural evolution in two ways:
350 rewards and conformism. In theory, the presence of market institutions leads to a lower
351 equilibrium population frequency of cooperative, prosocial traits [79]. The more marketness an
352 economy exhibits, the more strongly forces of natural and cultural selection select for individuals
353 who are self-interested or competitive. Increasing marketness also reduces the frequency of
354 repeated pair-wise interactions, which makes it more difficult to sanction violations of norms and

355 reward good behaviors with reputation. Moral economies that exist to make sure no one goes
356 hungry unless everyone does eventually break down or wither away [52,95]. If market elites
357 emerge, they use their status to entrench and expand markets [47,60]. If society must protect itself
358 from the harmful consequences of markets, then these counter-movements, to the extent that they
359 are successful, further entrench markets by making their effects more acceptable [52,96]. Practices
360 that promote injustice root themselves into the social fabric.

361 Markets legitimate unjust social relations, too. Across cultures, mythologies surrounding value tend
362 to conceal the collaborative nature of its creation [86]. Markets and market-centric economic theory
363 devalue and invisibilize the unwaged labor of women and non-humans that supports all
364 production [97–100]. Markets degrade the unpaid work that sustains them. It is market economies'
365 magic that they can pretend to be about something other than making people and social relations
366 [47,56]. Moreover, markets make inequality and exploitation appear as spontaneous results of
367 countless voluntary economic interactions, rather than as the outcome of any organized decision-
368 making process. Thus injustice can feel justified or inevitable. This phenomenon might explain the
369 finding that people are more willing to consent to injustice in market environments. Producers in
370 food markets, for example, struggle to provide both adequate wages for farmworkers and
371 affordable food for low-income families. These two objectives contradict each other. To farmers, this
372 conundrum could feel like an iron law of agriculture rather than an attribute of a specific economic
373 institution.

374 Markets create further distributional injustice when accounting for non-participants. Markets
375 facilitate and reward imposing costs on third parties [101,102]. Competition drives market actors to
376 shift costs onto the public [103]. This process most affects those without the political or economic
377 power to prevent others from taking resources from and dumping wastes on their environments
378 [104]. The world's poorest are the most dependent on the ecosystems that the global food system
379 pollutes and degrades [105]. They are also the least able to afford artificial substitutes to ecosystem
380 services, to the extent that those exist [21]. And, as suggested above, market participation might
381 make people care less about resultant injustice, because markets diffuse responsibility [106] and
382 evoke selfish, materialistic values. The ways that markets enable, normalize, and entrench injustice
383 mutually reinforce one another.

384 *5.2. Food markets are unsustainable*

385 Markets enable and reward environmentally harmful practices. Market food producers must make
386 their operations financially viable to exist. They have to produce at lower cost than the market
387 price. Likewise, markets direct agronomic research, breeding programs, and technological
388 innovation toward money-making rather than alternative objectives. These incentives for cost-
389 cutting in fact encourage high-input production methods because machinery and chemicals are
390 cheaper than labor and land. A barrel of oil can do the work of 20,000 hours of human labor.
391 Fertilizer can replace leaving fields fallow for fertility. Society bears many of the costs imposed by
392 machinery, fuel, pesticides, antibiotics, fertilizers, and irrigation systems, in the form of pollution,
393 resource depletion, and the degradation of ecosystems on which humanity depends. As more
394 producers adopt cost-cutting – more accurately cost-shifting – practices, competition drives down
395 food prices and all must adopt these practices. If many succeed in increasing production, the
396 oversupply pushes prices down as well [59]. Farmers, fishers, and foragers must produce ever more
397 cheaply to stay afloat, forever prioritizing short-term financial viability over long-run
398 environmental sustainability and other goals [107].

399 Markets facilitate the surpassing of sustainable scale, moreover. By continually motivating and
400 delivering productivity increases, competitive markets free up labor and resources to produce an
401 ever-greater array and quantity of goods and services. Wave upon wave of workers flock to cities as
402 food production becomes more labor-efficient, constructing industry and services on top of an

403 economy's agricultural foundation. Increases in material efficiency beget growth that ultimately
404 overwhelms those efficiency gains, increasing overall resource use [108–110]. Likewise, yield
405 increases have not spared land from agricultural encroachment [111,112]. Deforestation in fact
406 tends to increase as production per hectare increases or rural population decreases [113,114]. That
407 productivity gains make farming temporarily more profitable leads to more land in production
408 [115]. Then, as prices fall in response to oversupply, farmers need to increase production further to
409 make enough income to support their livelihoods [59]. At the macro level, increasing land and
410 resource productivity backfires – that is, leads to greater overall land and resource use – because
411 these efficiency gains drive growth. Cheaper food leaves consumers more money to spend on
412 everything else.

413 Markets also enable economic growth by making exchange itself more efficient; they decrease
414 transaction costs relative to sharing and gift exchange, which require established social
415 relationships, some degree of trust, and often cumbersome rituals. State-instituted markets enable
416 trade between strangers and over distance, allowing for increasing specialization and consequently
417 greater economic efficiency at the macro level. All these efficiency gains make food cheaper and
418 more abundant, increasing real incomes and human population, the twin components of growth.
419 Cheap food and raw materials drive profits as well, increasing the expansion of capital that propels
420 growth in the long run, pushing human environmental stressors past biophysical thresholds of
421 sustainability [116,117]. Some might protest that these are effects of capitalism, not markets as such.
422 Yet, in the sphere of agriculture, the two are inextricably intertwined. World-ecological theory
423 traces the origins of capitalism to market-oriented plantation agriculture, whose slaves were in
424 some instances forced to live by purchasing market food with wages [118]. Similarly, political
425 Marxist theorists argue that capitalism first arose from the genesis of market dependence [119] and
426 market imperatives [120] in the livelihoods of peasants. Once households rely on market exchange
427 for their social reproduction, the pressures of external competition force them to “improve” the
428 production process systematically and continually. In sum, the actions that food system actors,
429 individually and collectively, must take to survive and succeed in market settings align with neither
430 local environmental protection nor planetary sustainability.

431 Yet markets fail to punish the surpassing of sustainable scale. They rarely signal scarcity or
432 degradation of ecosystems that freely provide resources and services essential to humanity's
433 survival. To be sure, policy can create artificial market mechanisms that govern the use and
434 maintenance of ecological systems whose benefits to humanity are not tradable private property.
435 Yet treating ecosystem structures and functions as market goods is a risky abstraction because
436 ecosystems provide a complex multiplicity of interrelated attributes that benefit people in critical
437 ways we often cannot comprehend until they fail [52,102,121,122]. At the very least, economic actors
438 will respond to market-based environmental policy by perpetually shifting costs elsewhere, onto
439 nature or people that have little or no market value. A literally all-encompassing market system –
440 one in which *all* of nature's benefits and costs to people are bought and sold, or artificially priced –
441 would greatly extend the injustices of markets that I described above: individuals' environmental
442 preferences would count in relation to their purchasing power and poor people would be forced to
443 cut consumption to reduce their already-meager environmental impact while the rich simply pay to
444 pollute [21]. Such an arrangement, internalizing every externality, is not remotely possible, anyway,
445 since many of nature's values are neither compatible with property rights nor straightforwardly
446 quantifiable, much less commensurable with dollar values [63,65]. Monetary valuation of
447 environmental goods and services can never capture all of the relevant information for decision
448 making [102]. Some scholars, furthermore, argue that the market system would fail if capitalists
449 were to have to pay the full social costs of production [116]. The earth's life-support systems will
450 likely fail first, perhaps irreversibly, if the environment is protected in relation to its imputed
451 market value, since most individual components of ecosystems are valuable in their functional
452 relations to the whole, not because of their specialized, separable properties, much less any
453 attributes that individual consumers can enjoy.

454 Markets, by promoting specialization, make food systems more vulnerable to the environmental
455 disturbances they contribute to causing. Commercial production of cash crops and standardized
456 livestock have displaced and eliminated countless crop varieties and animal breeds that provided
457 stable subsistence but not profits through sale [123–126]. The loss of agrobiodiversity, including
458 genetic diversity within varieties, robs humanity of genetic resources from which to breed new
459 foods fit for a changing global environment [127–130]. Specialization of land use and labor mean
460 monoculture and mechanization, which reduce local biodiversity and preclude labor-intensive
461 agroecological farming techniques. Since densely populated single-species landscapes tend to host
462 more pests and diseases than biodiverse ones [131,132], pesticide use becomes indispensable. This
463 speeds up pest evolution: resistant insects, weeds, and bacteria typically appear within a decade of
464 new insecticides, herbicides, or antibiotics, sometimes sooner [133]. Superweeds and superbugs
465 threaten to destabilize an increasingly homogenous global food system. And specialization has
466 produced an increasingly urbanized human population that fundamentally depends on large-scale,
467 highly productive agriculture.

468 Market food systems have produced a particularly confounding sustainability and resilience
469 predicament related to nutrients. Urbanization breaks the nutrient cycles in which humans
470 participate. Nitrogen and phosphorous leave fields via harvests and leaching, never to return.
471 Potentially valuable nutrients become unwanted waste in cities and on industrial farms. They create
472 massive dead zones in aquatic and marine ecosystems. Farmers must continually apply fertilizer,
473 mostly from non-renewable sources. At this point, synthetic fertilizer manufacturing alone
474 produces almost twice the estimated sustainable limit for adding nitrogen to the global
475 environment [4,134]. Yet suddenly subsiding fertilizer production could condemn hundreds of
476 millions to starvation, since synthetic sources now account for about half of the nitrogen in the
477 proteins that make up human bodies, according to one estimate [135]. These results of
478 specialization are historically contingent and cannot be attributed to markets exclusively, yet it is
479 clear that the imperatives of a market economy and food system – increase productivity and
480 decrease the proportion of the workforce dedicated to feeding the population – restrict the option
481 space for addressing the breakdown of nutrient cycles.

482 Market food systems might make societies less resilient overall. It is clear that extreme
483 specialization will hinder societies' ability to recover from, and react to, the global environmental
484 changes and concomitant civilizational catastrophes that earth systems scientists foresee [136,137].
485 Peer-reviewed comparative case studies show that diverse, ecologically complex farming systems
486 sustain less damage than simplified ones in extreme weather events like hurricanes [138,139]. Labor
487 specialization has left much of humanity deficient in the sorts of food-related skills and ecological
488 knowledge that may be necessary to survive and thrive in a changed climate [140]. Market-
489 mediated economies deprive communities of the intimate social relations and spirit of mutual aid
490 that can ensure collective food security in times of crisis or shortage [141].

491 What is more, markets actively obstruct society from effectively addressing environmental
492 problems. Markets cut off exchange of all information between production landscapes and
493 consumption centers other than commodities' price, quantity, and observable characteristics [142].
494 Yet demand from consumers and profit-oriented food manufacturers guides production decisions
495 more than the intimate ecological knowledge of farmers, fishers, and foragers. Cognitive,
496 institutional, and ethical lags separate initial, proximate benefits from eventual, distant costs,
497 breaking feedback mechanisms between production, distribution, and consumption [143]. Placing
498 responsibility for, and addressing, invisible damage wrought by many hands in service of the
499 market poses substantial challenges [144]. Plus, markets impede the cooperative attitudes and
500 behaviors necessary to address humanity's sustainability challenges. Only international cooperation
501 can solve global public goods problems like climate change and, to some extent, hunger [145]. Yet
502 individuals and nation-states stand to benefit by acting in their own self-interest. These are

503 prisoner's dilemmas [21]. To address such issues, society must create economic institutions that
504 promote cooperation and altruism, not antisocial behavior [146].

505 Finally, markets for food might inhibit the formation of environmental values. Interacting with the
506 living world and experiencing the negative effects of environmental degradation tend to correlate
507 with pro-environmental attitudes, worldviews, and behaviors [147–150]. Markets, however,
508 distance consumers from both the ecology of food production and the environmental damage it
509 causes [142]. Those with the most purchasing power – the actors whose preferences essentially
510 *design* market food systems – will also tend to be most protected from the environmental
511 consequences of their decisions, which presents not only a barrier to developing pro-environmental
512 values but also a major problem of moral hazard. Some studies suggest that egoistic motivations,
513 which markets promote, reduce environmental concerns [151]. Thus, market mechanisms in food
514 systems not only contribute to creating environmental problems and impede societies from
515 resolving or dealing with them; they make it easier for people not to care about the environmental
516 consequences of their food.

517 *5.3. Food markets are inefficient*

518 Markets for food are inefficient because price signals frequently fail to elicit allocation responses as
519 theorized by welfare economics. During times of shortage, a rapid price rise does not necessarily
520 constrain excessive consumption. In the short run, food demand is inelastic because it is largely
521 determined by habits, culture, and necessity. Rich people do not cut consumption much in response
522 to price escalations because food expenditures comprise a tiny share of their incomes [21,152–154].
523 Thus, when food prices increase suddenly in response to, say, a failed harvest, limited supplies of
524 staple grains end up allocated to large livestock and processing companies while food insecure
525 households are forced to purchase less for lack of money. Price spikes cannot easily spur increased
526 food production, either. It takes at least a growing season for producers to increase the quantity of
527 crops supplied to market. Moreover, individual farmers do not always produce more in response to
528 higher prices, since their incomes increase just by producing the same amount; peasants, in
529 particular, exhibit such satisficing behavior when they can support a decent livelihood with less
530 work [155]. And barriers to entry, notably access to land, prevent new farmers from quickly
531 ramping up production.

532 Markets for food are unstable as a result. Since supply and demand do not quickly adjust, small
533 disruptions to food production can cause wild price escalations. Speculators purchase food when
534 prices begin to rise, knowing they will keep rising. This further increases food prices, in turn
535 begetting more speculative demand [156,157]. Even in local markets, merchants and farmers can
536 hoard food when it begins to seem scarce, exacerbating shortages into crises [158]. Price spikes
537 make the poor not just hungrier but poorer, in terms of real income. This holds for poor farmers,
538 who are often net buyers of food [159]. Putting all the food access eggs in the market basket, so to
539 speak, may make society more vulnerable to food price shocks, which are becoming more frequent
540 in an increasingly changed climate [160]. Markets' instability undermines their ability to efficiently
541 guide resource allocation toward food production and distribution.

542 Market efficiency evaporates entirely if we allow minimal interpersonal comparison of utility. At
543 the margin, markets tend to allocate essential, non-substitutable resources like food to those who
544 least need them [21]. As a person nears starvation, food's contribution to their well-being becomes
545 immeasurably large [161,162]. Yet markets send the marginal unit of food to well-fed, or overfed,
546 people for whom its value is miniscule if not negative. This happens because undernourished
547 people tend to have little purchasing power [163]. If they had sufficient money, they would be able
548 to buy sufficient food. Thus, reallocating food from overnourished to hungry people will increase

549 total utility.⁶ Pareto forbade comparing subjective satisfaction of subjective desires but prioritizing
550 physiological needs over psychological preferences feels ethically defensible, if not imperative.

551 Markets do not even efficiently satisfy any set of predetermined preferences weighted by
552 purchasing power, because they are cultural institutions. Markets shape people's preferences [79].
553 Preferences become increasingly endogenous in relation to the marketness of society. "It is
554 uncomfortably circular to justify a set of market arrangements on the grounds that they promote
555 the satisfaction of preferences if those preferences are themselves substantially the result of the very
556 market arrangements under question," writes Sam Bowles [47]. Ecological economists have made
557 the same point [64].

558 Markets are not entropically efficient, either, to the extent that they motivate substituting energy-
559 intensive inputs and machinery for human and ecosystem work. Modern, market-oriented food
560 production systems turn energy inputs into edible calories much less efficiently than traditional and
561 subsistence farming methods [164–166]. Massive amounts of food end up wasted because actors
562 receive no reward for ensuring that edible food ends up feeding people. If we redefine food system
563 efficiency with human nourishment in the numerator and ecosystem services sacrificed in the
564 denominator, then market allocation fails spectacularly. Given that the pursuit of certain agronomic
565 efficiencies has to some extent enabled the explosion of food waste, the escalation of obesity, and
566 the surpassing of sustainable scale, the ambiguous goal of efficiency itself should be questioned
567 [167]. Really, food system actors continuously balance the pursuit of different efficiencies and other
568 values, some of which contradict each other.

569 *5.4. Food markets suppress value pluralism*

570 Markets organize food systems according to exchange value, neglecting food systems' cultural,
571 spiritual, physiological, and ecological aspects. Values are the things people consider important.
572 Food systems, like the environment writ large, are sites where conflicting values and interests
573 compete [103]. The communities and stakeholders that hold competing values also compete:
574 conservation organizations might prioritize biodiversity and recreation, while farmers might
575 struggle for material ecosystem services and the aesthetics of a working landscape. Decisions, then,
576 distribute different goods and bads across groups, through space, and over time [168]. Above, I
577 made the case that markets give disproportionate decision-making power – and thus
578 disproportionate benefits – to the wealthy. But even in a hypothetical scenario with perfect
579 economic equality, markets systematically distort decision making toward certain values,
580 undermining others. This is because markets value things in monetary terms, when in reality values
581 are weakly comparable and therefore not commensurable via any single, common metric [65].

582 Markets seek to commensurate incommensurable values into prices, denominated in dollars or any
583 other currency. Imagine a food producer is choosing whether to plant an apple orchard or a
584 rotation of cereal crops on a plot of land. Cereal crops would produce more food in the first five
585 years while the apple trees mature, yet the orchard would produce far more calories over a 40-year
586 period. But cereals are easy to store and transport; they require less water and fewer pesticides; and
587 they provide more protein, complex carbohydrates, essential minerals, and B vitamins than apples.
588 On the other hand, apples are a better source of vitamin C, vitamin K, and potassium. And orchards
589 can host more plant diversity and better bird habitat than fields of grain. They need not be tilled,
590 but still typically require more human labor than cereal crops, which are more easily mechanized.
591 Each option performs better on some values and worse on others; many are context-specific. Some
592 cultures might ascribe beauty to amber waves of grain, while others might organize festivals
593 around harvesting apples and pressing cider. There is also an aspect of uncertainty: the apple trees,
594 for example, could be invaded by pests and die before producing at all. Clearly, there is no "right"

⁶ The law of diminishing marginal returns make this obvious.

595 decision or objective basis on which to decide. No solution optimizes all criteria at once. A
596 compromise solution depends on the values that food producers, and society, place on these
597 different attributes. These diverse values lack a common unit of measurement – material, ecological,
598 energetic, or otherwise [65]. In a market food system, these sorts of decisions are made primarily
599 based on profitability; monetary exchange value is used as the *de facto* common denominator, even
600 though people are neither cognitively nor ethically comfortable with transforming a complex of
601 relations into the single metric of money [102]. Value pluralism, by contrast, seeks to understand
602 the diverse ways that humans give importance to things, recognizing that these values often
603 conflict, are incommensurable, and cannot be reduced to any ultimate value [150].

604 Markets inhibit justice, sustainability, and efficiency in part by suppressing the values important to
605 achieving these goals. Even though different values and aspects of food systems are not
606 commensurable, there can be hierarchies of values [65].⁷ One might consider crop production for
607 meeting human nutritional needs a higher, more important value than for making automobile fuels.
608 Yet markets frequently prioritize the latter; it is lucrative to sell crops to powerful refining
609 corporations set on meeting a demand for biofuels backed by the purchasing power of the vehicle-
610 owning American middle class. Market farmers must care for plants and animals according to what
611 is profitable or feasible in terms of monetary *value*, not what is desirable according to
612 incommensurable *values* like religious beliefs, political ideologies, aesthetic preferences, or personal
613 morals [56,169,170]. Markets for food can only operate where participants regard certain aspects of
614 reality such as crops, livestock, water, land, and even time as commodities rather than as sacred
615 entities or kin [102].

616 Markets thus turn living beings and labor into things, useful toward the self-interested pursuit of
617 gain yet alienated from their social and ecological relationships. This promotion of *instrumental*
618 *values*, as described in the sections above, corrupts non-market norms, motives, and principles
619 worth caring about: love, duty, care, peace, reciprocity, mutual obligation, informal exchange, and
620 so on [13,14,79,89]. These are examples of *relational values*, which concern the relationships and
621 responsibilities that connect people to one another and to non-human nature [171]. These values
622 include the fundamental conditions of existence and cultural conceptions of the good life. Some
623 scholars categorize instrumental values within relational values, since they too emerge from
624 relationships – i.e. between subject and instrumental object [172].⁸ But it is the set of non-
625 instrumental relational values (hereafter simply relational values) that reflect the intuitive ways that
626 most people understand the world, make decisions, and tell right from wrong [174]. These values,
627 despite being ignored and repressed by market logic, are held by diverse people around the world
628 and do motivate action to protect ecosystems [150,174–177]. Many worldviews root their cultural
629 identities, notions of the good life, and well-being in relationships. Prominent scholars hold that
630 nature’s relational values underlie environmentalism, and that the heavy focus on conserving
631 biodiversity (nature’s intrinsic value) and ecosystem services (nature’s instrumental value) is
632 eroding the movement [171]. Others argue that relational values are the only ones fit for an
633 environmental ethic and aesthetic that addresses the twenty-first century’s crises [172]. Relational
634 values integrate and invigorate intrinsic and instrumental values: it is the orchardists’ relationship
635 to the orchard that makes it both sacred and satisfying to her.

636 Markets discount relational values because they each correspond to different languages of
637 valuation. Relational and instrumental values coexist in economic systems [178]. But markets, as
638 value-articulating institutions, capture exchange value, not the fundamental interdependence that
639 constitutes everyone or the eudemonistic relationships that constitute the good life. They reward
640 food producers and distributors for fulfilling others’ instrumental values, which incorporate

⁷ This article, for example, is based on prioritizing the values of justice, sustainability, efficiency, and pluralism.

⁸ To philosopher Samuel Alexander, all values “arise through the combination of mind with its object” [173].

641 relational values only to the indirect, limited extent that people's purchasing preferences reflect
642 them. Even if some policy mechanism endeavored to assign all relational values a monetary worth
643 and include these in market prices, the reflection would remain partial because markets change the
644 character and meaning of relations, in part by making all things substitutable. Market-based
645 frameworks for protecting the environment reduce complex relational values to their subset of
646 instrumental values, which treat ecosystems and food systems as simply means to meet human
647 preferences, interchangeable with other means toward that end [172]. It is doubtful that any market
648 value could pretend to approximate the intangible, unquantifiable values through which food
649 systems promote real well-being: connectedness, community, cultural identity, sense of place, and
650 other psychological relationships. Not without corrupting or instrumentalizing them, at least.

651 Markets even seem to degrade relational values over time. Food markets replace producing and
652 sharing non-market food, practices that connect people to each other and to ecosystems. The broad
653 relational value of subsistence from an ecosystem transforms into the purely instrumental value of
654 sustenance from a store, interchangeable with similar food from anywhere, produced however.
655 Connection to place and local uniqueness have been lost as crops, livestock breeds, recipes, even
656 microbes have been standardized for instrumental reasons. Market food systems threaten to strip
657 the social and cultural significance from eating, degrading it to mere feeding [140]. Organic foods
658 provide an example of markets reducing relational values to instrumental ones. Organic
659 certification schemes and labels were originally conceived to create a separate market for capturing
660 the value of farming practices that nourish the soil, care for non-human beings, and enact other
661 relational values between the land, farmers, and urban consumers. Yet now organic food is
662 overwhelmingly marketed as a way to protect the consumer's body from harmful agri-chemicals
663 and supposedly dangerous genetically engineered crops, reflecting purely instrumental values.
664 When people believe they are purchasing a personal protection against environmental danger, they
665 become less motivated to act to protect the environment or address its destruction [179].

666 Markets might not just amplify but also breed instrumental environmental values that see nature as
667 nothing but a useful stock of resources, sinks, services, beauty, and recreation opportunities [177]. I
668 argued above the markets constrain the emergence of environmental values. Market food systems
669 at their most disembodied prevent consumers from witnessing and participating in the
670 transformation of living beings into food. By disconnecting eaters from the landscapes, ecosystems,
671 and farmworkers that produce their nourishment, markets constrain the development of relational
672 values that underlie the continual struggles of communities to preserve the conditions of common
673 existence and, if possible, pursue the good life together. Values influence decisions and behavior
674 [180], which in turn determine the justice, sustainability, and efficiency of food system and
675 ecosystem outcomes.

676 **6. Food markets are difficult to fix**

677 As markets approach the disembodied ideal of economic theory and neoliberal practice, they
678 also tend to approach the unjust, unsustainable, inefficient, instrumentalist archetype described in
679 the previous subsections. I have shown that proposals to remedy some of these problems can worsen
680 others. Incorporating ecological costs into prices to improve sustainability, for example, reinforces
681 instrumental environmental values [177] and intensifies the injustices of markets [21]. Increasing
682 incomes until everyone can afford sufficient market food, in the name of justice, would in turn
683 accelerate the surpassing of planetary sustainability boundaries [181]. Ecolabels and alternative
684 "ethical" markets – organic, fair-trade, and the like – seek to value plural values like justice and
685 sustainability, typically through price premiums, yet in so doing restrict virtuous choices to affluent
686 people seeking green status [182]. At worst, they enable consumers to reproduce unjust social
687 relations while believing that they are undermining them [183].

688 Yet some of the justice- and efficiency-related problems of markets could be unambiguously
689 assuaged by radically reducing economic inequality through the redistribution of existing income

690 and wealth, including land. As a society approaches perfect wealth and income equality, “one dollar,
691 one vote” comes to resemble an equitable economic democracy. More-equal societies outperform
692 less-equal ones on all sorts of indicators of social, psychological, and physiological health [184]. But
693 reducing inequality is unlikely. Stanford historian Walter Scheidel [185] finds that established
694 inequalities have been flattened in the past only by mass-mobilization wars, transformative
695 revolutions, state collapse, and catastrophic epidemics. French economist Thomas Piketty [73] has
696 partially replicated these findings in wealthy countries over the past several centuries. He also
697 showed, as mentioned, that market economies tend to exacerbate inequality over time. Even where
698 better-intentioned states have attempted to redistribute land and enact other progressive reforms,
699 more-powerful foreign interests have often forcibly imposed capitalist development, providing
700 ideological justifications for intervention through departments of economics in universities and
701 government. The MIT Center for International Studies in 1957 proposed “deeper military
702 involvement in rural development so that peasants would be less inclined to support ‘internal
703 insurrections’” [158]. Those whom inequality favors control the distribution of wealth. They did not
704 ascend to their elite positions through generosity. To be sure, reducing inequality is a worthwhile
705 perennial effort not just as a means to make food systems and markets more desirable but for its own
706 sake – that is, to achieve distributive justice and egalitarian societies. I leave it aside here as a separate
707 struggle that is on its own insufficient to resolve the undesirable qualities of market food systems
708 described above. Yet subordinating markets to egalitarian social institutions can make societies more
709 equal even in the absence of income or wealth redistribution. In societies whose markets are more
710 embedded in institutions that treat individuals as equals, a given level of *economic* inequality will
711 correspond to less *social* inequality.

712 Societies can make their food systems generally more desirable by embedding markets in
713 desirable social institutions. My argument, in other words, is that societies limit the injustice,
714 unsustainability, inefficiency, and value monism their food markets perpetrate and facilitate by
715 intentionally subordinating market mechanisms to alternative, non-market logics, values, customs,
716 and rules. This embedding strategy, of course, works to the extent that the non-market institutions
717 within which markets are embedded embody values of justice, sustainability, efficiency, and
718 pluralism. In traditional and tribal societies, embedding is ubiquitous; all markets are rooted in the
719 institutions that comprise the general fabric of social life. In market societies, this subordination of
720 the market manifests in counter-movements to protect people and the rest of the web of life from its
721 devastating encroachment [52,186]. This counter-movement can take several forms. I will describe
722 each of these forms – reforms through the state, alternative markets, and non-market systems – and
723 the barriers to achieving them. I argue that each of these counter-movements is an important but
724 insufficient piece of efforts to align food systems with the normative objectives of ecological
725 economics.

726 First, counter-movements can be reforms enacted through the state. These reforms change the
727 rules of markets in ways that deviate from the self-regulating market system of economic theory,
728 such as by constraining certain types of transactions or manipulating prices such that they are not
729 entirely determined endogenously through supply and demand. This might include, for example,
730 laws that limit or forbid speculating on agricultural commodities, to lessen the magnitude of food
731 price shocks during times of shortage. Or it could consist of anti-hunger government programs like
732 the Supplemental Nutrition Assistance Program (SNAP, or food stamps) in the United States, which
733 provides limited-purpose money to low-income people with which they can purchase market food.
734 Policies and programs that improve wages and working and living conditions for farmworkers or
735 other food-system laborers also constitute a counter-movement against the disembedding of markets.
736 Social movements for sustainable agriculture are part of the Polanyian counter-movement, too, to the
737 extent that they push policies and food systems toward embodying non-market values [187].

738 Yet the realities of political economy limit the likelihood of achieving desirable food systems
739 through such measures alone. Once markets exist, it is quite challenging to prevent indexes,
740 derivatives, futures markets, and other speculative instruments from materializing [188], including

741 illegally. Even the recent global financial crash did not lead to regulatory limits on finance. More
742 troublingly, states use hunger for social control and as a rhetorical justification for their own
743 interventions; thus they do not want to fully eradicate its threat [158]. The SNAP program provides
744 too little to afford a healthy diet [189,190], does not vary benefits with food prices, and exists as part
745 of the U.S. farm bill, whose subsidies favor large-scale industrial agriculture [191] and reduce the
746 price of foods whose consumption is associated with greater cardiometabolic health risks like obesity
747 and high cholesterol [192]. Powerful corporate interests spend massive resources opposing effective
748 regulations to protect labor and the environment [193]. Any social and environmental protections
749 achieved must be defended in perpetuity. Plus, changing rules and incentives constrains rather than
750 transforms the fundamental logic of markets; it is hard to imagine how policy could curtail
751 instrumental values like selfishness or the drive to shift costs on others in market food systems. The
752 counter-movement to subordinate food markets to other social institutions and values through the
753 state, like the drive to reduce inequality, is necessary but not sufficient and faces steep odds. Below,
754 I elaborate further on the fundamental barriers to achieving desirable food systems through state
755 action.

756 A second type of counter-movement involves constructing self-contained embedded markets,
757 separate from the dominant commodity food system. These “alternative food networks” include
758 farmers markets, consumer cooperatives, and direct sales from producers to institutions or local
759 businesses [194,195]. They also encompass standards-based certification schemes like labels of origin
760 [196], organic, and fair trade [197]. Alternative embedded markets can provide effective protections
761 against certain undesirable features of food markets, through formal and informal rules. Relational
762 values related to justice and sustainability motivate many participants [198,199]. In local markets,
763 producers set prices with regard for more than market forces [200].

764 Yet alternative food markets’ contribution to creating more desirable food systems is
765 complicated. Many scholars question whether the values and structures underlying alternative
766 markets actually correspond with improved outcomes in terms of justice and sustainability [201–207].
767 Alternative-market producers must still prioritize financial viability and enact instrumental values,
768 after all [208]. Price premiums instrumentalize relational ethical values. Moreover, alternative
769 markets are marginal: just 1.2 percent of the world’s farmland is certified organic [209]; the global
770 fair-trade market is one-tenth the size of organic [210]; and direct markets to consumers, institutions,
771 or local businesses account for just over two percent of food sales in the United States [211]. Scaling
772 up alternative food markets often means compromising their embeddedness in local social
773 institutions or non-instrumental values [199,212]. Corporations have watered down certification
774 standards and followed their regulations but not their principles, leading to contradictions like
775 “industrial organic” farming [213–216]. On the other hand, alternative food networks provoke change
776 in part through their relation to the dominant market food system, such as by pressuring major
777 corporations to change their practices. Alternative food markets are one aspect of comprehensive
778 movements, such as food sovereignty and agroecology, that seek to transform global food systems.

779 Protective policies and alternative markets make progress toward justice, sustainability,
780 efficiency, and pluralism by constraining the reach of the market system into food systems. Another
781 type of counter-movement is not regulating or embedding markets but creating non-market food
782 systems. This can be done through the state, charities, or self-organization. I will treat each in turn.
783 States, for their part, can centrally plan and organize food systems. In theory, they can govern all
784 production and exchange of food above the level of the household without markets, as in the ideal of
785 state communism, or they can administer small food systems or subsystems separately from the
786 market, such as organizing food production and distribution for the military. In practice, neither of
787 these examples tend to be fully non-market food systems according to my definition, since buying,
788 selling, and prices are typically present. The Soviet Union and communist China, for example, both
789 purchased the output of farms – whose operations were partly governed by the central planner – at
790 prices set by the state, and then sold these products in state stores at another set of predetermined
791 consumer prices [217]. Social programs to feed the poor or the military often involve the state

792 purchasing food either at commodity prices or from contracted producers, and then either gifting
793 that food or selling it at preset subsidized prices. Thus, actually existing state-run food systems are
794 best characterized as markets that are highly embedded in authoritarian or bureaucratic social
795 institutions. Regardless whether by replacing markets or embedding them, though, state food
796 systems can prioritize desirable values. Food rationing can contribute to justice by giving precedence
797 to needs over wants, and to sustainability by limiting consumption [218,219]. State contracts that pay
798 price premiums for agroecological farming can contribute to sustainability [220]. Centrally planned
799 economies, unlike those based on the private accumulation of capital, need not grow, at least in
800 principle [221,222]. Centrally planned price schemes can make food markets incredibly stable, and
801 also enable, by subsidy, the simultaneous realization of adequate remuneration for producers and
802 affordable food for consumers.

803 But centrally organized state food systems have not performed desirably and may not be able
804 to. China's horrific famine during the Great Leap Forward illustrates the worst possible injustices of
805 state-planned food systems. From 1958 to 1961, 16–30 million people died prematurely – the greatest
806 loss of human life to hunger in recorded history – mostly because of systemic failures in central
807 planning: expecting implausible increases in productivity, China's government diverted resources
808 from agriculture and procured too much food to send to cities, leaving farmworkers famished and
809 unable to produce enough to feed their rural communities [223,224]. For achieving not just food
810 security but also sustainability and efficiency, state bureaucracies' centralized knowledge is far less
811 useful than the local, ecological knowledges of food system participants spread across the landscape
812 [59,225]. Productivist centrally planned economies in the Cold War years dedicated more resources
813 to agriculture than market economies yet output remained less than desired [217]. In Cuba, the farms
814 with the most autonomy over production decisions tend to fare better agroecologically – producing
815 greater output from fewer inputs – than those subjected to central planning [221]. Moreover, the
816 movement for food sovereignty is based on the premise that communities have the right to govern
817 their own food systems [226]. Without mechanisms like the market that enable participants to express
818 and respond to needs and offers in a decentralized fashion, large-scale food exchange networks
819 become woefully inefficient at allocating resources and nourishment to those who most need it.

820 There is reason to doubt that state-run food systems would ever be just even if planners were to
821 have perfect information. Political elites tend to attend and respond to the desires of other elites, not
822 ordinary people [227]. Those in positions of power leverage their status to personally benefit,
823 consolidate their privilege, and extend it to those in their empathic circle [228]. They are hardwired
824 to ignore risks that threaten less-privileged others or their own individualistic worldview, including
825 their self-serving belief in meritocracy [229]. Regardless technical advances or economic system, elites
826 eat first, even as marginalized people live on the edge of starvation [158]. States are history's only
827 strict, fixed, extractive, bureaucratic social hierarchies [230]. When states produce or procure food to
828 give away or sell at subsidized prices, even in market economies, it is the bread of "bread and
829 circuses," provided to the hungry populace to quell unrest and manufacture consent. Food remains
830 frequently used as a weapon of war in foreign policy [231,232]; it is an incredibly effective tool of
831 coercion in a world of hungry humans. State grasps for power over domestic food systems should be
832 seen in this context. What is more, since states institute all markets, even market food systems are to
833 a great extent planned [233]. Therefore governments are largely responsible for the injustice,
834 unsustainability, inefficiency, and value monism of real-world market food systems too. States did
835 not have to create market systems that approach the disembodied ideal of economic theory. But this
836 what they have tried to do, despite undesirable outcomes.

837 To be sure, state policies and programs *are* potentially effective means for working toward
838 desirable food (and economic) systems, precisely because state governments have so much power.
839 Historically, pressuring states to feed the hungry and generally improve social and environmental
840 conditions has worked, especially when such pressure has organized itself in disobedient, leaderless
841 mass movements with ambiguous demands [234–236]. Moreover, many policymakers, bureaucrats,
842 and others in government truly do have good intentions; they care about justice, sustainability,

843 efficiency, and even honoring the plural values of constituents. What is remarkable is that *in spite of*
844 declared noble intentions, hunger and poverty have never before been greater relative to the world's
845 collective capacity to eradicate them [237]. They persist mainly because powerful elites have,
846 deliberately or not, instituted economic systems that channel resources to themselves. International
847 governance institutions like the United Nations continually tweak measurement methods and
848 retroactively fabricate baselines to make it appear as if poverty and hunger are decreasing when they
849 are not [9]. As ecological economists, devising policies to tweak markets or programs to supplement
850 them is an important part of our work; policymakers pick from available ideas. Striving for *better*
851 markets and *better* states is striving for a better world. But what if there are actions that common
852 people and marginalized communities can take to make food systems – and economies – more just,
853 sustainable, efficient, and plural? What if they can avoid the pitfalls of markets and the state entirely?
854 This is my argument for serious inquiry into the nature and potential of food systems without
855 markets or states.

856 The call for regulated or embedded food markets misses grander opportunities for a more
857 desirable world. Food is rarely traded in markets at all in contemporary and historical societies whose
858 markets are embedded – that is, societies that do not subordinate social life and institutions to the
859 market [42,55,238]. Internal (within-community) food markets arise when land and labor become
860 commodities [52]. If, following Gerber and Gerber [22], ecological economics finds itself partly on
861 freeing life from full determination by markets, we might do well to focus on freeing food – an
862 essential, ecological, cultural good with unique characteristics that undermine many of the benefits
863 of markets. Think of food like healthcare. Economists have long struggled to reconcile market theory
864 with the fact that general equilibrium cannot be reached if participants' survival is not guaranteed by
865 some initial endowment [67]. A Nobel prize-winning economist, unable to find a satisfactory
866 specification that did not assume death by starvation for those whose resources were insufficient,
867 once conceded that the market model "would be found best suited for describing a society of self-
868 sufficient farmers who do a little trading on the side" [239]. Or any society whose nourishment is
869 assured by non-market food systems, I would add. In addition to alternative markets, food activists
870 and scientists should consider alternatives *to* markets.

871 But the fact that markets mostly fail to produce justice, sustainability, efficiency, and value pluralism
872 does not automatically entail that other economic arrangements for food systems can or will.
873 Whether, and *how*, non-market food systems can succeed where markets fail is the key question
874 around which to organize a research agenda on the topic for ecological economics. Of course, directly
875 comparing market and non-market food systems, or different types of non-market food systems with
876 each other, is tricky because all else is never equal. Yet learning about how non-markets food systems
877 function can point the way toward an understanding of their role in transformation toward more
878 desirable food systems. Through empirical analysis, ecological economists can determine what sorts
879 of non-market food systems to promote based on their performance or potential with relation to
880 justice, sustainability, efficiency, pluralism, or the values that participants themselves hold.
881 Theoretical work can then contemplate how such systems might replicate themselves or come
882 together in desirable assemblages of coexisting food systems. A subsequent article will review
883 research on non-market food systems and suggest an agenda for ecological economists studying
884 them. Here, I will conclude by reviewing the broad outlines of the research agendas I have proposed
885 for critically assessing the desirability of food system institutions and plans to transform them.

886 7. Conclusion

887 Overall, today's global food systems are unjust, unsustainable, inefficient, and value-monist. Yet
888 the primary institution for governing them, markets, has hardly been questioned as such. I have
889 argued that markets bear much responsibility for the undesirable nature of food systems. In so doing,
890 I have proposed a rubric of sorts for assessing the ecological-economic desirability of markets for
891 food, and I put forth several contentions and hypotheses intended to initiate research and incite
892 debate around this question. Researchers can and should adapt this agenda for considering
893 consistency with the normative foundations of ecological economics to any economic institution, not

894 just markets, and any good or service. I focused on markets because of their ubiquity and acceptance,
895 and on food because of its status as an essential, ecological, and culturally important resource.

896 To evaluate the desirability of markets as such, I argue that one should pay attention to markets
897 that are disembedded from other social institutions. To sum up: markets allocate food to its most
898 lucrative uses, not the hungriest humans. People act selfishly and accept injustice in market settings.
899 Market pressures force food producers to shift costs onto the public and ecosystems. Market prices
900 rarely signal environmental degradation. Market competition in food systems drives the economic
901 growth that has pushed resource use and waste generation past planetary thresholds of
902 sustainability. Markets for food are unstable and unlike the efficient markets of economic theory.
903 They revolve around monetary value, neglecting food systems' cultural, spiritual, and ecological
904 attributes.

905 Despite our compelling economy-in-society-in-nature diagrams, ecological economists' most
906 typical methods are well suited for studying economic systems as separate spheres, divorced from
907 but interacting with their social, cultural, political, and biophysical milieus. But to study embedded
908 markets and non-market systems, where no separate economic institutions exist, one must
909 understand the economy as just one aspect of an integrated whole made of nature, culture, social
910 organizations, and supernatural meta-persons. This requires developing what Clovis Cavalcanti has
911 tentatively called ethnoecological economics [240]. This transdisciplinary literature review, like the
912 synthesizing work of social ecological economics [63], coevolutionary ecological economics [241], or
913 political ecological economics [117], works toward fulfilling our field's holistic intentions. With a
914 broader set of quantitative and qualitative tools, as well as more diverse theoretical frameworks to
915 draw on, researchers are better equipped to critically consider the feasibility and desirability of
916 different options for embedding food markets through policy or alternative food networks, or for
917 maintaining and creating non-market food systems – an astoundingly underdeveloped area of
918 inquiry.

919 Thinking about how the evolution of economic institutions interacts with justice, sustainability,
920 efficiency, and values will not end with a convincing set of answers. Nor is it meant to. This research
921 agenda's purpose is to deepen and sharpen our understandings of the ways in which communities
922 work toward and at times achieve these goals (or not), in service of transforming societies toward
923 them. This research is meant to inform action. If my argument holds any kernel of truth, if market
924 food systems are undesirable and all strategies for resolving their shortcomings are partial and
925 extremely challenging, then this in itself warrants substantial promotion and propagation of non-
926 market food systems. Research is part of action; ecological economists should also analyze,
927 experiment with, and theorize about non-market food systems. We should learn from those who
928 produce food that is not for sale and exchange food without money. We should assess diverse non-
929 market food systems' desirability according to the rubric presented in this article.

930 Research is action in a more fundamental sense, too. Researchers create reality as they study it [242].
931 Data is generated, described, modified, analyzed, and interpreted; it is not simply out there waiting
932 to be discovered or harvested. By drawing academic attention to non-market food systems,
933 researchers bring them into being in the minds of their participants and give them legitimacy in
934 society. I cannot explain my research to an interviewee without familiarizing them with the critiques
935 of food markets or the concept of non-market food systems. Research is political, not only in its
936 philosophical orientation but in the subjects we decide to study [243]. Theories of food systems,
937 similarly, not only reflect reality but shape it [244]. Because social facts and values are inseparable,
938 this article unavoidably criticizes not just market-based food systems but also the *idea* that markets
939 are compatible with desirable food systems. May the ensuing debate bear fruit.

940

941 **Funding:** This research was funded by the Social Sciences and Humanities Research Council of Canada (SSHRC),
942 grant number 895-2013-1010.

943 **Acknowledgments:** Thanks to all my colleagues at the University of Vermont and in the Economics for the
 944 Anthropocene initiative who have questioned my ideas while encouraging this line of inquiry. I am especially
 945 appreciative of Dan Tobin for asking me what a market is, and of Josh Farley for preparing the fertile ground for
 946 this research project.

947 **Conflicts of Interest:** The author declares no conflict of interest.

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