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Building diverse, distributive and territorialized agri-food economies to deliver sustainability and food security

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Abstract:

This paper seeks to understand how agri-food economies can address current sustainability and food security challenges in the context of increasing economic and health inequalities. For that purpose, we cross-fertilize economic geography and food studies literature to develop an innovative conceptual framework that builds upon three currently fragmented bodies of work: the *diverse economies* literature, the *distributed economies* framework, and *territorial* and *place-based approaches* to food security. The proposed diverse, distributive and territorial framework further develops existing relational, performative and spatial approaches to explore changing economic geographies of agri-food systems. The application of this framework to investigate fruit and vegetable provision in the city of Cardiff (UK) reveals the key role of connective, fluid and multi-functional infrastructures to reconfigure foodscapes. Specifically, our analysis shows how food infrastructures have the potential to act as bridging conceptual, material and socio-political devices. The proposed framework ultimately serves as a capacity building tool to re-assess and rebuild territorialized agri-food economies which champion diversity and redistribution of value with the aim of delivering wide societal and material benefits, enhance democracy and increase the socio-ecological resilience of food systems.

Key words: agri-food economies, diverse economies, distributed economies, place-based approaches, territorial food security

1. Introduction: re-placing the 'missing middle' in agri-food chains.

In the context of growing spatial economic and health inequalities (OCDE 2015), and the apparent failures of neo-liberalist governments to effectively address these, this paper argues that newly emerging place-based agri-food economies can constitute a keystone to deliver more sustainable forms of development and food security. Indeed, food is increasingly being regarded as a vehicle to address simultaneously economic development, social justice and environmental degradation challenges (Lang et al. 2009). In recent decades, agri-food economies have suffered deep transformations linked to global urbanization processes, dietary changes, neoliberal policies and dwindling natural resources (Marsden 2017). An important part of these changes have been facilitated by the agglomeration tendencies in the midstream of agri-food chains - that is, in segments involved in processing, storage, wholesaling, retailing and logistics - although these have remained largely unnoticed in academic debates (Sonnino et al. 2014). These changes include spatial distancing and de-seasonalization of chains, reductions in the number of (especially small- scale) intermediaries, concentration of activities in larger (and urban -based) companies and a shift from labor-intensive to capital/digital intensive technologies in midstream firms (Reardon 2015). This 'missing or hidden middle' is particularly relevant in food economies, for example it accounts for 30-40% of the total margin value of crops such as rice and wheat in the Global South (ibid).

Practitioners and policy-makers have recently been active in promoting and reshaping agri-food economies to deliver wider socio-ecological benefits which often involve changes in the midstream of food chains. For example, the FAO is urging public and

private actors to build innovative market infrastructure as a necessary passage point to advance sustainable agricultural practices (Loconto et al. 2016). Similarly, the Civil Society Mechanism of the Committee on World Food Security is championing the concept of territorial food markets as a means to recognize the spaces where small-scale producers trade and their potential to address food insecurity (CSM 2016). Such organizations ultimately aim to make 'visible' key midstream activities that "fall below the radar" (CSM:7) for policy makers and understand what type of relations, infrastructure and governance mechanisms can foster agri-food economies that contribute to social justice and enhance food security.

To date, the academic literature on agri-food economies has largely revolved around two main bodies of work (van der Ploeg 2016). On the one hand, a hegemonic approach which studies dominant and increasingly agglomerated food systems. This approach focuses on concentrated markets and technology as the key forces shaping the governance of agri-food economies. On the other hand, theories which explore Alternative Food Networks (AFNs) and more nested markets. These initiatives are broadly conceptualized as vehicles to re-socialize and re-spatialize food economies through the establishment of shorter relationships between producers and consumers based on trust, the redistribution of value in the food chain, and the development of new forms of political association (Whatmore et al. 2003). Whilst on the ground agri-food economies present hybrid characteristics (Sonnino and Marsden 2006), these conceptual dichotomies pervade much of the literature and by and large limit themselves to analyze their favored reality (van der Ploeg 2016). For example, studies on AFNs have concentrated on production and consumption dynamics, generally overlooking the diverse and complex connections among these two spheres apart from

when those linkages are rather direct (Moragues-Faus and Marsden 2017), such as in farmers markets or community supported agriculture schemes (Holloway et al. 2007). These short supply chains, as well as the focus on private and agglomerated modes of regulation, have moved attention away from the social and physical infrastructure needed to sustain and reform the food system. There is therefore a need to explore further and construct interconnections between these two bodies of work by mobilizing different concepts and identifying potential bridging devices.

In order to address these gaps in the literature, we develop an innovative analytical framework by building on three bodies of work that aim to provide and empower more sustainable and just economies. First, the *diverse economies* literature has championed a different way of thinking about the economy, constituting a tool to bridge conventional/alternative divides by reading for difference and providing the grounds for innovative economic configurations to emerge (Gibson-Graham 2006). Second, we turn to the *distributed economies* literature as a proposal for regional economic development that sets out alternative spatial, scalar and functional configurations to build more sustainable and nurturing economic futures (Johansson et al. 2005). Third, we mobilize and progress *territorial and place-based approaches* as a means to connect different discourses around food but also to re-spatialize and re-assemble the components of agri-food economies with the aim to deliver food security (Sonnino et al. 2016). This new framework contributes to develop further relational, performative and spatial approaches to understanding changing economic geographies of agri-food systems.

Bringing these literatures critically together also contributes more broadly to wider debates in the recent economic geography literature connected to: (i) the evolution and

spatial construction of markets (see Leon et al. 2018); (ii) the ex-ante significance of relational spatial dynamics in the development of economic forms (Braun, 2016); and following these interventions, (iii) Sheppard's 'Limits to globalisation' thesis concerning the *a priori* uneven nature of geographical development and the acceptance that 'more than capitalist practices co-exist alongside concentrated capitalism, without necessarily being absorbed into it.' (Sheppard, 2016). The food sector has never been fully incorporated into concentrated capitalism even though this has (and remains) a major dynamic. Rather, as we explore here, food initiatives have also created new and re-configured markets and infrastructures which are more distributed and place-based. Our analysis aims to provide evidence of these reconfigured socio-spatial dialectics 'in which geography is endogenous and relational, where the economic is not a separate ontological domain from the non-economic, and where fictional commodities - people, earth and finance - resist commodification or disrupt capitalist globalisation' (Braun, 2016:527). For that purpose, we bring together concepts from the three somewhat disparate literatures of diverse, distributed and place-based economies (see figure 2). This new framework ultimately creates more specific and integrated conceptual parameters for assessing the newly emerging distributive economic geographies in the agri-food sector, as in fact globalised and concentrated food markets become both less ecologically sustainable and publicly legitimate.

2. Research design and methods

We use this new *diverse, distributive and territorial agri-food economies framework* to explore the case of fruit and vegetable provision in Cardiff (UK), which plays a key role in addressing the city's food insecurity and sustainability dynamics given its association

with positive health outcomes. After an overall analysis of the landscape of fruit and vegetable provision in the city, we focus on two examples of distributed agri-food economies. We rely both on primary and secondary data analysis of key policy documents, websites, social media and internal reports of these initiatives. In the case of co-ops, information has been gathered during interviews with key stakeholders and visits to 8 co-ops. In every co-op, lead volunteer, other volunteers and customers were interviewed. Two area coordinators and general project manager were also interviewed, alongside one local wholesaler supplying over 70 co-ops. In the case of the vegetable box schemes, semi-structured in-depth interviews were conducted with key actors from four local initiatives. Interviewees were selected in conjunction with local experts, aiming to represent different organizational models. This data was complemented by notes taken during regular interactions with different Cardiff-based food initiatives which included 10 meetings of the Cardiff Food Policy Council¹.

3. Agri-food economies to deliver food security: diverse, distributive and place-based economies

3.1 Diverse economies

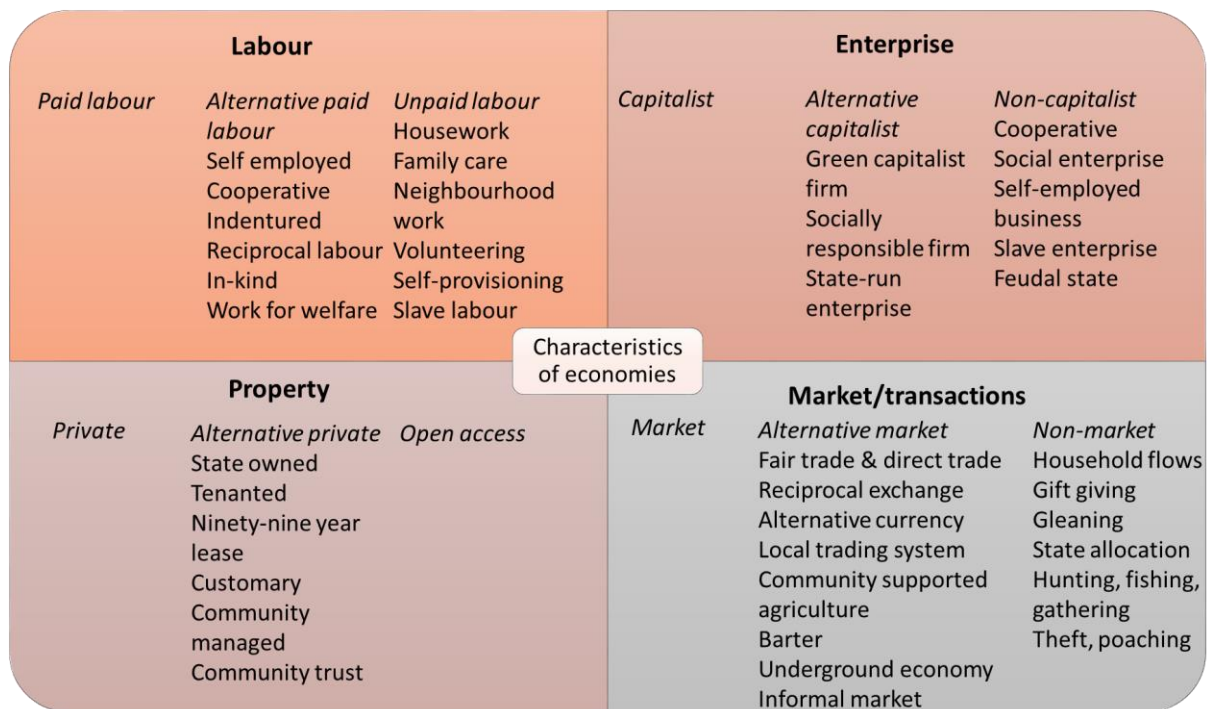
In the last two decades, there has been a growth in work aimed at exploring alternative economic spaces (Leyshon et al. 2003); whereby the agri-food scholarship has actively contributed through the study of AFNs (see Goodman et al. 2012). Somewhat disconnected from these food studies debates, economic geographers have developed an important strand of work that challenges the place of the economy as all-pervading

¹ These meetings took place between January 2013 and May 2016 and include two dedicated sessions on fruit and vegetable provision in Cardiff.

and inherently capitalist (Hughes 2005; Sheppard 2015). The seminal work of Gibson-Graham (2006; 1996) on post-capitalist politics has bloomed into a diverse and community economies approach that reads for difference and acknowledges the socially embedded character of economies (Leyshon et al. 2003; Community Economies Collective 2001). This approach aims to develop an economic and political language that assess initiatives, practices and their context outside capitalist parameters (Gibson-Graham 2006). Increasingly, the diverse economies framework has been mobilized in the food domain to avoid portraying neoliberalism as a “hegemonic story” (Larner 2003:509) and to inspire new political opportunities (Harris 2009; Sarmiento 2017; Crossan et al. 2016; Cameron and Wright 2014). The literature on diverse food economies also acknowledges the hybridity and even dependency of many of these alternative initiatives on capitalist relationships (Dixon 2011).

The diverse economies approach has developed an innovative analytical framework to ‘read for difference’ and explore how to do economy differently. This framework points out that the economy is made up of: i) diverse labor arrangements, ii) multiple forms of governing the use of and access to resources, iii) different forms of enterprises and iv) diverse markets (see figure 1 below) . Diverse economies, in turn, are underpinned by different ways of understanding, generating and distributing value that differ from those of capitalist enterprises, where surplus value is produced by workers and appropriated and distributed by the capitalist owner.

Figure 1: Characteristics of economies under a diverse economies approach



Source: Authors' elaboration adapted from (Gibson-Graham 2006; Gibson-Graham et al. 2017)

Critics of this highly political approach have labelled diverse economic activities as utopian, short-lived, detached from serious political concerns or vulnerable to co-optation by capital and the state (Jonas 2010; Healy 2009; Amin et al. 2003). Criticism partly stems from the narrow empirical focus of the literature (Wright 2010), with most studies mainly exploring explicit alternative initiatives which has led to a polarization between believers and sceptics (Fickey 2011). We address this gap by investigating different types of agri-food initiatives. Furthermore, we mobilize the diverse economies approach to analyze the hybridity and multiplicity within these initiatives, as well as to read for difference in the process of understanding the interconnections within the wider urban fruit and vegetable provision landscape.

3.2 Distributed economies

The notion of distributed economies has its earlier origins in the radical anarchist literatures of the 20th century associated with Peter Kropotkin and Colin Ward (Ward 1998). However, a new scholarship on distributed economies has recently emerged as a systemic response to overcome failed approaches to deliver sustainable development through conventional economic means. According to Manzini and M'Rithaa (2016), this concept is part of a broader literature focused on developing distributed systems based on technological networks, but which has progressively expanded to include energy production and just now started to challenge mainstream globalized production and consumption systems. Partly inspired by the Italian industrial district model, Johansson et al. (2005:974) define distributed economies as “a vision by which different innovative development strategies can be pursued in different regions” with the goal of creating wealth and wellbeing. These works, despite based solely on manufacturing and energy projects data (Kohtala 2015; Hellström et al. 2015), introduce a normative goal for regional economic development and point out specific spatial, scalar and functional configurations to develop more sustainable and nurturing economic futures.

Specifically, Johansson et al. (2005) propose that regional activities will be organized in interconnected small-scale units in symbiosis with large-scale production systems. This flexible architecture will seek the active participation of citizens in steering these economies in ways that add quality to their lives. Distributed economies are based on heterarchies that support open innovation by distributing knowledge and developing ways to organize diversity. Under this perspective, social, economic and ecological diversity are prerequisites for efficient production systems, and, simultaneously, these economies foster and acknowledge a diversity of needs and wants. Proponents of

distributed economies advocate for intersectoral cross-fertilization rather than specialization, where the symbiotic relationships needed to address sustainability challenges come from self-organizing and non-competitive processes. Finally, this approach champions re-localization processes based on new balances between intra-regional and inter-regional exchanges of resources and underpinned by new producer-consumer relations. According to Johansson et al. (2005), new technologies and communication platforms will be instrumental to develop these new relations, and particularly to deploy territorial social-ecological capitals that attract mobile financial and human resources.

The distributed economies approach highlights the importance of the balance between concentration/distribution of economic architectures in delivering sustainability and wellbeing. Consequently, it calls for further exploration of the social and physical infrastructures that make these distinct economic configurations possible. However, the distributed economies proposal fails to engage with a reflexive conceptualization of place in order to avoid linking specific scales with positive or negative sustainability attributes (see debate on the local trap (Born and Purcell 2006)). To avoid this bias in our framework, we turn now to recent conceptualizations of place-based approaches in food studies.

3.3 Place-based and territorial agri-food economies

Place constitutes a key mediator in connecting shorter and more distributed food supply chains and networks. We recently proposed a place-based approach to progress food security concerns with the aim to overcome the limitations of current conceptual frameworks which “tend to be locked into fixed levels of scale and generalized as well as oppositional assumptions” (Sonnino et al. 2016: 477). This place-based approach calls

for greater attention to three key parameters: (i) an understanding of the diversity of food security conditions as constituted by the *flows* of knowledge, materials, capitals and people that take place in and between food systems; (ii) a focus on *re-localization* processes that contributes to unveil how different food initiatives can create (by active horizontal and vertical network and governance building) a transformative basis for wider changes in food system; and (iii) a progressive sense of place that integrates *discourses, scales and interdependencies* between geographies as key elements configuring specific food security dynamics.

A renewed focus on place in food studies emerges in the context of the industrialization of the food system, which has encouraged both the lengthening and flattening of supply chains such that food is transformed at different stages and places, while provenance itself is largely hidden from the consumer (Morgan et al. 2006). In contrast, alternative or 'shorter-supply chains' tend to be territorially embedded and engage in place-making strategies to add value to specific foods (Moragues-Faus and Sonnino 2012). They are thus more distributed in that they share value between places and different actors in the supply chain. The last decade has seen a proliferation of empirical concern for these shorter supply chains which are inherently place-based (Goodman et al. 2012; Tregear 2011). In midst this literature, critical scholars have warned about an idealization of AFNs, since 'ethical' and 'sustainable' initiatives can conceal potential environmental impacts and reproduce social inequalities (Moragues-Faus 2017). For example, by creating exclusive landscapes for high and middle classes, idealizing localness or concealing exploitative labor conditions that create a new geography of winners and losers (Guthman 2004; DuPuis and Goodman 2005). These contested but relentless

processes of re-localizing and re-territorializing the food system can constitute an exemplary case of both diverse and more distributed economies.

In order to foster more equally and functionally distributed systems of food production, consumption and service provision, it is paramount to introduce a progressive place-based approach and relational spatial dimension that bring to the fore the socio-ecological basis of distinct foodscapes (Hinrichs, 2016; Klassen and Wittman, 2018).

Indeed, key food security practitioners are prompting a shift from a national to a territorial food security perspective (OECD et al. 2016). Cistulli et al. (2014) state that a territorial approach – defined as public intervention “which builds on local capabilities and promotes innovative ideas through the interaction of local and general knowledge and of endogenous and exogenous actors” (Barca et al. 2012:149) - leads to a better understanding of the diversity, cross-sectoral and context-dependent nature of food security challenges and therefore provides the grounds for more efficient policies and interventions.

In this paper, we develop an integrated analytical framework that combines three literatures:

- The *diverse economies approach* in order to read for difference and understand the distinct market, labor, ownership and decision-making arrangements that configure agri-food economies.
- The *distributed economies approach*, which pays particular attention to how different economic activities relate to each other to generate increased levels of sustainability and wellbeing, by analyzing decision-making mechanisms, size, level of interconnectedness/concentration and intersectoral linkages.

- *A reflexive place-based* lens to understand re-localization processes, trans-localization dynamics and re-assembling capacities.

The integration of these three approaches begins to enlighten how different systems of provision create new spatial markets and infrastructures that might provide innovative solutions to the growing problems of contemporary food insecurity.

4. Exploring urban fruit and vegetable provision: the case of food co-ops and box schemes

Access to fresh fruit and vegetables for all constitutes a key goal to deliver food security. Economic access to good food is one of the main concerns for UK's population, with food prices raising 18% in real terms between 2007 and their peak in August 2012 (DEFRA 2014b). UK households consume more food and drinks high in fat and/or sugar and less fruit and vegetables than those recommended in the Government eatwell plate, with negative health consequences affecting particularly those on lower incomes (ibid). Furthermore, government figures estimate that there are around 13 million people in poverty in the UK (Department for Work and Pensions 2014) and numbers experiencing food poverty are increasing. For example, Britain's biggest food bank network handed out a record 1.2m food parcels to families and individuals in need in 2016-17 (Trussell Trust 2017) -. These numbers show the tip of the iceberg with increasing evidence that people are skimping or skipping meals, and systematically underfeeding themselves because they lack money to buy healthy food (Food poverty alliance 2016). Finally, the UK produces just 55% of the total supply of vegetables for the country and only 17% of the fruit consumed in the UK (DEFRA 2014a). In the case of

Wales, just 0.1% of agricultural land is dedicated to grow fruit and vegetables contributing to an estimated measly 3% of the nation's fruit and vegetable requirement for a healthy diet (Wheeler 2015). Consequently, initiatives that aim to provide affordable fresh fruit and vegetables are key to reduce food insecurity.

Cardiff, the capital of Wales, is also affected by these food insecurity dynamics. With a population of around 341,000 people, Cardiff remains a relatively small city existing within a region which lags significantly behind the rest of the UK in economic terms (Bristow and Morgan 2006). Recent economic changes in Cardiff have been insufficient to address the city's entrenched social and spatial inequalities. Public health data shows that people living in the least deprived areas of Cardiff can expect to live in good health for 22 years longer than those in the most deprived areas of the city (NHS Wales 2016). There is also a high number of malnourished people, with 52.2% of adults being overweight or obese, a proportion that increases amongst lower income families (Welsh Health Survey 2016). Also, Cardiff food banks delivered 12,140 three-day food packages in 15/16 – a 12% increase on previous year.

Table 1. Comparison of key public health indicators of UK cities.

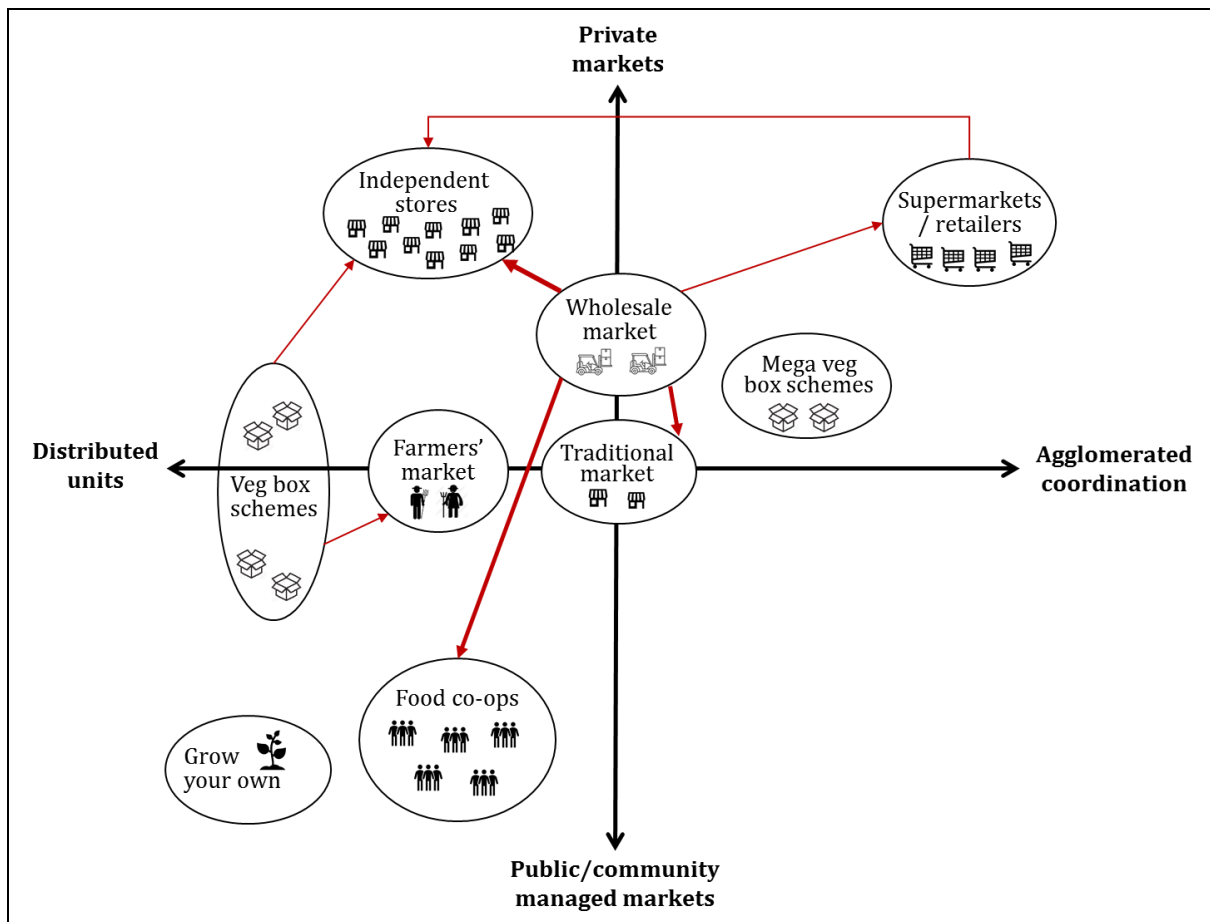
	Male healthy life expectancy at birth (2014-2016) <i>England average: 63.4</i>	Prevalence of overweight (including obesity) in children year 6 (2015-2017) <i>England average: 19.6 %</i>	% Children in low income households (under 16s) (2016) <i>England average: 17 %</i>
Cardiff	65.3 (Welsh average 65.3)	20.9 (Lower than Welsh average 26.2%)	16 % (Higher than Welsh average 10%)
Bath and North East Somerset	62.5	25.1	9.8
Blackpool	55.1	22.1	26.2
Bournemouth, Christchurch and Poole	63.7	15.9	16.4
Bristol	58.9	34.5	19.7
Liverpool	57.6	38.4	26.3
Swindon	64.4	19.1	14.1
York	66.3	15.9	10.3

Source: Author's own elaboration based on data from Public Health England <https://fingertips.phe.org.uk/> and Welsh Health Survey 2016. The cities have been selected to reflect high, medium and lower rankings of the multiple deprivation index.

Access to fruit and vegetables in the city relies mostly on big retailers. While in early 2000s food shopping was dominated by a small number of large stores around the periphery of the city, the main UK retailers have now opened stores virtually in every neighborhood with generally higher prices than their larger outlets (Guy et al. 2004). An additional 40 independent food retailers supply fruit and vegetables to Cardiff's inner residents, with three of them based at the publicly owned Cardiff's central market. These independent food retailers rely mostly on Wales only wholesale market to access fresh produce (Bearman et al. 2016). However, this wholesale market based in Cardiff is facing closure after a steady decline in the number of traders and the redevelopment of its grounds for housing purposes. Some of the independent food stores already stock produce coming from Bristol or Birmingham wholesale markets, deliveries from London-based companies or purchased directly from discount supermarkets such as Lidl (ibid). The city also has three weekly farmers' markets and a number of organic

fruit and vegetable box schemes operating – four local and two UK wide mega-organic box suppliers (Albert & Cole and Riverford). A total of 25 not-for-profit food co-ops have also been set up in the city to provide affordable fruit and vegetable to urban communities. Figure 2 below shows Cardiff's spatial construction of fresh fruit and vegetables markets.

Figure 2. Fresh fruit and vegetable outlets as part of wider private/ public and distributed systems.



Source: Authors' own elaboration. The arrows represent flows of fresh fruit and vegetables, with thicker arrows representing more volume traded.

As Figure 2 shows, food co-ops and box schemes are initiatives characterized by a structure of small and distributed units, combined with alternative forms of enterprise and property as defined by the diverse economies approach. Below we analyze in depth how these two types of agri-food economies embody characteristics of diverse, distributed and territorial agri-food economies.

4.1 Independent and local fruit and vegetable box schemes

In our study we analyzed the main 'local' vegetable box schemes in Cardiff: Blaencamel, Penylan Pantry, Riverside Market and the Welsh Food Box Company. These four schemes are markedly different from each other in terms of their overall organization and modus operandi. Below we explore how these examples illustrate the diversity within the so-called alternative agri-food economies (see also table 2).

The **Blaencamel** vegetable box scheme is the only farm-based project. They sell only produce grown on their organic farm in West Wales (150 km from Cardiff). The scheme was established in 2007, when they stopped supplying supermarkets with vegetables.

As an informant puts it:

"We wanted to sell within Wales. We've got much more direct relationship with our customers and that's my interest. We sort of share our successes and failures (...) It's a much more human way of doing it... and financially it's not massively different from the supermarket. From a farmer point of view, our business is in our hands. (...) Every year we are able to experiment with new things. So we've gone from growing 7 or 9 varieties in mid, late nineties, to now when we grow around 70 varieties throughout the year. It keeps things interesting for us."

Blaencamel is a family-run farm involving three family members. The farm also employs four full-time workers and a few casual workers over the summer. According to Blaencamel's farmer, customers "*order when they want and because of that I send an email every week (...). I have a database of up to 300 people (...) and it [demand] tends to fluctuate between 25 and 50 veg-boxes a week.*" Boxes consist of six to seven pre-defined items. The price for home delivery is 12£ but just 10£ if collected at the weekly Cardiff's farmers market.

Penylan Pantry's vegetable box scheme began in July 2015 and runs alongside a café, a deli and a recently opened store in Cardiff's indoor market. The Pantry's ethos is to promote local producers, the community, and respect for the environment throughout their different businesses and related events. The project consists of two full-time and three part-time workers. They receive the produce from the Organic Fresh Food Company based in Lampeter, Wales (118 km from Cardiff) and the local Riverside Market Garden (see below). A significant portion of the produce is local and seasonal, but they also import products from abroad. The Pantry aims to provide personalized vegetable boxes, with the option to include products from the deli. Through this personalization, they intend to eliminate waste: "*The last thing we want is that people get their veg-box and chuck it out in the bin.*" About 40 to 50 vegetable boxes are sold per week and their prices range between £10 and £35. Their veg-boxes are delivered by bicycle to reduce transportation-related emissions.

The **Riverside Market Garden** (RMG) is a small-scale intensive horticultural operation located 10 miles from Cardiff that supplies individual customers, catering businesses and farmers' markets in South East Wales. The RMG is part of the Riverside Community Market Association which runs three farmers markets in Cardiff since 1998. The Garden

aims to support more sustainable livelihoods that increase the quality of life without damaging the health of the environment, the economy and the community. It operates as a co-operative where people can buy shares and get 10% discount on the veg-boxes. However, as one of the Garden's representative notes, despite having 150 shareholders just three of them are actively involved in running the Garden. RMG received a grant from the Welsh government between 2011 and 2015 to be a demonstration project, this support has been essential to keep operations as one of the founders recognizes:

"We've had a few people coming to the farm, to show them what we're doing. We've got the grant to do a knowledge transfer. For the first four years we lost money. (...) This is our first year without any grant."

The scheme employs one grower, two part-time workers and one volunteer. They now do home delivery of 40 to 50 boxes a week to a loyal customer base who can customize the size and content of the veg-boxes. The price ranges from £10.50 to £16.50. During the "hungry gap" (winter-spring period when there is generally less availability of produce in the UK due to weather conditions) around 80 per cent of the produce is bought in from the Organic Fresh Food Company. In the summer, they sell almost exclusively their own products.

The **Welsh Food Box (WFB) Company** started to deliver vegetable and fruit boxes in 2011. They specialize in Welsh produce and their range includes meat, dairy and dry goods. Their main motivations have been "commercial, whilst maintaining an ethical and health-driven focus." This company is the largest initiative studied, delivering about 100 boxes per week. The produce is sourced both directly from farmers and via wholesalers. Consumers can tailor the boxes selecting different foodstuffs and price varies from £10.50 to £20.

The analysis of secondary and primary data shows that, by and large, these initiatives contribute to sustainability and food security outcomes by supporting the longer-term goal of providing sufficient food through sustainable production methods and increasing the availability of local food. Veg-box schemes also have an impact on the access to certain foods such as local varieties by specific segments of the population (mainly upper and middle classes) as well as contribute to changes towards more sustainable diets and improvement of food utilization skills. Nevertheless, Table 2 shows markedly different characteristics of these four types of agri-food initiatives.

The analysis of different dimensions of the *diverse economies framework* reveals that most schemes are private, and, in those initiatives, owners (whether self-employed or family farmers) are the sole decision-makers. Labor arrangements, however, are very varied, and all initiatives have developed local trading systems integrating non-local actors to different degrees.

These hybrid characteristics also apply when analyzing key dimensions highlighted by the *distributed economies approach*. The only initiative underpinned by distributed decision-making mechanisms is the RMG, where shareholders actively participate in managing the community supported agriculture scheme. However, all box-schemes are small units connected to a variety of other food and non-food actors. For example, Blaencamel sells part of its produce through two farmers' markets in the city, which are managed by the same association that set up the RMG. The RMG engages with other producers to offer a more varied selection of vegetables and acts as a supplier to restaurants and other veg-box schemes. In the case of the Penylan pantry, the veg-boxes are embedded in the café and deli business, and therefore offer a range of products from different suppliers including the RMG and Blaencamel. As a Penylan member states:

"Independent businesses came to a conclusion that it is better to help each other". A similar structure has been created by the Welsh Food Box Company, which offers produce from 30 suppliers and claims to be an online farmers market:

"We also know that, in reality, people are far too busy to make weekly treks around farmers markets and shops to get the quality and variety of produce that they would dearly like. That's where we can help. We do the leg work, searching for quality products across small local producers and growers to deliver the highest production standards and associated ethical farming practices."

Accordingly, while the RMG and Blaecamel mostly focus on farming activities and providing new skills for volunteers or other farms, the Welsh Food Box Company engages with different food manufacturing companies and creates an online distribution platform for a range of producers. The Penylan Pantry expands even further, with the veg-box being only a side activity in midst their varied catering activities that connect different sectors and actors across Cardiff.

The analysis under the *place-based dimensions* of the framework shows a clear drive to re-localize production, consumption and associated distribution systems in all initiatives; with the Penylan Pantry and Welsh Food Box schemes aiming to re-localize as well catering and food processing activities. Two of the schemes actively participate in translocal alliances, such as the Soil Association (a UK-based charity campaigning for sustainable food and an organic certifier) or the Slow Food Movement. In the case of the RMG, they are actively involved in Food Cardiff- a space of deliberation where the civil society, public and private sectors come together to build a sustainable food system. It is through this space that the RMG indirectly forges additional alliances across Wales and the UK. The Penylan Pantry, but particularly the Welsh Food Box, create linkages

through their business hub function, pulling together Welsh and even foreign produce from different suppliers. Finally, the way these initiatives re-assemble resources, skills and discourses has evolved through time and reflects different levels of interconnectedness, as highlighted under the distributed economies framework, but also through their degree of business diversification. Blaecamel restricts itself to grow and sell directly organic veg and fruit, similar to the Welsh Food Box which is effectively an online platform of organic local produce. The Penylan pantry is the most diversified and flexible business model of the four schemes; while the RMG is in constant search of alternatives to make the venture economically viable, from growing salad garnish for restaurants to developing soup products or offering training.

4.2 Community food co-ops

In the UK, food co-ops refer mainly to food outlets ran on a not-for-profit basis to give people access to good food at affordable prices. In the case of Wales, the project was established as a pilot program in 2004. Funded by the Welsh Government, it has been run by the Rural Regeneration Unit (RRU), a social enterprise with a previous experience with running food co-ops in England.

The original drive to set up food co-ops revolved around tackling socio-economic inequalities and health problems (Elliott et al. 2004). As explained by the General Manager of the Wales Co-op Network:

“Food co-ops are not just about food, but it meets the food poverty agenda. Because those people who feel that they can’t afford to eat fresh, can, and they can see that they can”.

However, as the government's emphasis (and related funding) widened from health to supporting local production, RRU started to cooperate with local producers (Food and Drink Wales 2014). In 2015, more than one third of all produce supplied by food co-ops was grown or produced in Wales. Between 2012 and 2015 the program generated almost £1.5 million in income for Welsh businesses (Rural Regeneration Unit 2015). The focus has progressively widened beyond socially deprived areas and, until now, the RRU has helped to establish over 300 co-ops across Wales.

This case study comprises 8 co-ops in Cardiff area. These initiatives link volunteers running the co-op weekly - in most cases affiliated with an already existing community initiative such as churches or housing associations - to a local supplier who can be a local producer or a wholesaler. Customers then choose from several types of veg and fruit bags, order, pay for them a week in advance and pick them up from a stall based in a community venue. Bag prices can vary according to the supplier, area and bag size, with an average fruit, vegetable or salad bag costing between £2.50 and £4.00. In 2012 food co-ops started to offer 'Additional Welsh Produce', linking consumers to local producers of milk, eggs, meat or bread. Our mixture of desk-based research and fieldwork revealed that co-ops are strongly rooted in place and therefore shaped by their social-ecological context, which fosters social benefits for their participants. This analysis also revealed how co-ops contribute further to food security and sustainability outcomes by improving access to affordable fresh fruit and vegetables, an essential aspect to develop more sustainable and healthy diets. They also promote better use of those foods through knowledge and information sharing.

The analysis of the food co-ops through the *diverse economies* lens reveals that the core operation is based on volunteer labor, however, the support offered by the RRU relies

on public funds. This support has been changing due to funding availability but mainly it included starter kits to establish new co-ops, marketing tools, training for volunteers and help to connect suppliers to individual co-ops. Some of these schemes are linked to schools, churches or community centers and therefore benefit from these organizations' in-kind support. The state has thus actively contributed to the establishment of co-ops which calls for a wider problematization and a more fluid understanding of the role of the public sector in the diverse economies framework. Specifically, how these types of initiatives are embedded in broader formal and informal social infrastructures and how these infrastructures shape the benefits these initiatives deliver². Overall co-ops are not-for-profit and partly a local trading system, since produce is also supplied from global markets, with some preference for British vegetables.

The hybrid character of these co-ops also emerges when analyzing the *distributed* character of these initiatives. For example, decision-making is distributed between the different actors participating in the co-ops. Food co-ops mostly provide customers with a set of produce determined by local suppliers. However, in South Wales two wholesalers supply over 85 co-ops and therefore hold considerable power over what consumers receive every week. As the following quote shows, decisions are shaped by the wholesalers' understanding of customers' demands as well as what is perceived by the wholesaler to be economically beneficial for him and the consumers:

"R: And what about those mushrooms?"

W: No, I don't put them in. You know, people] wouldn't know how to cook them. They prefer having a bigger pack, more of everything."

² See other examples of diverse economies studies on cooperatives in Gibson-Graham (2006)

The framing of food options is also informed by the experience of the supplier and his relationship with the clients/consumers. For example, the same supplier stressed his encouragement of feedback from customers:

“Last week someone called if they could get some courgettes. So, we looked into it and got courgettes to all [70] co-ops this week.”

Empirical data illustrate a certain degree of flexibility in decision-making processes and show the central role of multistakeholder interaction in shaping the process. Informants also highlighted that some Cardiff co-ops cater for different ethnic minorities and therefore purposefully include non-traditionally Welsh produce to provide culturally appropriate foodstuffs.

The co-ops present a distributed structure since they are small units made up of linkages between suppliers, the RRU, volunteers and customers. Wholesalers and the RRU constitute nodes that connect different individual initiatives. However, due to the termination of funding in 2017 for RRU’ support and training program, there has been a special emphasis in providing tools to share knowledge between co-ops and establish a peer-support structure. The distributed structure of co-ops also combines effectively different sectors, such as distribution, trade, production, health services and a range of community activities. For example, food co-ops take Healthy Start vouchers, a governmental scheme providing vulnerable young families with food vouchers to buy milk, fresh or frozen fruit and vegetables, and formula milk. Furthermore, food co-ops in many cases run alongside Credit Union meetings, doctor’s surgeries or community meals. Over and above their function of delivering affordable, fresh, “local” produce, they provide an opportunity for customers to socialize. Indeed, interviewees reported supporting local community as an important motivation to shop there.

Finally, a *place-based analysis* of these initiatives reveals further differences with simplistic separations of conventional/alternative, as previously highlighted by the other two components of our integrated framework. First, food co-ops propose a particular form of re-localization that contrasts with Cardiff's veg-box schemes and AFNs more generally, which mostly emphasize local food production. Instead, food co-ops highlight the local component of trade and communities. In this regard, they also challenge some of the 'meanings' around local food advocated within the alternative food movement. For example, whereas there is a clear top-down narrative promoting local (meaning Welsh) produce and businesses from RRU, interviews showed that the interest amongst volunteers and customers was rather weak. An argument that "*local food is a myth, it is a myth that people want local food*" put forward by one volunteer is a telling, albeit extreme illustration of an apparent disinterest around the provenance of food amongst participants. However, the lack of distinctiveness of the fresh produce creates room for more direct competition with other retailing options. Indeed, Cardiff co-ops reported they had been struggling recently with falling numbers of customers. Although co-ops offer a very good value for money, the contemporary food price volatility and temporary lower prices in supermarkets can affect co-op membership especially in urban areas where there are more convenient shopping options.

While the notion of 'local food' is contested within participants, food co-ops reassemble local resources to deliver affordable fresh fruit and vegetables. They mostly rely on volunteers to run a non-profit organization embedded in the local community. In this way, one project coordinator states that they are "*doing more with less*", and she affirms that "*[we] have always felt that having no running costs is more sustainable.*" And indeed, many volunteers saw no costs as their main asset, especially free venues. However,

those 'no costs' are more often costs borne by other partner organizations.

Consequently, the successful development and sustainability of co-ops is largely dependent on their embeddedness in other local initiatives and the extent to which they are networked. For example, a number of co-ops closed when the Communities First program lost some venues due to austerity-related cuts. Hence being linked with other organizations can make co-ops over-dependent. Despite this reliance on non-monetary exchanges, food co-ops also contribute to the formal local economy, among others by creating jobs in the supply chain. For instance, a supplier interviewed for this case study reported that two jobs have been created in his business as a direct result of food co-ops work.

Finally, co-ops also establish linkages to other places. On the one hand through business operations, as illustrated by the wholesalers and consumer demand for international, culturally appropriate food. An on the other hand, through the RRU initiative which connects hundreds of co-ops across Wales.

Table 2 Application of the diverse, distributed and place-based economies framework

Dimensions Initiatives	Diverse economies				Distributed Economies			Place-based approach		
	<i>Labour arrangements</i>	<i>Enterprise</i>	<i>Market transaction</i>	<i>Property</i>	<i>Decision-making</i>	<i>Size and interconnectedness/ concentration</i>	<i>Intersectoral linkages</i>	<i>Re-localisation</i>	<i>Trans-localisation</i>	<i>Re-assembling, fluidity</i>
Blaencamel	Family farming Paid labour	Family-run	Direct-local trading system Give free produce to some collaborators	Private	Family farm plus close relation to consumers	Small unit Connected to Farmers' market	Farming Skills	Local food production and consumption	Part of alliances: Sustainable food trust, Soil Association	Low level of diversification as a business model
Penylan Pantry	Self-employed and paid labour	Capitalist	Mostly a local trading system	Private	Two owners that also work in the pantry	Small unit Connected to different types of food producers and the catering and event industry	Trade Catering Farming Food transformation Skills Leisure economy	Local food production, business and consumption	Part of Slow Food Movement	Diversified and flexible business model that brings together local and non-local products
Riverside Market Garden (RMG)	Main grower is paid a wage Temporary workers Shareholders volunteer	Social enterprise	Community supported agriculture and local trading system.	Community managed	Association with board of directors and annual general meeting where shareholders participate (1 shareholder, 1 vote)	Small unit Connected to farmers' market and some local business such as the Penylan Pantry	Farming Skills Trade Catering	Local food production and consumption	Embedded mostly in local activities: part of an association with different ventures and Cardiff Food Policy Council	Attempts of diversifying (soups, high-end restaurants, etc.) by reassembling assets and skills.
Welsh Food Box (WFB) Company	Paid labour	Capitalist	Mostly a local trading system	Private	Owners	Small unit that offers produce from 30 suppliers, from farmers to organic wholesalers (including RMG)	Farming Trade Transformation Distribution	Local production, transformation and consumption	Connects with other businesses and expanding operations across South Wales	Developed an online farmers' market linked to the veg box scheme.
Food Co-ops	Voluntary labour State support	Community-run State support	Mostly a local trading system	Community managed	Distributed across participants, important role of wholesaler	Connections between consumers, suppliers, RRU and volunteers Co-op network	Distribution and trade, Production Health services Community activities	Local trade and local communities	International and culturally appropriate food Co-op Network through RRU	Use of local community assets in creative ways

Source: Author's own elaboration

5 Social and physical infrastructures to realize more distributive agri-food economies

The application of the conceptual framework in the previous section shows how the initiatives studied, box schemes and co-ops, embody a range of hybrid mechanisms to deliver fresh fruit and vegetables to urban consumers. Consequently, both diversity in organisational form and the distributed character of systems of provision lie at the heart of these new food geographies. While the three lenses allow for a new characterisation of diverse, distributed and place-based food economies; their associated categories are not discrete, rather, they come together in the process of creating different types of infrastructures to supply food to Cardiff residents. In this section we delineate in more depth what types of infrastructure are being (re)created and assembled to bridge the ‘missing middles’ between consumption and production; and how a focus on infrastructure can serve as a boundary object and bridging device across conceptual and practical agri-food economies’ challenges.

In the food studies literature, infrastructures link individual actions to wider connective scales and spaces as well as to historically produced socio-material arrangements (Blumberg and Mincyte 2019; Frohlich et al. 2014). According to Conelly and Beckie (2016), efforts to scale-up and out local food initiatives mostly focus and depend on *physical infrastructure*, such as distribution, storage or retail facilities. In the case of the veg-box schemes studied here, this infrastructure includes modes of transport (from vans to bicycles), storage spaces and retail space (local shops, farmers’ market). For the WFB, digital infrastructure is essential to make the box scheme work as an online farmers’ market, although other schemes also use emails, websites or shared documents to communicate with clients and suppliers. In many cases, face-to-face

relationships between producers and consumers reduce the need for additional physical infrastructure since deliveries are often made from the farm to the household doorstep, such as in the case of Blaecamel.

The analysis of food co-ops shows a relatively different picture. Cardiff's co-ops rely on a mixture of infrastructure, from the wholesale market where main suppliers operate (see figure 2) to freely accessible community spaces where food bags are delivered. Previous work has been critical of initiatives that 'piggyback' on 'conventional' food system infrastructures, suggesting that they constitute a distraction to attain alternative food systems goals such as building equity and trust within the food chain (Conelly and Beckie 2016; Bloom and Hinrichs 2010); and advocate for state investments and publicly owned assets (Myers and Caruso, 2016). However, the combined diverse, distributed and territorial approach taken in this analysis challenges conventional/alternative dichotomies. Instead, it calls for further exploration of the key role that shared and multi-dimensional infrastructures play in providing affordable fresh fruit and vegetables. In this regard, the same infrastructure –e.g. wholesale markets - can be understood as part of the conventional food system or, instead, as new reconstituted sites made of materials and actors that direct flows of food in accordance with specific governance imperatives (see Sarmiento 2016). While the governance of supermarkets' physical infrastructure is subjected to strong private regulation - and therefore their access and management is restricted-, this analysis shows that there are numerous midstream infrastructures that can be reassembled to redistribute control and value. Hence some facilities can be multi-functional. For co-ops this includes traditional food infrastructure – wholesale markets – but also non-food sites such as public buildings, schools or garages.

In order to build a redistributive agri-food economy, greater attention needs to be paid as well to different types of *social infrastructure*, that is, the interactions between organizations and institutions that underpin collective action and determine how physical infrastructure is used and for what purposes (see Conelly and Beckie, 2016; Flora and Flora, 1993). Studies on AFNs have thoroughly investigated how some of these initiatives - such as veg-boxes or farmers' markets - build common goals, reconnect different actors and develop trust relationships that underpin their success. However, the examples analyzed in this paper highlight the situated, flexible and cross-sectoral character of this social (food) infrastructure by showing how different initiatives reassemble food and non-food stakeholders across space. These cases illustrate how the establishment of hybrid agri-food economies involves creating a social fabric that effectively bridges conceptual conventional/alternative food system divides. Some actors are active bridging agents, such as the RRU in the case of the co-ops, an umbrella organization funded by Welsh government that provides knowledge, skills and resources to a range of co-ops, including contacts with food suppliers and local organizations. Institutions can therefore be embedded in the development of not only physical but also social infrastructures to create diverse and distributive agri-food economies.

The role of social infrastructure is particularly relevant in a context of austerity where processes of infrastructure degradation are also leading to increasing financialization and related contradictions around access to its services (Furlong 2019). Indeed, the governance of food infrastructure to supply fresh fruit and vegetable in the city presents great challenges. As shown in figure 2, the retail sector is the only agglomerated initiative with high levels of internal coordination. The wholesale market presents a

potential hub for the city, although facing dereliction. This relatively open-access infrastructure has progressively lost food traders, and to date there are no plans to relocate it. Furthermore, there is a low level of coordination amongst distributed food initiatives. The analysis shows how these initiatives can reassemble resources and create intersectoral linkages, however, they display a limited capacity to affect the governance of these relationships as exemplified by the dependence of food co-ops on venues and wholesalers. These limited powers have wider implications for the sustainability of these ventures but also for the redistribution of value within agri-food economies, which constitutes a key aspect to transition from *distributed* to *distributive* economies.

In this context, food hubs are championed in policy and academic arenas as innovative solutions to expand the capacities of agri-food economies and deliver sustainability and food security outcomes (Blay-Palmer et al. 2013; Sarmiento 2017; Loconto et al. 2016). The concept of food hubs has expanded from an intermediary step in the food chain (Morley et al. 2008) to represent “networks and intersections of grassroots, community-based organizations and individuals that work together to build increasingly socially just, economically robust and ecologically sound food systems that connect farmers with consumers as directly as possible” (Blay-Palmer et al. 2013:524). While this conceptualization embraces a wide range of initiatives, it posits the risk of side-lining potential synergistic relationships that exist between food actors. These relationships are not-necessarily built on shared goals, as exemplified by the food co-ops. Neglecting the hybridity and diverse nature of agri-food economies exposed through our analytical framework might diverge attention from the necessary material and social co-

constitution of food infrastructure which can actually support an equitable delivery of sustainability and food security outcomes.

5. Conclusions: Rebuilding diverse, redistributive and territorial agri-food economies

In this paper, we have developed an integrated analytical framework which combines the fragmented literatures on diverse economies, distributed economies, and place-based and re-territorialized approaches to food security. Through our conceptual framing, we show the diversity of organizational architectures which conform agri-food economies and their associated socio-economic and political possibilities. Practically, the framework provides 10 dimensions to guide the assessment of initiatives and their potential to build diverse, distributive and territorial agri-food economies to deliver public goods by: i) reading for difference and valuing diversity, ii) providing pointers to unpack the architectures that support redistribution of value and power; and iii) understanding how the re-spatialization and re-assemblage of knowledge, capacities, material, capital and people shape food systems and their outcomes such as malnutrition. The application of this framework shows the need for conceptual synthesis and refinement in agri-food geographies and illustrates how the combination of the three approaches creates synergies and supersedes some of their individual criticisms. For example, the emphasis on re-localization and trans-localization as reassembling processes championed by the place-based approach is essential to build distributed economies. However, while current conceptualizations of distributed economies include a focus on sectoral linkages, they largely fail to engage with ideas of

re-spatialization of the economy. Simultaneously, the distributed and diverse economies approaches ground some of the meta-conceptualizations of place-based proposals which, in many cases, remain overtly theoretical; for instance by pointing out the need to redistribute decision-making processes or value. Furthermore, this focus on power from the distributed approach allows us to overcome alleged criticisms of diverse economies around its detachment of serious political concerns.

The proposed *diverse, distributive and territorial framework* thus contributes to develop further relational, performative and spatial approaches to understanding changing economic geographies of agri-food systems. More specifically, the application of this framework unveils the mediating role of infrastructures – conceptually and practically (see (Larkin 2013; Tonkiss 2015) – in building redistributive and territorial agri-food economies that contribute to deliver sustainability and food security outcomes.

However, conceptualizations of infrastructures - or hubs - need to be underpinned by a more grounded, connective and multi-functional perspective rather than reproducing exclusionary or dichotomous narratives that have pervaded the food literature to date. Consequently, it is paramount to further develop open-access physical infrastructure attached to reflexive, integrated and inclusive modes of de-centered governance which are essential to overcome food insecurity and unsustainable dynamics. Indeed, our analysis shows the potential of developing more resilient infrastructures co-constituted by multiple stakeholders, sectors and scales. Building on recent geographical debates, we call for a more fluid, place-based and interactive conceptualization of food infrastructures as bridging material and socio-political devices that allow reconfiguring foodscapes into more diverse and distributive economies.

We have mobilized this new framework to analyze the food dynamics of one city and one - albeit increasingly heterogeneous- 'economic sector'. But there is significant evidence across cities in Europe to support that the sorts of embedded and distributed constellations identified in Cardiff are occurring on a far more widespread basis (Morgan 2015); often merging or re-defining the conventional economic notions of 'sectors' like food, energy, finance, care services, and transport. Partly as a response to the crisis in the conventional food system, and since 2007-8 more generally in the dominant modes of economy, we are beginning to witness the rebuilding of food systems and other sectors following distinct economic development pathways based upon diverse and distributed economy principles. The integrated analytical framework proposed here thus supports the development of this more engaged heterodox economic geography (Sheppard, 2015) by providing integrated conceptual tools to observe, analyze and design these transitions. This framework ultimately aims to serve as a capacity building tool to re-assess and rebuild territorialized agri-food economies which champion diversity and redistribution of value to deliver wide societal and material benefits, enhance democracy and increase the socio-ecological resilience of food systems.

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