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More-than-transactional circular economies: the café-urban farm nexus and emergent regional food waste circuits

Sam Quirk, Chris Gibson and Nicole Cook

Discipline of Geography and Sustainability, University of Wollongong, Wollongong, Australia

ABSTRACT

As governments encourage circular economy (CE) initiatives, markets for waste recirculation are taking shape. But implementation is in its infancy and material circuits are emergent. Early food waste CEs shaped by commercial players emphasise capital investment, routinised forms of waged labour, processing sites distant from food waste sources, and transactional relationships. Less well understood is the potential for vernacular circularity beyond market-based, transactional frames. This paper reports from a collaborative research exercise with a non-profit community farm in nonmetropolitan Australia, seeking to connect with cafés to access food waste for composting. Cafés are a nexus of production and consumption, ubiquitous in the contemporary multicultural Australian context, and therefore ideal for grassroots CEs. Ten local cafes participated, reviewing existing food waste practices, motivations for circularity, and contextual factors including the regional setting. We found that food waste circularity emerges via divergent pathways related to enterprise type and scale, environmental values of actors, place embeddedness, and local relationships. These pathways reflect the place-based attributes and diverse sustainability values of residents and businesses in the coastal, industrial city of Wollongong, where the study is based. Contrasting distant, transactional circuits, are more-than-transactional food waste pathways, developed by microscale actors shaping vernacular material flows and "hacking" public provision of Food Organic and Garden Organic (FOGO) waste services to mobilise environmental values and community relationships. Overlooked by "big policy" more-than-transactional relationships bind producers, intermediaries and consumers in closer loops and, in so doing, enrich place and facilitate an ethic of care for soil and land.

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Introduction

Circular economy (CE) initiatives are among the more popular sustainability interventions promoted by governments, encompassing the divergence and reuse of material flows of production, consumption, and waste away from landfill. The principle is nothing new: reusing, recycling and repurposing materials are long-standing features of human societies, and in much of the world, salvaging and reusing materials is a source of grassroots livelihoods and survival (Carenzo 2017). In the affluent Minority world, CE policy initiatives arise from heightened concerns over the economic and

CONTACT Nicole Cook ncook@uow.edu.au Discipline of Geography and Sustainability, University of Wollongong, Northfields Ave, Wollongong 2522, Australia

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environmental costs of waste and disposal, amidst unprecedented levels of production, consumption and fluctuation in recycling capacities (NSW Government 2018). In this decisive phase, circular markets for materials are taking shape. Yet, progress has been varied – a function of the distinctive pathways and value-propositions inherent in "heterogeneous biophysical materials" (Bakker and Bridge 2006). Not all materials beget easy circularity (Stanes 2021). And thus, CEs take diverse forms, some maturing as capitalist markets, others lagging or splintering into incoherent forms (Lynch 2022). While reuse markets for post-consumer materials proliferate (Warren and Gibson 2021), actually-existing circularity is rare (Hobson 2020). Indeed, circularity for its own sake is not uncomplicated, nor intrinsically virtuous. As with all markets, uneven power relations configure state, capitalist, and civil society actors, socially and spatially (Massey 1984). Diverse CEs thus have the potential to consolidate or distribute power, concentrate or share profits, and embed more or less exploitative relations among actors (Herod et al. 2014). Calls for acknowledgement of these justice considerations have accelerated as CEs are integrated into market-based paradigms (Ashton et al. 2022; Hobson 2016; Lekan, Jonas, and Deutz 2021). How exactly CEs take shape, on-the-ground, in specific geographical contexts, is thus our concern in this article.

We accordingly report from a collaborative research project undertaken to document and explore possibilities for food waste CEs in a nonmetropolitan Australian setting. The collaboration was between university researchers and a non-profit urban farm, Green Connect, that is guided by permaculture and waste recovery principles and dedicated to training and career development for former refugees and unemployed young people. Green Connect is based in Wollongong, in the Illawarra region of New South Wales (NSW), Australia (80 km south of Sydney). A successful food producer, it encompasses an 11-acre urban farm and Fair Food enterprise, in a socio-economically disadvantaged neighbourhood on land leased from the NSW Department of Education. A steep, unused, weedy lot once used as a dumping ground, is now a functioning farm providing food, jobs and connection to people and community. One author of this paper has for the past 4 years been involved in growing food and repurposing food waste on peri/urban farms in the region, including at Green Connect. While Green Connect had been keen to improve food waste circularity and "close the loop" between food waste and food cultivation, perennial problems resurfaced. The goal – to develop "small loops" (Hobson 2020), linked to restaurants and cafes – required alignment between food waste recycling, agricultural rhythms, and the exigencies of kitchen work, consumer expectations and insufficient composting materials. The potential for cafés to redirect food waste back to Green Connect was discussed with the (then) manager of the urban farm. The hope was to evolve closer ties between food waste and food production, whilst creating efficiencies in existing farm infrastructure and leveraging local food box delivery routes. While the circularity of food in café and restaurant settings can include preventative actions or circulation of soon-to-expire foodstuff, this paper focuses exclusively on biowaste (consisting of food waste) recycling.

Considerations of materials and logistics immediately surfaced as that author, in dialogue with Green Connect, countenanced closed-loop models for food waste recirculation. Beyond technical considerations, it became clear that an understanding of social, cultural, and economic factors was necessary (Corvellec et al. 2020). Certain enterprises, and the settings of their work, lend themselves to distinctive forms of circularity. Cafés are one such enterprise, and cultural-economic space. Cafés have their own "vibe", place-based character, and community connections. While some cafe markets are oligopolized (e.g. United States [Starbucks] and United Kingdom [Costa]), in Australia, New Zealand and much of Europe, cafes are mostly independently operated, family-owned, small enterprises. A culmination of diverse migrant and grassroots entrepreneurial experiences, cafés are distinctive ethnic small businesses that, especially in Australia, are ubiquitous (Felton 2018). They are frequently expressions of owners' desires and passions. And like mushrooms, cafés pop up anywhere when the conditions are suitable. In an Australian regional setting such as Wollongong, they emerge beside libraries, at markets, in inner-city car parks or annexed to homes. Critically, cafés are points of intersection between consumption, production, and waste; sourcing produce that requires further processing (preparation, cooking and/or plating) before serving. Cafés are poised

to not only participate in circular food waste activities, but to introduce sustainable practices to the public through their position as "third places" where publics meet (Oldenburg 2013). Understanding the potential for Green Connect to close the food waste loop thus required two phases of research: first, to conduct qualitative research with café managers, owners and workers about their food waste experiences, values, and practices, and second, to propose a scenario for cafes to more fully "close the loop" with the Green Connect farm. We report on both phases of the research here.

We thus bring to the surface a key tension identified in the ensuing results and analysis: between emergent food waste circuits dominated by profit-seeking waste management firms (and based on socio-technical systems akin to other forms of materials recycling and waste management, in which monetary transactions define relationships) and more-than-transactional circuits encompassing informal and hybrid food waste practices that prioritise community relationships. We refer to these informal, community-centred circuits underpinned by social and environmental values beyond transactional concerns as "vernacular CEs". Guided by post-capitalist and feminist principles to eschew profit- and rent-seeking (Cameron and Gibson-Graham 2003), we evaluate the potential for grassroots economic activities based on environmental and social values (cf. Hobson 2020). Our guiding research question was: what are the prospects for more-than-transactional food waste circuits in a prosaic regional setting? As we elaborate below, forging closer, vernacular CEs against the dominance of profit-seeking waste management firms requires attentiveness to a range of factors, including enterprise type and scale, personal environmental values of key intermediary actors, place embeddedness, and the presence and durability of meaningful local relationships.

Literature review

The globalised food system is shaped by industrialised capitalism and profit-based logics that drive over-production, global land and soil exploitation, and the externalisation of waste (Kneafsey et al. 2021). The accumulation of wealth through food production depends on linear modes of consumption enabled through the production of landfill to keep food waste "out of sight out of mind" (Evans, Campbell, and Murcott 2012). Circular economy (CE) challenges the linear character of mainstream economic growth via the revaluing and recirculation of post-purchase resources (Lekan, Jonas, and Deutz 2021). Emerging from the field of political ecology as a critique and solution to the waste generated in industrialised production in consumer societies (Hobson 2016), CE promotes the revaluing and recommodification of waste for input into new phases of production (Korhonen et al. 2018). Described as "restorative and regenerative industrial systems" (Hobson 2016, 88) CE aims to "value resources by keeping products and materials in use for as long as possible" (NSW Government 2019, 2). It therefore aspires to a transition from the linear, resource-consuming economy, decoupling economic growth from resource wastage (Corona et al. 2019).

While much CE policy aspires to smoothly-functioning circulations of materials through well-ordered markets, CEs take divergent forms, and actually-existing circularity – where the waste products of one process tightly feed into production, consumption, and waste feedback loops – are rare (Hobson 2020). CEs range from industrialised models, currently prioritised in public policies, to social-enterprise models emphasising local development (Lekan, Jonas, and Deutz 2021) and closing-the-loop at a smaller scale (Hobson 2020). Pathways to circularity vary, shaped by market players, geographical density and proximity, and the specific properties of materials. While some markets reuse of materials have proceeded apace (e.g. plastic/cardboard/metal waste repurposing), others have faltered (Lynch 2022). Beyond technical considerations, the stuttering emergence of CEs compels analysis of how they take shape across a spectrum of possible social relations.

This article accordingly seeks to make sense of CE as a series of emergent economic forms. In the case of CE, government policy has, in an emergent phase, favoured market-based approaches, supporting private sector innovation in the revaluing and extraction of financial value from post-purchase commodities and previously wasted resources (Lekan, Jonas, and Deutz 2021; Warren and Gibson 2021). CE is envisaged by governments as a market-based approach and understood as a

technical problem to be overcome by engineers and supply chain experts (Bulkeley, Watson, and Hudson 2007). In NSW, Australia, where the authors are based, the government has promoted large-scale solutions, "standardised" approaches, sector-wide "benchmarks" and "industrial waste collection" (NSW Government 2020). The NSW Government mandate for food and organic waste recycling applies to households at the municipal scale and "targeted business" including "large supermarkets and hospitality businesses" (NSW DPIE 2021a) – locking-in waste pathways to new technologies and distant processing centres including "new organics transfer stations to move material outside urban areas for processing" (NSW DPIE 2021a). Yet, emergent market relations of this shape warrant scrutiny. Such approaches overlook the potential for localised nutrient capture and associated environmental, economic and social benefits (Lu, Qu, and El Hanandeh 2020; McClintock 2010), while the large-scale focus reproduces an "out of sight out of mind" waste paradigm (Evans, Campbell, and Murcott 2012), limiting actual circularity and its transformative potential (cf. Hobson and Lynch 2016). While CE can be transformative, it has also been critiqued as a market instrument focusing on profit at the expense of "the political and socio-cultural dimensions that a transition to circularity would entail" (Corvellec et al. 2020, 99). For those sceptical of the propensity of capitalist actors to address sustainability equitably, the challenge is to comprehend emergent CEs based on more-than-transactional and market-based paradigms.

Feminist political economists draw attention to the diverse enterprises, forms of work and relationships that sustain social and economic systems (Fraser 2014, 542) including unpaid work in the home and nonprofit and volunteer organisations. Understanding the diversity of enterprises across and within industries is thus important for contemplating capitalism's alternatives (Gibson-Graham 2008). CE forms range from "high-tech", global-corporate-conglomerates of manufacturing industries where aftermarkets are to be exploited, to hyper-localised solutions based less on transactions than on relationships and non-market values (social, cultural, and environmental). Hobson (2020) for example, foregrounds the everyday circular spaces and smaller-scale initiatives crucial to CE transitions (Hobson 2016). The "ordinary practices of sharing and circularity" (Holmes 2018, 138) underpinning alternative systems demand different conceptual framings and methods.

Such possibilities are central to the question recently posed by Ashton et al. (2022) regarding who wins and who loses from CE. CE's evolution in a market-based paradigm strives for formalisation, with discarded resources "drawn into the private sphere" (Ashton et al. 2022, 4) and recommodification for profit. This can disempower on-the-ground actors practicing vernacular circularities (Chen and Carré 2020; Soliz Torres and Acosta 2017). Carenzo, Juarez, and Becerra (2022) acknowledge these dynamics in formalising recycling practices in Argentina, where Corporate Circular Business Models (CBMs) driven by top-down governance, individual appropriation of collective benefits and protectionism (with regards to IP) proliferate. Meanwhile, tensions grow between the capacities of more-than-transactional social enterprise to diversify economic development towards CE while eschewing larger circuits of capital (Lekan, Jonas, and Deutz 2021). "Grassroots" CBMs reframe waste as a commons underpinned by collective governance and sharing solutions that transcend "market and techno-productive" framings, while centring social and human dimensions (Carenzo, Juarez, and Becerra 2022). Yet many grassroots CBMs struggle for a seat at the table (Carenzo 2017). Understanding CE "from below" is therefore key to possibilities for more equitable CEs.

Café culture and vernacular circularity

For food waste especially, the spectrum of possible circularities is broader than solely profit-seeking market players, encompassing diverse actors operating at the edge of, or beyond, profit-seeking logics, including cafés and restaurants, domestic households, food industrial processing facilities, and charities. Here we focus on cafés. The café is, at one level, a capitalist enterprise selling beverages and food to consumers for profit. The tendrils of café consumption and production reach from local

food producers to the distanced global supply chains within which coffee – the cafe's stock in trade – is entangled (Neilson and Pritchard 2009). Yet, cafes are more than merely firms in a capitalist marketplace. In contexts such as Australia, with few corporate owned chains, cafes have deep community roots (through migrant heritage, and in vernacular high street culture). Cafés connect histories of colonialism, urbane culture, and political activism to agricultural commodity production and distribution. Said to have emerged first in Constantinople in the 1500s at the crux of maritime trading routes forged by colonial expansion, cafés spread across Europe in the Georgian and Victorian eras, trading upon coffee's taste and addictive properties (as a stimulant drug), becoming important social spaces enabling the flourishing of radical political culture and artistic and literary communities (Tjora and Scambler 2013). Nowadays, cafés are high street and shopping mall spaces embedded in everyday life (Eom, Yoon, and An 2021) and in Australia especially, forge a distinctive vernacular public realm (Walters and Broom 2013). Italian and Greek post-war migrants brought with them the espresso machine, and were pioneers of Australian café culture (Felton 2018), from the inner city to small country towns (Alexakis and Janiszewksi 2016). Offering a "certain cachet" (Felton 2018), cafés were an important location to stay connected to community, particularly for migrants, cultivating everyday multiculturalism (cf. Noble 2013, 182). Notwithstanding the racial discrimination that many café operators faced (Alexakis and Janiszewksi 2016), cafés have been places of social experimentation and innovation facilitating a greater acceptance of multiculturalism.

Cafés and restaurants have also been understood as businesses pioneering social enterprise and sustainable consumer behaviour (Higgins-Desbiolles, Moskwa, and Gifford 2014; Lewis and Vodeb 2021), promoting environmental awareness and practices through the enjoyment of conversations and consumer experiences (Higgins-Desbiolles, Moskwa, and Gifford 2014; Loschelder et al. 2019). Matters of provenance, seasonality and local varieties and production can be foregrounded (Higgins-Desbiolles and Wijesinghe 2018) connecting broader food systems and local consumers (Lewis and Vodeb 2021). Through food waste repurposing, cafés have the potential to contribute to food waste cultures guided by more-than-transactional motivations, from sustainability to a more-than-human ethic of care for soil and land (Puig De La Bellacasa 2015). Whether such possibilities materialise on-the-ground, and how, was the subject of our inquiry.

The study

Initial directions for the research were shaped by discussions with the (then) farm manager at local urban farm, Green Connect, seeking to connect with cafes in Wollongong to access food waste for composting. The ultimate aim of this collaboration was to develop a distinctive, more-than-transactional CE via localised composting, linking a social enterprise prioritising community development with café managers' growing concern about food waste processing. However, understanding the potential for Green Connect to close the food waste circuit required an initial phase of research (reported here): to conduct qualitative research with café managers, owners and workers about their food waste experiences, values, and practices.

Qualitative interviews probed how cafes positioned themselves in relation to food waste composting opportunities afforded by the regional setting. In contrast to metropolitan cities, such as Sydney and Melbourne, the diversity and relative proximity of industrial landuse zones to residential populations, means that regional towns are at the forefront of emergent food waste CEs (Ames and Cook 2020; Wall 2020). These diverse landuse zones and locational features matter to emergent food circularities: they create the optimal conditions through which to channel public investment in industrial food waste infrastructures into the region, including via NSW Government Infrastructure Grants (NSW DPIE 2021b). These grants have particularly supported the transition of local soil company (Soilco) to industrialised organics composting. The nonmetropolitan setting therefore comprises both café cultures and organics composting facilities generating diverse values, relationships and interactions between small, community-based businesses, industrial scale and vernacular food waste circularities.

Methods

The primary method of data collection was semi-structured qualitative interviews with café workers, managers, and owners in Wollongong. Originally, interviews on site were to be combined with a tour of kitchen facilities, and explanations of how food waste was managed in cafe spaces. This would investigate the socio-material dynamics of cafés that are under-reported in the literature (cf. Fine 1990). Because of the COVID-19 (Delta variant) outbreak in Sydney from June to October 2021, workplace tours could not be conducted. Interviews were instead via Zoom meetings, limiting in situ insights on materials, but nevertheless intensifying the focus on the *values* of the participating workers regarding food, waste, sustainability, and the community.

Ensuing recruitment was targeted rather than randomised. After formalising their support, Green Connect provided consent to incorporate their delivery routes to narrow down the number of potential participating cafes. Although some cafés remained open during the Delta-variant lockdown, many closed. For others, staff were shed, leaving a skeleton workforce. Because of staff losses, managers and owners were time-poor, resulting in recruitment delays. While the sample size was therefore smaller than anticipated, the ten cafés interviewed generated rich insights into café waste processes, generating over 50,000 transcribed words.

In line with University Research policies, the project sought and received ethics approval (HREC: 2021/142). Café participants were informed that results would be reported back to Green Connect to inform new potential food waste circuits; for this, all gave their consent. Three participating cafe managers chose to be assigned a pseudonym and one participant chose to be referred to by their position. In what follows, five cafés have been given alternate names. Some enterprises gave consent to be named but on further advice have been anonymised, given that participants revealed aspects of their food waste practices that could be considered as transgressing regulations for municipal waste schemes (e.g. using a service they are not paying for or not paying for at a business rate).

The interview schedule comprised three main sections. The first section sought to identify what cafés do with food waste, in particular whether cafés sent food waste to landfill or pursued alternative options. This section also encouraged participants to reflect on the place-based material infrastructures (bins, collection mechanisms) and workplace and labour force dynamics in managing food waste flows. The second section interrogated motivations and values underpinning existing practices of food waste recycling. Here, participants were invited to reflect on values and motivations underpinning owning and operating the café and engagement with other local businesses and communities (cf. Mostafanezhad and Suryanata 2018). A third section of the interview, examining future scenarios for urban-farm and café CEs, rounded out the discussion.

An introduction to participating cafes

Participating cafes reflected the diversity of contemporary Australia. Turnip Up café is in a central area that has long suffered neglect but remains popular with commuters using the railway station, along with healthcare workers from nearby Wollongong Hospital. Co-owner Ursula is proud of their Middle Eastern heritage and deep connection to food provenance. Glass Alley is located in Wollongong Central Mall, owned by Nathan, whose passion for coffee led him to abandon his corporate accounting career. The café's focus is on speciality coffee but is complemented by restaurant-style take-away food, filling the niche of coffee and lunch for office workers – an echo of Nathan's past. A hundred metres south, on Burelli Street, is Guts About Health Café, spilling onto the footpath from the side of a multistorey car park. Advertising organic produce and coffee, it is a café-cum-organic and wholefood retailer owned by Dorothy, who with a coaching background runs it with a wellbeing focus, facilitating diverse dietary needs.

Further south, tall office buildings transition to a lower-density mixed industrial area with mechanics, food manufacturers, and Bell and Spoke Café. Originating from a single coffee machine in a bike shop, Bell and Spoke has grown into a standalone establishment renowned with cyclists.

Tucked away behind trees and annexed to the Illawarra Performing Arts Centre (IPAC), is The Social, popular with employees of Wollongong City Council located across the road. A kilometre north, at a dramatic beachside location, is Diggies Café and The Kiosk, nestled under 150-year-old Norfolk Island pines and the city's heritage-listed surf-bathing club. The beachside café, popular among tourists, exercisers, and beachgoers, has a youthful staff, many also students at the university. Further north is Delano Speciality Coffee, operating a roastery and wholesale coffee supply business from a warehouse in a bustling industrially zoned precinct of factories and small workshops. The remaining three cafes are in small coastal suburbs further north: The Broken Drum, a small espresso bar run by Jo and Graeme after moving from Sydney with their young family; the Walnut Cafe, a popular community-minded establishment and local social hub; and Letterbox Latte, nestled alongside yoga studios, rapidly gentrifying houses and dog walkers in beachside Austinmer.

Existing food waste practices

While participating cafés differed in location, clientele, and focus, all but one had developed food waste recycling processes (Table 1). Larger cafés maintained relationships with commercial waste services providers that collected and transported food waste to an industrial-scale processing plant (Soilco) in nearby Kembla Grange, for composting and sale to landscaping companies throughout NSW. The generally smaller cafés made use of what was available to them. Bell and Spoke, Letterbox Latte and Walnut Café had access to the recently introduced Food Organics Garden Organics (FOGO) recycling scheme introduced by Wollongong Council for kerbside household collection (highlighted in green in Table 1), also processed at Soilco. This was possible because they were annexed to residential buildings. The latter two also have on-site compost bins. Glass Alley café had access to organics recycling, organised by their landlord. Dorothy, manager at Guts About Health, took food waste home and composted it. The Broken Drum and Walnut Cafés also had community members pick-up some organic waste. Meanwhile, Turnip Up had reached out to local community members to collect waste but was unsuccessful.

While cafés were already actively experimenting with food waste repurposing, the nature of circularity diverged. Focusing on the flow of organic waste from cafes to end users, Figure 1 shows that cafes reliant upon Soilco as the processing location, (Delanos, Diggies, The Social and Glass Alley) including those cafes that via FOGO connected indirectly to Soilco (IE Bell and Spoke, Letterbox Latte and Walnut Café), contributed to a commercialised waste pathway. Here, food waste was revalued through industrial-scale compost production as an additional aftermarket commodity in the agricultural and landscaping industries (cf. Warren and Gibson 2021). This commercial pathway was not a strictly circular, closed-loop organic food waste model. Nutrients from food waste were not processed locally, nor used to grow food in urban farms in the same localities.

Neither did cafés that processed organic waste on-site or via community members (Letterbox, Walnut, Broken Drum, Guts About Health) achieve strict circularity. This compost supported food production for community members but not food used by the café. At the same time, three of these cafes were also directing food waste to commercial pathways through the FOGO scheme, highlighting the integration of grassroots and commercial models (Lekan, Jonas, and Deutz 2021). Café food waste circuits were therefore emergent – not completely fixed or locked-in. While emergent practices succeeded in diverting food waste from landfill, none closed the loop completely, achieving circularity.

Three emergent food waste repurposing systems: corporate, hacking and DIY

Underpinning these different waste flows are divergent economic rationalities, consumer relationships and labour processes. To capture the diversity of cafes' adopted approaches, we categorised waste reuse pathways into three categories: the corporate solution; hacking solution; and DIY solution (summarised in Table 2).

Table 1. Cafes' food waste end of use practices.

- Café without FW recycling solution
- Cafés using council provided residential FOGO system
- Cafés paying for commercial FW recycling
- Cafés composting FW at residence
- Cafés allowing community collection of waste (Only Coffee Grounds)

Café Name	Organic Waste Recycling	Organic Waste Recycling Type	Organic Waste Service Provider	Entity responsible for collection	Organic Waste processing location	Other Recycling
Turnip Up	No	N/a	N/a	N/a	N/a	N/a
Bell and Spoke	Yes	Industrial Composting	Wollongong City Council (WCC)	Remondis (Contracted out by WCC)	Soilco, Kembla Grange	Yes
Letterbox Latte	Yes	Industrial Composting, Onsite Composting	WCC	Remondis (Contracted out by WCC)	Soilco, Kembla Grange, Letterbox Latte	Yes
Walnut Café	Yes	Industrial Composting, Small-scale composting, Unprocessed use as soil amendment, Onsite composting	WCC	Remondis (Contracted out by WCC)	Soilco, Kembla Grange, Walnut Café, Local Community Garden, Local School	Yes
Delano Speciality Coffee	Yes	Industrial Composting	Remondis	Soilco	Soilco, Kembla Grange	Yes
Diggies Café	Yes	Industrial Composting	Remondis	Soilco	Soilco, Kembla Grange	Yes
The Social	Yes	Industrial Composting	Remondis	Soilco	Soilco, Kembla Grange	Yes
Glass Alley Café	Yes	Industrial Composting	ORG	ORG	Not Advised	Yes
Guts about Health Café	Yes	Home Composting	N/a	Café owner	Café owner's residence	Yes
The Broken Drum	Coffee grounds only	Not Advised	N/a	Community Member	Not Advised	Yes

The *corporate solution* was used by the four largest cafes: Delano Speciality Coffee; The Social; Diggies and The Glass Alley. Each was owned by, or in property relationships with larger business enterprises.[1] Under the corporate solution, cafés contracted a Waste Services Provider (WSP) (e.g. Remondis) or food waste processor, Soilco, who provided cafés with a bin (210–660 L wheelie bins) and collection service. Food waste processed at Soilco, used in-vessel composting comprising fully automated enclosed tunnels that controlled water, air, and heat (Soilco 2020). This high-tech, mechanised solution required codified knowledge of industrialised composting in accordance with Australian standards, acquired by workers inside the enterprise,

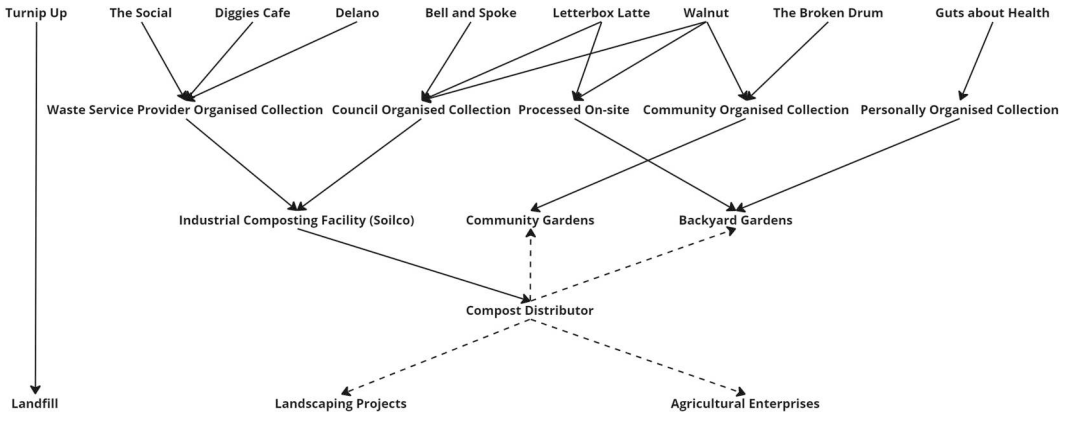

Figure 1. Flow of organic waste from cafes to end users. This includes: participating cafés (row 1); collection and waste processing entities (row 2); place of processing/end use (row 3); the compost distributor (row 4); and destination of industrially composted food waste (row 5; dotted lines). In none of these solutions is the food waste being repurposed into compost that is known to grow food that is used in the café, demonstrating the difficulty of achieving complete circularity. Initial flows of waste from cafés are distinguished by differing coloured arrows according to the collection entity.

Table 2. Selected characteristics of food waste reuse pathways.

Description of characteristics	Corporate	Hacking	DIY
Money exchanges hands	✓		
Transactional	✓		
Relies on Social Capital			✓
Marketability	✓	✓	✓
Potential to increase Cultural Capital	✓	✓	✓
Wollongong Council involvement (rate paying)		✓	
Volunteers involved			✓
Division of Labour (Café involved in sorting)	✓	✓	✓
Division of Labour (Café involved in composting)			✓
Healing the "metabolic rift"			✓
Traceability			✓
Waste provenance			✓
"Epiphytic" (i.e. reliant upon larger systems)	✓	✓	
Continuation of "out of sight, out of mind" philosophy	✓	✓	
Collection			
High tech (computerised)	✓	✓	
Low tech (analogue/non-computerised)		✓	✓
Requires tacit knowledge		✓	✓
Requires codified knowledge	✓		
Personal connection to people collecting waste			✓
Processing			
High tech (computerised)	✓	✓	
Low tech (analogue/non-computerised)			✓
Requires tacit knowledge			✓
Requires codified knowledge	✓	✓	
Personal connection to people collecting waste			✓
Distribution of end product (compost)			
Used On-site			✓
Distributed locally (within Wollongong LGA)	✓	✓	
Distributed outside Wollongong LGA	✓	✓	
Used to grow food	✓	✓	✓
Used outside of food production	✓	✓	
Used to grow food which is used in the cafe			
Personal connection to people using end-product			✓

rather than through formal external training. The finished product, sold commercially for large-scale landscaping, farming, and home gardening, was distributed beyond the locality, thus requiring further inputs. The corporate solution aligned with a transactional, profit-driven CE

foregrounding recommodification of, and value extraction from, waste products (cf. Warren and Gibson 2021). A large resource base was consolidated while both café staff and consumers lacked awareness of the waste pathway and downstream processing methods, furthering an "out of sight out of mind" mentality.

The corporate solution was only financially viable when food waste volumes reached a critical mass. Food waste was the heaviest component of cafes' general mixed waste attracting a waste levy for disposal to landfill ($147.10/tonne in Wollongong [NSW EPA 2021]). Critical mass was reached when it was cheaper to remove food from general mixed waste and employ corporate composting. Smaller businesses were unable to reach the critical mass, but of the cafés adopting the corporate approach, Diggies – a large café with approximately 70 staff – reached the critical mass, saving $2000 per month through corporate composting. For Delano and The Social, the decision to use corporate waste providers was not strictly financial, but their scale and turnover (as part of larger companies) justified this in line with environment, social, and governance (ESG) values. Smaller cafés did not have the financial scope to make similar decisions. The exception was The Glass Alley Café, a small business, located in the Wollongong Mall where their tenancy included a food waste recycling service.

The *hacking solution* was used by Walnut, Letterbox Latte and Bell and Spoke cafes. These businesses did not generate enough waste to engage corporate WSPs, but due to their location in residential areas, they could access Wollongong City Council's FOGO service, introduced in 2020 and also processed by Soilco. Designed for households rather than small businesses (and funded via housing rates), this approach could be considered a form of "hacking", through the unauthorised access and adaptation of other infrastructure (see Maalsen 2022). The residential location of these cafes provided access to Council's FOGO service connecting cafe kitchens to Soilco's industrial composting. Lines were blurred between micro-enterprises and residential households.

DIY solutions were non-commercial waste pathways where café owners or community members recycled organic waste. These vernacular, non-transactional solutions included on-site composting, sharing of coffee grounds with local community members, and home composting. DIY and community-based solutions were used by Guts About Health, The Broken Drum, Walnut Café, and Letterbox Latte (the latter two deploying the hacking alongside DIY and community-based solutions). Walnut Café and Letterbox Latte managed their compost on site, adding food scraps and organic materials (e.g. grass clippings). Dorothy, from Guts About Health, took food waste home, feeding static piles in her backyard to produce vermicast-type compost, used on her garden and offered to café customers for a donation (that was passed on to the farmers supplying the café). At the Broken Drum, food scraps were combined with general waste, where, like Walnut Café, coffee grounds were collected for school and community gardens for direct application on gardens or compost. These low-capital infrastructure solutions required tacit knowledge of composting, bringing people into closer engagement with food waste processing. The cafés undertaking such practices were smaller, generating less organic waste than those using corporate solutions. Pre-COVID-lockdown, Guts About Health generated just over 20L of food waste daily, equating to approximately 140L of food waste per week, compared to Diggies (five 660L FOGO bins weekly).

Smaller cafés achieved tighter circulation of food waste through backyards, preserving valuable nutrients in closer, local, intimate relationships. Deeper connections to waste were forged through being intimately involved with waste and understanding its more-than-commodity value (cf. Puig De La Bellacasa 2015). The hyper-local recirculation of nutrients was another outcome of such systems, with organic waste transformed into compost and used on-site to grow food or gardens or gifted for the same purpose.

Environmental and community values and food waste repurposing: more-than-transactional enterprises

The evolution of different solutions emerged from a melting pot of business goals, personal persuasion, and ambition. While participating cafés were mostly small businesses operating for profit in a

capitalist marketplace, participants held diverse environmental and community values, blurring boundaries between business and community interests (cf. Lekan, Jonas, and Deutz 2021). It was impossible to divorce practices, including food waste practices, from the wider set of values that the cafés espoused, and managers held in relation to food provenance and localism.

Participants identified desires for a deeper connection to where and how food was grown. Emily, at Letterbox Latte, for instance, aimed not only to source supplies from local farmers in Kangaroo Valley (Fox and Quail), and urban farms (Green Connect and Popes Produce), but to orient the café menu around seasonal variation. As Emily explained:

> I created a flexible menu, based around what they have planted … a lot of brassica vegetables and greens, and trying to source grains and local bread. And then each week, or each day sometimes, it changes. For example, the farm down in Kangaroo Valley will message and be like "Hey, the Cauliflower has just bolted, do you want it for cheap?". So, this week we're doing a cheesy Cauliflower bake with Jalapeño jam. We get second Jalapeños that have gone a bit gross down at the farm and make them into jam. That's how the menu runs.

For Emily, personal desire compelled her to reach out to the people that grew and harvested food:

> Growing up, I didn't really have a strong connection with where my food was grown. So, throughout the last few years I have wanted to be working within a job that connects people closer to the produce that is being grown locally and where it is coming from. I don't know, it's like a really personal connection with them.

Local and organic food suppliers were similarly important for Ursula at Turnip Up, who grew up on an organic herb farm, where her Lebanese mother cultivated more than four hundred herb varieties on a well-known property visited by chefs and naturopaths from across Australia. Revealing the alternative food cultures within Australia's diverse migratory histories (Head et al. 2021), Ursula drew on her experience of organic farming to source food from small organic growers rather than larger farms dependent on chemical inputs.

For Dorothy, the redirection of food waste from landfill to her own backyard compost was the "whole intention" of the café, described as "the actual full cycle experience". This included understanding where and how food was sourced: "not only to know where the food is coming from but what's happening to the animal while it's alive, [and] how it is killed".

Meanwhile, at The Broken Drum, Graeme and Jo connected environmental values to social justice in global supply chains. Articulating values of "caring about the planet", they sold keep-cups,[2] sourced local suppliers to minimise "food miles", and sought fair-trade coffee through suppliers (e.g. Campos), with a superior record on ethical fair trade, and upstream transparency. Graeme articulated a more-than-transactional philosophy towards relationships with suppliers: "I don't think we would be able to handle going with a company that is just dealing with machinery or just treating people like machinery".

Cafés also articulated desires to "keep it local". For Sophie at Diggies, it was important to help support locals through tough times – pertinent during bushfires in 2019 and then pandemic conditions (2020/21), through acknowledging producers:

> It has just been something on our menu that, rather than having just eggs, it's Kangaroo Valley Eggs. It's a small family run business and they got really badly affected during the bushfires, so it was really important for us to make sure they felt supported.

Others like Jo and Graeme of the Broken Drum supported local people by sourcing jams and cakes from their community, because "you just want to keep it as local as you can and invest in your own economy and your own little space". They also supported local charities by hosting coffee tasting fundraiser events.

Motivations for cultivating local relationships were not only altruistic: they helped to generate reputational benefits – a form of cultural capital (cf. Bourdieu 1984) – as well as social capital. Emily at Letterbox Latte developed a relationship whereby her local food supplier made contact if some vegetables had bolted or were damaged and could be moved at a lower price. Brad's relationship with Hasties Meats, a local butchery, helped build trust to ensure transparency in the

provenance of meat. Similarly, the manager at Walnut Café sourced food from a local market because the relationship built over time meant they would "look after her" and distribute produce quickly. Walnut Café's coffee grounds were collected by the local school, providing the café with a waste solution and the school with a beneficial soil amendment, recirculating nutrients locally and growing food for the community. At Delano café, the introduction of compostable coffee cups signalled a level of environmental "care" that ultimately attracted "more customers, and more money into the business". Cafés' experimentation with sustainable and localised food practices was therefore generative of cultural capital that enhanced business and client relationships.

These accounts reveal how the desire to connect with food producers and to nurture localised food initiatives (Mostafanezhad and Suryanata 2018) produces diverse waste pathways that complicate transactional models. Such desires actively contributed to a vernacular café culture in the Illawarra that prioritised localised producers, seasonal menus, and ethical fair trade. The café became an intermediary space, developing and nurturing circuits of value (Lekan, Jonas, and Deutz 2021) between consumer culture and sustainability values (Higgins-Desbiolles, Moskwa, and Gifford 2014), and through which diverse food waste circuits emerged.

Scenario for cafes to more fully "close the loop" with an urban farm

A scenario whereby a version of these diverse food waste circuits could be implemented was put to the cafes, in which Green Connect could collect the food waste generated at the cafes (via 20L buckets) and compost it on the farm. Generally, all cafes were interested in the potential of this closer loop. However, Turnip Up café, that generated too little waste for the industrial solution but couldn't access the DIY or hacking solutions due to their location and clientele were the most excited about the cafe-farm solution. . Other cafes who already had solutions to their food waste recycling still expressed interest due to the cultural capital that Green Connect held, mentioning the reputational benefits that "sticking a Green Connect sticker" on their café windows and notice boards could add to their reputation. Cafes were also vocal about the limitations of this scenario as a solution, citing reasons such as space, collection frequency, smell and bin configurations. Despite these concerns, there was strong interest in linking the service of waste collection proposed with the addition of the farm supplying the café with food. Multiple cafes mentioned that they thought this more-than-waste-service-provider relationship would have reputational benefits for the café but would also make staff more connected to the food they were using and potentially less likely to waste it.

At the time of the study, this scenario and the linking of waste services and produce provision was unable to be implemented due to space and infrastructural limitations. Supplying cafes with a diversity of produce every week would require a much larger output from Green Connect than the farm could achieve, or from the cafes' perspective, a significant reduction in menu options. Despite this, in the intervening years, Green Connect has continued to expand their vegetable production and has plans to extend their composting facilities and practices on site. As with other Australian examples such as Loop Growers in Brisbane (https://loopgrowers.com/), these modifications enhance the potential for café-farm circularities pointing to nascent business models centring environmental and local values in food systems innovation.

Conclusion: cafes as intermediary spaces of sustainability

The emergent, heterogenous nature of food waste circuits is a reminder that economic forms are made, not given (Cameron and Gibson-Graham 2003; Polanyi 2001), shaped by cultural, economic and political contexts that differ by and evolve in place. Circular economies are still emerging in the Australian context, and are unlikely to cohere as a singular model, whether industrial, corporate, or more-than-transactional. Market players are asserting dominance, facilitating modest environmental improvements while circumventing more radical shifts (Ames and Cook 2020). Most government policy initiatives reflect this, framing transformation as a technology-centred, corporatized process, with a focus on

scaling-up (Hobson 2016; Lacy and Rutqvist 2016). The focus on large-scale projects fails to support relationships between food production and retailing in ways that forge "closer loops" with food producers and enhance prospects for initiatives to embrace a more-than-human ethic of care (Puig De La Bellacasa 2015). The focus on economies of scale means that initiatives among smaller, economically diverse businesses may not fit the "growth paradigm" (D'Amato et al. 2017, 725) leaving the capacities of smaller producers and retailers – the key focus of this research – unrecognised and realised.

Large investments made by governments and corporate actors have shaped emerging markets around food waste. Currently, food waste recycling in this corporate form is expensive for microbusinesses such as cafes. They either must generate large amounts of food waste or must have a diversity of revenue streams to be able to afford corporate food waste services. Nevertheless, the development of public kerbside food waste recycling in a regional setting has meant certain cafés could "hack" appropriate services (such as FOGO), in creative ways beyond their original intent.

This research showed that established corporate actors active in the food waste repurposing space use pre-existing relationships with WSPs to administer a largely status quo solution, augmenting but not challenging existing systems for other streams of waste such as co-mingled recycling. As governments seek to scale-up CE initiatives (FIAL 2020; NSW Government 2018), policy and funding may be available for corporate actors to further build markets. If true, there could in time be *less*, rather than more space for diversity of CE forms, as corporate actors lock into place infrastructural arrangements over long time-frames that may inhibit flexibility and transparency.

Nevertheless, other possibilities exist, and should factor more prominently in CE policy debates, for their ethical, environmental, and social advantages. Based on our study of cafe food waste in Wollongong, we argue that vernacular, more-than-transactional variants must be promoted in shifting current production-consumption waste practices (Hobson 2016, 2020; Hobson and Lynch 2016). Enterprises such as cafes lend themselves to the evolution of more-than-transactional forms of circularity because of their small scale, place embeddedness, and personal environmental and community values. Cafés lie at the centre of emerging food waste economies, assembling and accessing different food waste processing resources, relationships, and outcomes. These economies are embedded in the coastal, industrial city of Wollongong, where café cultures, sustainability values and food waste processing facilities intermingle. Examining CE "from below" (Carenzo, Juarez, and Becerra 2022), illuminates a diversity of business types, foregrounding circuits of value associated with food provenance and localism. Such values underpinned the initiation of sustainable practices, and food waste repurposing is part of that repertoire. While political narratives in settler-colonial societies foreground sites of production (such as farming and manufacturing) in sustainable transitions, intermediary spaces such as cafés potentially perform an important role in reinforcing and experimenting with sustainability practices and transitions. Considering the socio-material and place-based formation of CEs thus requires an approach focused on the contingent and spatially specific nature of systematic changes.

Possibilities abound to close the loop even further: to be more attuned to the sociomaterialities of localised farm composting: of sorting waste; integrating separate bins into waste streams; and adjusting waste contracts and pick-up times to align with farm compost processing (Quirk 2021). Grassroots CEs countenance the potential for food waste partnerships that return food as waste to the soil via organic food production, with minimal inputs or additional intermediaries. Cafes thus saw the reputational benefits of sourcing produce and food waste processing from the same local farm, aligning the café-farm nexus with the cultivation of cultural capital among an environmentally minded clientele. The ongoing documentation of CE experiments among diverse, smaller actors is therefore a crucial ingredient in the development of the transformative CEs needed for more socially and environmentally just transitions.

Notes

1. The Social is part of the Merrigong Theatre Company, Delano Café is owned by Delano Speciality Coffee; Diggies Café and Kiosk is owned by the larger Diggies Group and The Glass Alley leases its premises from the owners of Wollongong Central shopping centre (50/50 owned by Haben Property Fund and JY Group).

2. For Delano Café, antecedent to food waste repurposing was an earlier transition from single-use plastics and take-away coffee in response to public concerns.

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