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An Ecological Basic Income? Examining the Ecological Credentials of Basic Income Through a Review of Selected Pilot Interventions

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Abstract: While basic income (BI) has long been advocated for its social benefits, some scholars also propose it in response to the ecological crises. However, the empirical evidence to support this position is currently lacking and the concept of an ecological BI (EBI) is underdeveloped. Part one of this paper attempts to develop such a concept, arguing that an EBI should seek to reduce aggregate material throughput, improve human needs satisfaction, reduce inequalities, rebalance productive activity towards social activities in the autonomous sphere, and promote societal values of cooperation and sufficiency. Part two examines how BI interventions consider the principles of an EBI in their designs and discusses what their findings infer about BI's ecological credentials. The results find that while ecological considerations are largely absent from BI intervention designs, their findings suggest that interventions aligned with the principles of an EBI could play a role in addressing the ecological crises.

Keywords: basic income, postgrowth, sustainability, environmentalism, ecologism

1 Introduction

Basic income (BI) has been described as a radical proposal for a free society and sane economy (Van Parijs & Vanderborght, 2017) and a means of redistribution which aligns with the principle of social justice (Standing, 2017).

Arguments supporting BI centre around its potential to improve human wellbeing and address social issues, such as poverty and inequality (Lowrey, 2018); insecurity and unfreedom (Fitzpatrick, 1999), poor and precarious work (Gilbert et al., 2019), and the under-recognition of unpaid, reproductive work, largely

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performed by women (Lombardozzi, 2020). Many of these arguments have been empirically examined and evidenced by BI pilots around the world (e.g. Davala et al., 2015).

However, in recent years, scholars have given increased attention to BI's ecological credentials (Howard et al., 2019; Pinto, 2020). Given the overwhelming need for policies which simultaneously address social and ecological challenges (Gough, 2017), such attention is welcome. However, the empirical evidence to support BI's ecological credentials remains "severely limited" with less than one percent of academic journal articles on BI addressing the natural environment (MacNeill & Vibert, 2019, p. 2).

BI's ecological credentials rest upon its ability to improve wellbeing while reducing societal pressures on the environment. Sections 3 and 4 review the literature to propose principles for a basic income with the potential to do just this, referred to hereon as an ecological basic income (EBI). Sections 5–7 examine how selected BI interventions have considered these principles in their research designs and discuss what their findings infer about BI's ecological credentials. Section 8 offers a final summary and conclusions.

2 The Social and Ecological Crises

The world is facing multiple social and ecological crises. Over 60% of the global population live below an ethical poverty line (Hickel, 2017) while rising inequality, insecurity and debt have created a growing precariat class (Standing, 2020). The vast majority of extreme poor live in the Global South (Pogge, 2010) with differences in average incomes between the North and South quadrupling since the 1960s (Hickel, 2019b).

Poverty, however, is not exclusive to the South. In 2018, 14 million people in the UK lived in poverty with four million children too poor to achieve a healthy diet (Standing, 2020). At the same time, the income share of the rich has increased dramatically (Alvaredo et al., 2013). Of all the wealth created in 2017, 82% went to the richest one percent while the poorest 50% saw no increase at all (Alejo Vázquez Pimentel et al., 2018).

Poverty and inequality create a vicious cycle of debt and insecurity (Kallis et al., 2020), which has multi-generational social impacts (Standing, 2017). Debt also has negative ecological consequences. Paying interest on government bonds requires economic growth, which often sees the slashing of supposed "barriers" to growth, including environmental protections (Hickel, 2020). Similarly, servicing private

debt, and generating returns on investments, requires increasing production and consumption within the economy. Over the last 50 years, credit has been encouraged to facilitate economic growth (Kallis et al., 2020). The wider ecological consequences of growth are discussed further below.

The ecological crises have also reached unprecedented levels (IPBES, 2019; IPCC, 2021). As of 2022, at least six of the nine planetary boundaries which define “the safe operating space for humanity with respect to the Earth system” (Rockström et al., 2009, p. 472) have been crossed (Wang-Erlandsson et al., 2022): Greenhouse gas (GHG) concentrations are at a three-million year high (Willeit et al., 2019) putting the world on course for 2.5 °C of warming above pre-industrial levels by the end of the century (UNFCCC, 2022), 25% of all animal and plant species are at risk of extinction within decades (IPBES, 2019), biogeochemical flows are at more than double safe levels (Steffen et al., 2015), and 75% of land is severely degraded (IPBES, 2019).

There are multiple interactions and feedbacks between the planetary boundaries (Lade et al., 2020). The same is true for the social and ecological crises. The effects of the latter are borne disproportionately by the poor, resulting in an even greater transfer of wealth to the rich (Hsiang et al., 2017). The social crises of poverty, inequality, and indebtedness are also likely drivers of the ecological crises, particularly in rich nations (Grunewald et al., 2012). Inequality exacerbates ecological harms through status-based consumption (Wilkinson & Pickett, 2010) and via the wealth effect, whereby greater wealth correlates with a larger ecological footprint. It is also associated with longer working hours and higher levels of debt, “both of which stimulate consumption and emissions” (Gough, 2017, p. 81). High inequality also facilitates elite political capture (Oxfam, 2019), allowing the rich to “set agendas and inculcate selfish values” (Gough, 2017, p. 81) and so erodes the social capital required to “demand, enact and enforce environmental legislation” (Raworth, 2017, p. 172).

The social and ecological crises demand eco-social policies: policies with both social justice and sustainability objectives at their core (Gough, 2017). While some insist that this requires only tweaks to extant economic systems, values, and patterns of production and consumption, others argue for more radical transformation. Dobson (2007) distinguishes these two positions through the language of “environmentalism” and “ecologism”.¹

¹ Dobson’s language provides a useful distinction between responses to the social and ecological crises which seek to preserve the status-quo and those which seek to change political and social structures. Pinto (2020) also uses Dobson’s language to illustrate this distinction.

3 Environmentalism and Ecologism

3.1 Environmentalism

Environmentalism encapsulates mainstream responses to the crises which refrain from challenging the political and social consensus. Such responses embrace “means-based” development, the belief that the goal of development is simply to expand the total available means of production and consumption (Patnaik, 2010), and the continued expansion of the global economy through the pursuit of “green growth”. Green growth is a strategy for accruing long-term economic benefits through investment in natural capital, environmental protection and clean-up activities, and an industrial revolution to decarbonise the global economy (Gough, 2017). A primary focus of capitalist economies, green growth forms the foundation of the mainstream environmental movement (Dale et al., 2016) and underlies international policy agreements such as the Sustainable Development Goals (SDGs) and the 2015 Paris Agreement (Spash, 2021).

When discussing growth, it is important to distinguish between GDP and material throughput, that is, the natural resources which sustain human activities. Environmentalism argues that we can grow the former while technological innovations reduce the latter.

Green growth relies upon productivism and wage labour. “Green jobs” are a key driver of growth and seen as the means for providing everyone with a stake in a future, green economy (ILO, 2015; Renner et al., 2008; UNDESA, 2012). Compatible welfare systems encourage recipients into the labour market (Standing, 2017) and are funded by growth-reliant taxes (Buchs, 2021).

Green growth is technologically optimistic and reliant on future innovation (Jackson, 2017). Proponents argue that economic activity can be decoupled from environmental pressures through increased efficiencies, resource substitution, and carbon capture and storage technologies. Of the 116 IPCC scenarios for staying within two degrees centigrade of global warming, 101 rely on bio-energy with carbon capture and storage (BECCS) (Hickel, 2020). Advocates argue that growth drives technological breakthroughs as innovation is driven by the pursuit of profit (Kalaniemi et al., 2020). Green growth is seen as both reliant on, and a source of, technological innovation.

A BI aligned with environmentalism would therefore seek to stimulate green growth and economic activity. It would aim to increase labour market participation and encourage innovation, particularly in green technologies. Any accompanying policies would seek to maximise these effects.

3.1.1 The Challenges of Green Growth

Green growth is the subject of two main critiques. First, aggregate economic expansion is an insufficient, and inefficient, method for improving wellbeing. Despite a 65% increase in GDP per capita, the number of people living below \$5-a-day has *risen* by 370 million since 1990 (Hickel, 2017). This is because the benefits of growth are poorly distributed. The 2022 World Inequality Report found that, since the mid-1990s, 38% of new wealth has gone to the richest one percent. The bottom 50% have captured just two percent (Chancel et al., 2022). This means that over a third of “all the labour we’ve rendered, all the resources we’ve extracted, and all the CO₂ we’ve emitted . . . has been done to make rich people richer” (Hickel, 2020, p. 29).

Kallis et al. (2020) argue that economic growth *requires* inequality and exploitation, both of the poor (traditionally along race and gender lines) and of the environment, in order to generate surplus value. By requiring “certain types of people”, i.e. labourers, growth-based economies also discriminate against “unproductive” citizens who are seen as not contributing to society (Spash, 2021, p. 1128).

Second, further global growth appears incompatible with ecological limits. Absolute decoupling occurs when GDP growth coincides with reductions in emissions or resource use. In other words, it is when the economy grows yet the pressure it exerts on the environment falls absolutely (Parrique et al., 2019). The absolute decoupling of CO₂ emissions from economic growth has been observed in certain contexts (Hausfather, 2021). However, it is not occurring at the global level and is not expected to do so any time soon (Anderson & Bows, 2011; Bringezu et al., 2017). Gough (2017) uses the industrial production of bulk materials (cement, steel, etc.) to demonstrate the challenge. Such production accounts for 25% of emissions and is already highly efficient. However, with further economic growth, demand is expected to double over the next four decades meaning that even with *further* efficiency improvements of 50%, emissions would remain stable. When considering environmental pressures beyond CO₂ emissions, such as methane emissions, biodiversity loss, or land use changes, studies find that absolute decoupling is not possible (Haberl et al., 2020; Parrique et al., 2019). Technical solutions, such as recycling, material substitution, or carbon capture and storage, will only make limited contributions and create additional challenges (see Hickel, 2020 for a critique of BECCS).

Several scholars therefore argue that addressing the social and ecological crises cannot be achieved through the pursuit of green growth (Hickel, 2019c; O’Neill et al., 2018; Rao & Min, 2018). Hickel (2019c) found that achieving a good life for all within planetary boundaries requires a 40–50% reduction in the biophysical footprints of rich nations, that is, in the resource use contributing to the crossing of planetary boundaries. This requires a “fundamental reorientation of development theory”,

swapping means-based development for the pursuit of sufficiency, and shifting focus away from “the deficiencies of poor countries” and towards the excesses of the rich (p. 31).

3.2 Ecologism

If we employ the precautionary principle, and accept the above critiques, then alternative approaches, which do not involve the pursuit of economic growth, are required to address the social and ecological crises. Dobson (2007, p. 3) uses the term “ecologism” to describe approaches which call for “radical changes in our relationship with the non-human natural world, and in our mode of social and political life”.

3.2.1 From Material Consumption to Human Needs

Human Needs (HN) theories offer an alternative to means-based visions of development which correlate prosperity with material consumption. HN theories recognise that “all individuals, everywhere in the world, at all times present and future, have certain basic needs” which are “objective”, “plural” (i.e., cannot be aggregated), “non-substitutable”, “satisfiable” and “cross-generational”. “Satisfiers” are the infinite goods, services, relationships, and activities which satisfy HN in a given context or time (Gough, 2017, pp. 42–48). HN theories are people-centred and question the “goals, behaviours, satisfiers, and infrastructure” of mainstream development (Gough, 2017, p. 157).

In their Human Scale Development (HSD) framework, Max-Neef (1991) identified nine fundamental HNs² which are met through “systematically related and interdependent” satisfiers. A “synergic satisfier” is one which meets more than one need. Conversely, “inhibitors” or “violators” hinder the satisfaction of other needs (Max-Neef, 1991).

Doyal and Gough’s (1991) Theory of Human Need (THN) identifies “participation in some form of social life without serious systematic limitations” as “our most basic human interest” (Gough, 2017, p. 42). This requires the satisfaction of the “basic needs” of “physical health”, “autonomy of agency” and “critical autonomy” through “culturally specific satisfiers” with several “universal characteristics”.³ The availability of satisfiers is dependent on “societal preconditions”, including

² Subsistence, participation, freedom, protection, affection, idleness, creation, understanding and identity.

³ These include adequate nutrition, shelter, security, and healthcare; basic education, a non-hazardous physical and work environment; and significant primary relationships.

freedom, political participation and the most basic requirements of reproduction and cultural transmission (Gough, 2017, p. 43).

HN theories offer several advantages when considering wellbeing within ecological limits. First, HN theories identify people's most *basic* needs, defining a minimum baseline for wellbeing and providing a focal point for production and consumption (Gough, 2017). Second, HN theories provide a normative theory of wellbeing; HNs are universal and applicable across space and time. This requires the preservation of functioning ecosystems so that future generations can satisfy their own needs (Doyal & Gough, 1984). Third, by widening the scope for needs satisfaction beyond material commodities, HN theories allow for non-material satisfiers, such as better relationships and changing values, with lower ecological impacts (Kallis et al., 2020). Finally, HN theories have their roots in sustainability movements (Guillen-Royo, 2018). Max-Neef saw the pursuit of GDP growth as the dehumanisation of development and the subdual of nature. Through HSD he sought to bring human development back into harmony with nature by allowing consideration of the "reasonable use of resources that a person needs to have an acceptable quality of life" (Caria & Domínguez, 2019, para 11). Focusing resources on HN satisfaction, including through non-material satisfiers, has the potential to address the social and ecological crises by reducing unnecessary economic activity and its associated ecological damage.

3.2.2 Post-Development and Post-Growth

HN theories align with the post-development literature. Post-development challenges dominant assumptions, including on growth, and exposes development's failings and "darker side" (Escobar, 2011; Rodney, 1972/2018). The literature explains how Western prescriptions of development "overlook and marginalise 'pluriversality'", rendering other "ontologies and ecologies of knowledge" as "traditional, regressive and non-credible" (Klein & Morreo, 2019, Introduction, para 7). HN theories, in contrast, promote pluriversality through the infinite ways in which satisfiers draw on local knowledge and culture (Gough, 2017).

The challenges of green growth and the critiques of means-based development support the adoption of post-growth perspectives on development. Post-growth perspectives⁴ are informed by ecological economics (Martinez-Alier, 2015) and demand the just and equitable downscaling of energy and resource use in order to improve human wellbeing and bring societies into balance with nature (Hickel,

⁴ Post-growth covers a range of growth-critical positions including steady state economics (Daly & Farley, 2011), doughnut economics (Raworth, 2017), post-growth (Jackson, 2017) and degrowth (Kallis et al., 2020).

2020; Kallis et al., 2020). Post-growth positions accept the interdependence of the social and ecological crises (Raworth, 2017).

The post-growth literature features several key themes. First, it advocates for aggregate reductions in global material throughput, i.e. the material intensity of the economy, and a respect for ecological limits. Unnecessary overconsumption by the rich would be the primary source of reductions, with an increased focus on sufficiency and the directing of resources towards HN satisfaction (Hickel, 2020). This would likely lead to improvements in quality of life for most people (Hickel, 2019a), especially given that a “substantial amount” of life satisfaction comes from non-material sources, including “social support, generosity, freedom to make life choices and absence of corruption” (O’Neill et al., 2018, p. 93).

Second, post-growth positions prioritise greater equality. This is not only important for social stability (Daly & Farley, 2011) but it also improves wellbeing (Wilkinson & Pickett, 2010) and has ecological benefits, as discussed above. Once basic needs are met, equality contributes more to wellbeing than absolute growth in income (Easterlin, 1995). Post-growth societies would require a more equal distribution of resources in order to facilitate the satisfaction of everyone’s needs without requiring aggregate economic expansion (O’Neill et al., 2018).

Third, social participation and local democracy are important features of post-growth societies (Buchs, 2021; Kallis et al., 2020), as changes need to be endorsed by local citizens: “this can only be achieved through truly democratic and participatory processes” (Buchs, 2021, p. 3). Unimpaired, critical social participation, which embraces community economics and access to the commons, is a fundamental feature of post-growth societies (Gough, 2017).

Fourth, while growth economies involve long labour hours, post-growth societies, free from the need for endlessly increasing production and consumption, would feature reduced hours and the better distribution of work (Devetter & Rousseau, 2011; Jackson, 2017). A 25% reduction in working hours is associated with a 30% reduction in ecological footprint (Knight et al., 2013), as shorter working hours lead to lower average incomes and less unnecessary production and consumption. In addition, increased leisure time is associated with less materially intensive lifestyles (Devetter & Rousseau, 2011) and greater participation in activities in the autonomous sphere, including care, volunteering, and community and cultural activities (Gorz, 1999; Van Parijs, 2010). Such activities can generate “a greater sense of wellbeing and fulfilment” than the “time-poor, materialistic, supermarket economy in which much of our lives is spent” (Jackson, 2017, p. 149) and are also thought to have a lower ecological impact (Boulanger, 2010).

Fifth, post-growth societies prioritise different values to growth-based economies. Kallis et al. (2020, p. 23) argue that the centrality of markets and consumption under capitalism has created individuals that are detached from community and

the natural world and are “vulnerable to promises of pleasure, identity, and meaning through consumption”. Responsible citizens are seen as “good consumer [s], buying and consuming as much and as fast as possible” (Spash, 2021, p. 1129). In addition, the view of humans as separate to, and above, nature justifies its exploitation (Hickel, 2020). Post-growth societies would instead be “guided by values of community wellbeing rather than competition and growth” (Kallis et al., 2020, p. 45) and view of society as embedded within nature, rather than separate from it (Moore, 2015). This requires change at the individual, communal, and political levels as focusing on individuals alone “underestimate[s] the power of socio-cultural systems” (Kallis et al., 2020, p. 20).

4 An Ecological Basic Income

While not enjoying universal support (Dinerstein, 2014; Gough, 2017), BI features frequently in the post-growth literature (Blaschke, 2020; D’Alisa et al., 2014; Raworth, 2017) and there are several reasons to suggest the policy’s compatibility with post-growth perspectives.

First, cash transfers may be the most effective way to reduce poverty (Hickel, 2017). BI’s beneficial impact on poverty and inequality is claimed by almost all advocates (Standing, 2017, p. 40) and evidenced by pilots (Davala et al., 2015). Further benefits may also occur if BI were financed through progressive taxation, placing the burden on the rich and not on welfare or public services (Buchs, 2021; Howard et al., 2019).

Second, as a secure, alternative source of income, BI could remove the need to accept poor work and long hours (Van Parijs, 1991), freeing people to exit the wage labour force and participate in socially beneficial activities in the autonomous sphere (Buchs, 2021; Howard et al., 2019): BI opens “opportunities for people to participate in the much needed, but time-consuming, work of rebuilding our communities and our democracies in ways that enable us to realise our collective interest in sustainability” (Lawhon & McCreary, 2020, p. 453). The degree to which an EBI can, and should, encourage exit from the labour market is, however, debated (Van Parijs, 2021).

Third, the increased security, time, and freedom afforded by BI could facilitate value change within individuals and communities, a requirement of the transition to post-growth societies. Exactly how such value change can be fostered, however, remains unclear. Fitzpatrick (2013, p. 265) notes that BI embodies values of “common ownership” of the Earth’s resources, making everyone “a steward or a trustee whose duty is to hand on the Earth to the next generation”. However, leaving individuals to follow their preferences in a liberally neutral context could instead

give priority to the extant individualistic culture (Fitzpatrick, 2010), particularly given the individual nature of BI payments (MacNeill & Vibert, 2019). Overall, policy approaches that prioritise social and ecological values over profit and economic growth, such as an EBI, could play a role in fostering more collective values. This could be furthered through accompanying policies, such as changes to public education, increased access to the land and nature, or funding for non-market-based community events or festivals.

4.1 Funding an Ecological Basic Income

A post-growth compatible BI (i.e. an EBI) cannot rely on growth-based taxes (Buchs, 2021) nor should it come at the expense of public and welfare services. Public services are significantly more cost-effective and less ecologically intensive than their private counterparts (Coote, 2022a, 2022b). Countries with relatively low GDP per capita have achieved high levels of life expectancy and literacy through investment in high-quality public services (Sen, 2015). Additional welfare payments will also still be needed by those with disabilities or other disadvantages. The provision of universal basic services (UBS) should therefore be seen as complementary to, rather than in competition with, an EBI. While UBS focuses on the production side of the economy, BI focuses on consumption (Buchs, 2021).

Instead, an EBI should be funded through progressive taxation, including wealth and inheritance taxes, as well as taxes on financial transactions (Pinto, 2020). Additional funding could come from Pigouvian taxes - taxes which target activities generally seen as negative, such as carbon taxes - although declining resource use limits this as a lone funding source (Howard et al., 2019). While BI would temper some of the regressive implications of Pigouvian taxes, additional measures would be required (Gough, 2017). Alternatively, in line with Modern Monetary Theory (MMT), monetarily sovereign governments could spend a BI into the economy and use taxation to mitigate inflation and prevent excessive inequality (Crocker, 2020; Santens, 2021). MMT asserts that such governments are not constrained by taxes or borrowing for public spending. This is, however, a controversial idea.

There is no agreed size of BI payment (Torry, 2019). However, satisfying HN's, addressing insecurity and vulnerability, and shifting work to the autonomous sphere requires a payment at the level of sufficiency (Birnbaum & De Wispelaere, 2016; Howard et al., 2019): "one can't walk away from a nasty boss unless that job really is not needed" (Berg, 2020). While scholars have attempted to put a figure on sufficiency (Kenny, 2013; Reddy & Lahoti, 2015; Woodward, 2010), quantifying a sufficiency BI risks conflating needs with satisfiers and neglects options for meeting

needs with lower incomes. The exact figure would vary by context and by the presence of complementary policies and public services.

An EBI should therefore prioritise HN satisfaction, and seek to reduce poverty and inequality, promote social and democratic participation; shift activity to the autonomous sphere, and change societal values on individualism, consumption, and the natural world. The burden of funding an EBI should not be borne by current public services but by the wealthy. Table 1 outlines the principles of an EBI. These are used to interrogate selected BI interventions in the following sections.

5 Methods

5.1 Ontology

This paper embraces a realist ontology. Realism accepts that while an independent reality exists, our knowledge of it is socially constructed and therefore not objective (Maxwell, 2012). Realism therefore offers a third alternative between positivism and interpretivism (Elder-Vass, 2022). While embracing the positivist view that science can deliver worthwhile knowledge, it also accepts that the layers of reality, and the influence of our own preconceptions, prevent us from concluding that this knowledge is true (Elder-Vass, 2022). It is, however, “still worth trying to adjudicate between alternative explanations even in the knowledge that further explanatory possibilities remain untapped” (Pawson, 2006, p. 19). For example, while impossible to consider all the factors which influence the ecological credentials of BI, it is still worth offering a best possible understanding.

5.2 Methods

This project used a method inspired by Pawson’s (2006) “realist synthesis” to review the academic and grey literature on seven BI interventions (Table 2). It sought to examine how the interventions conform to the principles of an EBI (Table 1) and what their findings demonstrate regarding BI’s ecological credentials.

Realist synthesis focuses on comparison and explanation. It seeks to avoid the oversimplifications associated with systematic review by retaining the intrinsic variations and features which explain how social interventions work (Pawson, 2006). This paper, therefore, seeks not to aggregate the findings of BI interventions, but to compare and explain their compatibility with the principles of an EBI, alongside relevant findings.

Table 1: Principles of a basic income for addressing the social and ecological crisis: an Ecological Basic Income (EBI).

Reduce aggregate material throughput	To align with ecological limits, an EBI would seek to reduce aggregate material throughput. In some contexts, increased throughput may be required to satisfy HN. EBI compatible interventions should focus on material sufficiency and aligning consumption with HN satisfaction. They should also monitor changes in ecological footprints or equivalent indicators.
Improve Human Needs satisfaction	Several studies reject the correlation between prosperity and increasing material consumption, or economic growth (Jackson, 2017). HN has instead been proposed as a more suitable approach for evaluating wellbeing (Gough, 2017). Compatible EBI interventions should therefore focus on increasing HN satisfaction and monitor any changes. In the absence of specific HN language, this paper will consider the monitoring of changes in satisfiers, such as health, education, shelter, or autonomy, as compatible with an EBI.
Reduce inequalities	An EBI should seek to reduce socio-economic inequalities and redistribute resources. Compatible interventions should aim to reduce such inequalities and monitor changes.
Aid transition to autonomous sphere	A post-growth society would seek to reconnect people to the activity and product of their labour, with work viewed as a meaningful activity contributing to the satisfaction of HN. An EBI would contribute to this by breaking the link between income and paid labour and supporting the transition to activities in the autonomous sphere. EBI compatible interventions should therefore monitor changes in time-use and aim to rebalance the activity of work towards socially beneficial activities in the autonomous sphere.
Increase social connection	An EBI would increase social and democratic participation, promote a social economy and the role of the commons, and facilitate collective action. Compatible interventions should promote and monitor such changes.
Promote value change	It is hoped that an EBI would support value changes at the individual, community, and political levels. Compatible interventions should encourage and monitor such changes, specifically relating to individualism, consumption, and attitudes towards community and nature. They may also focus complementary activities on facilitating value and behaviour change.
Political economy considerations	EBI compatible interventions should strive to meet BIEN's definition of BI. Transfers should be at, or close to, sufficiency to facilitate HN satisfaction and exit from the labour force. The exact amount will vary by context and by additional activities and public service availability. EBI interventions should also consider options for scale-up, sustainable funding options, and appropriate complementary policies. Given the importance of public services to sustainable wellbeing, funding an EBI should not be at their expense.

Table 2: BI interventions selected for interrogation.

Intervention	Location	Year(s)	Description
Alaska Permanent Fund Dividend (PFD)	Alaska, USA	1982–present	An unconditional, yearly payment given to all Alaskan residents. The state invests revenue from oil production into a portfolio of assets, known as the Alaskan permanent fund (APF). The profits are paid to citizens through the PFD. The amount paid varies each year, but in 2020 it was worth US\$992 per resident.
B-MINCOMBE	Barcelona, Spain	2017–2019	A BI pilot focused on poverty alleviation in deprived districts of Barcelona. Close to one thousand households received a payment based on the difference between the “basic threshold” for household maintenance costs (basic needs + housing costs) and household income. The payment was also determined by household size. It therefore amounted to a guaranteed minimum income (GMI). For around 580 households the payment was paid as a guaranteed, unconditional BI. For others it was conditional on participation in one of four additional “active policies” (training and employment planning, the social economy, community participation, and housing rent aid) or reduced as additional income increased. The project aimed to examine the effect of the payment in conjunction with the active policies.
Finland Basic Income Experiment (FBIE)	Finland	2017–2018	A two-year randomised control trial with 2000 participants swapping unemployment benefits for a partial-BI of €560. A control group of 178,000 people continued to receive the standard benefits.
Gyeonggi province Youth Basic Income (YBI)	Gyeonggi, South Korea	2019–present	One of several interventions in Gyeonggi province in S. Korea. YBIP provides 250,000 Korean won (~US\$225), in local currency, to all 24-year-old residents of the province (175,000 people) every quarter for one year.
Ontario Basic Income Pilot (OBIP)	Ontario, Canada	2018–2019	A BI pilot involving 4000 randomly selected low-income residents of Ontario. The payment was equal to \$16,989 per year for single participants and \$24,027 for couples,

Table 2: (continued)

Intervention	Location	Year(s)	Description
			reduced by 50 cents for every dollar of earned income. People with a disability received an additional \$500 per month. The pilot was planned for three years but cut after one.
Pilotprojekt Grundeinkommen (Basic Income Pilot Project) (PPG)	Germany	2021–2024	PPG consists of three studies: Study one provides €1200/month to 122 participants for three years with studies two and three dependent upon its success. Study two will examine the impact of money versus security by topping-up low incomes to €1200 per month. Study three will examine BI and taxation: participants will receive €1200 offset against a simulated tax of 50% on other income. PPG is related to the Mein Grundeinkommen (MG) project in Berlin which has been raffling off annual UBIs of €1000 per month for six years. It has so far granted more than 650 UBIs.
Stockton Economic Empowerment Demonstration (SEED)	California, USA	2019–2021	A privately funded intervention in Stockton, California whereby 125 residents were paid an unconditional BI of US\$500 per month for 18 months. Participants randomly selected from eligible applicants: Those over-18 and living in an area with an income below city's median (although individual incomes may be higher).

To ensure comparability, only interventions with over 100 participants and occurring post-2005 – the year the Kyoto Protocol came into force, signalling an increase in attention given to environmental issues – were selected in the sample. Given the desire to shift focus to overconsumption amongst the rich, the sample was also limited to interventions in the Global North. Interventions were also selected according to their compatibility with BIEN's definition of BI and on the availability of literature for interrogation.

In line with Pawson (2006) the literature was not limited to peer-reviewed research, but included information from podcasts, news articles, published and unpublished documents, and personal communication. Given language limitations, only information in English and Spanish was selected.

Interventions were interrogated against to two research questions identified through a review of the background literature (see Sections 2–4):

1. To what extent does the intervention comply with the principles of an EBI?
2. What do the intervention’s findings infer about BI’s ecological credentials, and its potential to align with post-growth principles?

Each source was read in full, with relevant sections grouped according to their applicability to the research questions and coded by their relevance to the components in Table 1. The results are presented in Section 4. While each intervention is examined separately, trends are identified and discussed in Section 5.

6 Findings: Examining BI Interventions Against Principles of an EBI

This section examines how the interventions in Table 2 align with the principles of an EBI in Table 1 and draws out relevant findings from the interventions. Although presented separately, there is clear overlap between the principles. The section begins with “Political Economy” to provide greater contextual clarity. A summary of the findings is provided at the end of the section (Table 3). Section 7 discusses the findings inferences about EBI’s potential to help address the social and ecological crises.

6.1 Political Economy

Few of the interventions fully met BIEN’s (n.d.) definition of BI. While the PFD is paid to individuals, universally, and unconditionally, the infrequency of payments prevents some scholars from considering it a BI (Torry, 2019). PPG will not distribute cash universally (Keller & Lieder, 2020) and other interventions made payments conditional on socio-economic status (FBIE, OBIP, B-MINCOME) or age (YBI). While SEED placed no conditions on income, participants needed to live in below median-income neighbourhoods. Funding and logistical restrictions make targeting a common practice.

While most interventions made payments at the individual level, in certain contexts, they likely became proxy household transfers as only specific individuals received them, for example, extant benefit recipients (Kangas, 2016; Keller & Lieder, 2020; Martin-West et al., 2021). B-MINCOME and OBIP paid at household level with smaller payments for additional members (Colini, 2017; McDowell & Ferdosi, 2021).

Table 3: Summary of findings.

Intervention	Summary
Alaska Permanent Fund Dividend (PFD)	<ul style="list-style-type: none"> <li data-bbox="498 274 1041 444">– The PFD is paid universally and unconditionally at the individual level. It is, however, only paid once a year preventing it being classified as a BI by some scholars. The payments are also not close to sufficiency level. The dividend's ecological compatibility and long-term future are also contentious, given its reliance on oil production. <li data-bbox="498 447 1041 591">– The PFD does not explicitly aim to increase wellbeing or satisfy HNs. However, evaluations found modest improvements in birthweight and obesity among toddlers and a correlation with poverty reduction. Educational outcomes, however, have seen no significant change. <li data-bbox="498 595 1041 708">– The equitable distribution of oil incomes was a key rationale of the dividend. However, there is some evidence that it has increased inequality as the rich are able to save and invest the cash. <li data-bbox="498 711 1041 795">– While consumption data is limited, demand for consumer goods and services appears to increase during the month that the dividend is paid out. <li data-bbox="498 798 1041 852">– There is no evidence of changes in labour supply resulting from the PFD, nor of any changes to social participation.
B-MINCOME	<ul style="list-style-type: none"> <li data-bbox="498 887 1041 999">– B-MINCOME was targeted at low-income households, with payments conditional for some participants. Its alignment with BIEN's definition is therefore questionable. It did, however, pay at a level which was calculated to cover basic needs. <li data-bbox="498 1003 1041 1057">– B-MINCOME featured several complementary activities related labour market participation and the social economy. <li data-bbox="498 1060 1041 1260">– Changes to basic needs, including health, nutrition, housing, education, autonomy, and social participation were evaluated. Wellbeing was found to improve, as did access to healthcare, mental health outcomes, food security, housing, and autonomy. Improvement in education outcomes were only found when accompanied by complementary activities. <li data-bbox="498 1263 1041 1347">– Equality was a key objective of the intervention, with positive impacts reported on female economic empowerment and wellbeing. <li data-bbox="498 1350 1041 1463">– While the ecological implications of consumption were not analysed, spending of the cash appeared to be directed towards goods and services which contribute to HN satisfaction. <li data-bbox="498 1466 1041 1522">– B-MINCOME did not specifically aim to increase wage-labour supply, instead providing the choice to not work if

Table 3: (continued)

Intervention	Summary
Finland Basic Income Experiment (FBIE)	<p data-bbox="518 274 1020 473">desired. The intervention's view of what counts as work included participation in community interest projects and volunteering. The findings reported overall declines in labour market participation but an increase in participants' desire to participate usefully in their communities. Participation in community activities increased, particularly when accompanied by the complementary activities.</p> <ul style="list-style-type: none"> <li data-bbox="475 510 1020 647">– FBIE was targeted at low-income individuals, with payments delivered unconditionally. They were, however, below the level of sufficiency and considered a replacement for extant welfare. FBIE was criticised for being fiscally unrealistic and for not considering scale-up. <li data-bbox="475 656 1020 706">– FBIE analysed health and life-satisfaction outcomes, reporting improvements in both. <li data-bbox="475 715 1020 795">– Little attention was given to inequalities, consumption, or ecological footprints, neither in the aims of the intervention nor in evaluations. <li data-bbox="475 803 1020 913">– Labour supply changes were a key focus, with the primary objective of the intervention being to increase labour market participation. However, no change in the days employed nor in earnings were found. <li data-bbox="475 921 1020 1025">– FBIE monitored time use changes, finding an increased likelihood of participating in voluntary or extra-curricular activities. Increase trust in social institutions was also reported.
Gyeonggi province Youth Basic Income (YBI)	<ul style="list-style-type: none"> <li data-bbox="475 1064 1020 1173">– YBI payments are delivered unconditionally to individuals. However, they are targeted at people aged 24 years and so do not meet the universal requirement. They are also paid below the level of sufficiency. <li data-bbox="475 1182 1020 1232">– YBI evaluations analysed wellbeing, health, and self-determination outcomes, reporting improvements in all. <li data-bbox="475 1241 1020 1321">– Perceptions of gender equality and discrimination were monitored, with increases found in the former and no change in the latter. <li data-bbox="475 1329 1020 1409">– Consumption increases were reported under YBI, with money spent on food, books, cosmetics, travel, fitness and other items. <li data-bbox="475 1418 1020 1494">– Increasing labour supply is a primary objective of the intervention with evaluations reporting an increase in working hours.

Table 3: (continued)

Intervention	Summary
Ontario Basic Income Pilot (OBIP)	<ul style="list-style-type: none"> <li data-bbox="498 274 1045 383">– YBI evaluations monitored changes in domestic and community relationships. Trust in other people and in society, laws and institutions; politicians, and the media was found to increase. <li data-bbox="498 418 1045 557">– OBIP was targeted at low-income households, with payments reduced if participants earned additional income. Its alignment with BIEN’s definition is therefore questionable. However, the payments were higher than existing welfare and reported to cover necessities. <li data-bbox="498 565 1045 730">– OBIP monitored changes to health, education, and housing outcomes. It reported physical and mental health improvements, including increased food security, dietary improvements, and increased access to healthcare. It also found that many participants (around one-third) used the cash to improve education and skills. <li data-bbox="498 739 1045 878">– Increasing labour supply was a primary objective of OBIP. However, evaluations reported declines in labour market participation. In contrast, participation in social activities and volunteering increased and improvements were reported in domestic and community relationships. <li data-bbox="498 887 1045 939">– Over three-quarters of participants reported a more positive outlook on life.
Pilotprojekt Grundeinkommen (Basic Income Pilot Project) (PPG)	<ul style="list-style-type: none"> <li data-bbox="498 973 1045 1078">– PPG is paid unconditionally, to individuals, at what it claims to be a “liveable amount”. However, it is not universal. Options for scale-up are an explicit focus of the intervention. <li data-bbox="498 1086 1045 1199">– At the time of writing, the intervention was yet to report findings. However, it is focusing on changes to health and nutrition, to injustice and discrimination, to environmental attitudes and behaviours, to social cohesion, and to values. <li data-bbox="498 1208 1045 1286">– PPG takes a neutral stance towards work, aiming to create conditions in which people could choose to leave the labour force if desired.
Stockton Economic Empowerment Demonstration (SEED)	<ul style="list-style-type: none"> <li data-bbox="498 1321 1045 1459">– SEED transfers were paid unconditionally, to individuals, with the only requirement being to live in below-median income neighbourhoods. The payment was below sufficiency level as it intended to supplement, not replace, existing benefits. <li data-bbox="498 1468 1045 1524">– SEED monitored changes to general wellbeing, health, and the ability to meet urgent needs. Life satisfaction and health

Table 3: (continued)

Intervention	Summary
	<p data-bbox="516 267 1019 361">outcomes improved, as did food security, with benefits extended to participants' wider social groups. There were limited improvements in autonomy and freedom.</p> <ul style="list-style-type: none"> <li data-bbox="475 366 1019 447">– Improvements in women's economic autonomy, levels of financial stress, and ability to prioritise their own wellbeing were reported. <li data-bbox="475 453 1019 534">– Consumption data was collected, with results showing the top three uses of the cash were food, utilities, and transportation. <li data-bbox="475 539 1019 652">– SEED also took a neutral stance towards work. It reported increases in full-time employment as well as increased participation in non-labour market activities and improvements in community relationships.

Again, payments under most interventions were unconditional, although, under OBIP and the “limited” B-MINCOME modality they were reduced if participants earned additional income (Colini, 2017; Hamilton & Mulvale, 2019). For some B-MINCOME participants, the cash was conditional on participation in active policies (Colini, 2017).

Payments were generally below sufficiency levels. Most FBIE families still required additional benefits (Kangas et al., 2019). OBIP payments were below the low-income threshold but were still higher than existing welfare and recipients reported that they covered necessities (Hamilton & Mulvale, 2019). PPG claims to pay a “liveable amount” (Keller & Lieder, 2020, p. 88) although it is still below the monthly, minimum-wage in Germany if working a 35-hour week (BMAS, 2020). B-MINCOME was calculated to cover basic needs (Colini, 2017).

Scale-up potential was a consideration for several interventions. Specifically, PPG will examine financing options during Study 3 (Keller & Lieder, 2020) while Gyeonggi's Governor hoped YBI would lead to a South Korea-wide BI, financed through taxes on the private exploitation of commons, including land, GHG emissions, and digital services using citizens' data (UBI Lab Leeds, 2020). FBIE, in contrast, was criticised for being “fiscally unrealistic”, partly because payments were excluded from tax liabilities. Its limited duration was also cited as a challenge to wider scale-up (De Wispelaere et al., 2018, p. 15), but this also applies to other interventions. The long-term future of the PFD is uncertain as fossil fuel use and extraction in Alaska decline. Funding for the Alaskan government has relied on oil revenue royalties and, as these decline, there is pressure to divert income from the APF away from the PDF and toward supplementing the state budget.

Several interventions included complementary policies/activities. B-MINCOME's range of "active policies" intended to stimulate participation in the labour market, the autonomous sphere, and the social economy (Colini, 2017, 2018a, 2018b). YBI (and one modality of B-MINCOME) experimented with a "local currency", hoping to benefit the local economy and generate new institutions, including non-profits (Lee et al., 2020). In line with SEED's intention to supplement, not replace, existing welfare, a "Hold Harmless Fund" reimbursed unanticipated benefits losses (SEED, n.d.). In contrast, FBIE and OBIP were testing BI as a partial replacement of the welfare system (Kangas, 2016; Segal, 2016).

6.2 Material Throughput

6.2.1 Interventions' Designs

Most interventions gave no specific attention to ecological outcomes, with none analysing ecological or material footprints. PPG intends to evaluate changes in environmental attitudes and behaviours, but consumption changes are out of scope (Keller & Lieder, 2020).

Consumption and spending data was collected by several interventions (Blanco et al., 2021; Martin-West et al., 2019; WSJ, 2020). However, the ecological implications of consumption were not considered, with most concern given to economic impacts.

6.2.2 Interventions' Findings

Necessities comprised the majority of spending under B-MINCOME, including food, shelter, clothes and household items (Blanco et al., 2021). The top three uses of the SEED transfer were food, utilities and transportation (Martin-West et al., 2021). Consumption increased under YBI, with money again spent on food, plus books, cosmetics, travel, fitness and other items (Gyeonggi Research Institute, 2019).

While little is known about how the PFD is spent, Goldsmith (2010, p. 10) suggests that demand for consumer goods and services increases at the time of the transfer and retailers compete for business with timed offers and sales, creating a "consumption frenzy". Kueng (2018) found that Alaskans spend significantly more on non-durables and services in the month the dividend is paid.

PPG's environmental hypotheses are based on findings from its partner intervention, Mein Grundeinkommen (MG). While the results are based on online self-assessments, and so not necessarily representative, 53% of MG respondents claimed to have "shopped greener" as a result of the intervention (Keller & Lieder, 2020, p. 24).

Despite the average carbon footprint at the FBIE level of income being less than half the Finnish average (Kalaniemi et al., 2020), it is still three times that required to limit global warming to 2C, as calculated by O'Neill et al. (2018).

6.3 Human Needs Satisfaction

6.3.1 Interventions' Designs

None of the interventions explicitly adopted HN frameworks. However, there was alignment with several characteristics from Doyal and Gough's (1991; 2017) THN, including health, nutrition, shelter, education, autonomy, and social participation.

B-MINCOME aimed to help "participating households cover their basic needs and gain greater autonomy and decision-making capacity" (Riutort et al., 2021, p. 4). It considered the "basic needs" of food, clothing, education, housing, and transport in calculating the transfer size (Lain et al., 2019). SEED considered how BI could meet "urgent needs", including subsistence and shock resilience (SEED, n.d.). Both interventions focused on poverty alleviation. B-MINCOME evaluated this through multi-dimensional indicators including health, education, and life-satisfaction (Colini, 2017). SEED considered changes in income volatility. The former is considered compatible with HN approaches, while the latter, as a means-based metric, is not.

All interventions, except PFD, monitored changes in health (including mental health) and nutrition (Colini, 2017; Gyeonggi Research Institute, 2019; Kangas et al., 2019; Keller & Lieder, 2020; SEED, n.d.; Segal, 2016). One of B-MINCOME's active policies trained participants in healthy eating and another helped those with reduced mobility access healthy food from local markets (Colini, 2018b). OBIP and YBI monitored exercise participation (Basic Income Canada Network, 2019; Gyeonggi Research Institute, 2019) while B-MINCOME and OBIP examined changes in access to healthcare services.

B-MINCOME and OBIP included a focus on shelter. One active policy encouraged B-MINCOME's homeowner participants to rent-out spare rooms at social, below-market rates (Colini, 2017). OBIP included housing improvements as a key focus area, alongside financial volatility and education (Glass, 2017). Educational outcomes were monitored under B-MINCOME and YBI. Social participation was included to differing degrees in all interventions apart from PFD.

Several interventions examined freedom and autonomy. SEED aimed to give people the freedom to meet urgent needs and evaluated changes in agency and autonomy (Martin-West et al., 2021; SEED, n.d.). YBI's first quarter report evaluated changes to self-determination (Gyeonggi Research Institute, 2019) while financial security and decision-making capacity were also monitored by B-MINCOME (Riutort et al., 2021)

PFD includes no wellbeing aims and evaluations of wellbeing changes are restricted to isolated studies examining specific health and educational impacts (Chung et al., 2016; Lerner, 2019; Watson et al., 2019).

6.3.2 Interventions' Findings

Wellbeing and life satisfaction improved under B-MINCOME, FBIE, SEED, and YBI (Blanco et al., 2021; Gyeonggi Research Institute, 2019; Kangas et al., 2019; Martin-West et al., 2021). All modalities of B-MINCOME saw reductions in deprivation (Riutort et al., 2021). While PFD has coincided with poverty reduction, particularly among Native Americans (Berman, 2018), its contribution is unclear.

All interventions demonstrated health improvements (Basic Income Canada Network, 2019; Gyeonggi Research Institute, 2019; Kangas et al., 2019; Laín, 2019; Martin-West et al., 2021). While no change was found regarding the probability of severe health problems (Blanco et al., 2021), access to healthcare increased under both B-MINCOME and OBIP (Basic Income Canada Network, 2019; Riutort et al., 2021). OBIP participants, however, reduced their reliance on medication (McDowell & Ferdosi, 2020) and, alongside YBI recipients, increased their participation in exercise (Basic Income Canada Network, 2019; Gyeonggi Research Institute, 2019) suggesting overall health benefits. SEED participants dedicated more resources to preventative medical care (Martin-West et al., 2021). Two studies of PFD demonstrate modest improvements in birthweight and obesity in toddlers (Chung et al., 2016; Watson et al., 2019).

Mental health improvements were reported under all interventions, except PFD (Gyeonggi Research Institute, 2019; Kangas et al., 2019; Martin-West et al., 2021; Riutort et al., 2021): 68% of OBIP participants reported improved mental health (McDowell & Ferdosi, 2020) while the probability of developing mental illness after participating in B-MINCOME declined by 10% (Laín, 2019). SEED participants moved from being likely to have a mild mental health disorder to likely mental wellness over the year-long intervention (Martin-West et al., 2021). FBIE participants reported improved cognitive functioning, confidence, and the ability to enjoy things (Kangas et al., 2020).

Food security increased under OBIP, SEED, and B-MINCOME (Basic Income Canada Network, 2019; Blanco et al., 2021; Martin-West et al., 2021). The probability of B-MINCOME participants going to bed hungry reduced by 8–10% (Laín, 2019). Dietary improvements were made by 75–86% of OBIP participants (Basic Income Canada Network, 2019; McDowell & Ferdosi, 2020, 2021). The benefits from SEED extended to participants' wider networks (Martin-West et al., 2021).

The need for shelter was better satisfied under B-MINCOME and OBIP: 59% of OBIP participants improved their housing situation (Basic Income Canada Network, 2019) while housing quality and rent affordability increased under B-MINCOME (Blanco et al., 2021; Riutort et al., 2021).

One third of OBIP participants used the cash for education, retraining, or upgrading their skills (Basic Income Canada Network, 2019; McDowell & Ferdosi, 2021). While no significant change was found in the educational outcomes of children under both PFD and B-MINCOME (Lain, 2019; Lerner, 2019), B-MINCOME's active policies saw some positive impact (Lain, 2019).

Some B-MINCOME participants reported increased economic independence and the ability to plan for a more autonomous future. Others still lacked the resources to exit economic and housing precariousness, limiting their self-determination (Riutort et al., 2021). Changes in autonomy and freedom under SEED were limited, although some participants were able to break unwanted ties of vulnerability, bolstering their “self-determination and a sense of agency” (Martin-West et al., 2021, p. 20). The perception of YBI participants regarding their self-determination and influence on decision-making increased, even after only one quarter of payments (Gyeonggi Research Institute, 2019).

6.4 Inequalities

6.4.1 Interventions' Designs

All interventions recognised BI's potential to improve economic, social and gender inequalities, contributing to their focus on low-income participants. Combating inequality was a specific objective of B-MINCOME (Colini, 2018a) while the equitable distribution of Alaska's oil incomes was a key rationale behind PFD (Widerquist & Howard, 2012). PPG will examine BI's ability to combat injustice and discrimination (Keller & Lieder, 2020).

Women formed the majority of participants in both B-MINCOME (over 80%) and OBIP (68%) (Basic Income Canada Network, 2019; Riutort et al., 2021). B-MINCOME therefore included measures to support women's participation in the active policies, including adjusting hours and locations and creating mutual aid spaces so that women could combine participation with childcare (Blanco et al., 2021). YBI monitored changes in perceptions of “gender equality in society” and “interest in gender discrimination issues” (Gyeonggi Research Institute, 2019, p. 41).

FBIE modelled the equality impacts of different sized transfers prior to the intervention (Kangas, 2016). Larger transfers were found to reduce income inequality by increasing the purchasing power of low-income earners and reducing the disposable income of the rich. However, larger payments were viewed negatively from a gender equality perspective as they could result in women staying home and reducing labour market participation. The modelling also showed that a partial-BI of €550 would have no significant impact on inequality and could increase child poverty

as it would not be enough to replace existing income and losses would occur through higher taxation of other benefits. However, given increasing labour market participation was the key aim of the intervention, a partial-BI was still selected.

6.4.2 Interventions' Findings

Despite theory to the contrary (Goldsmith, 2010), Kozminski and Baek (2017) found that PFD worsens inequality due to different consumption practices among the rich and poor: Low-income groups spend the dividend on non-durable goods while high income groups invest it, increasing economic disparity.

B-MINCOME and SEED reported improvements in women's economic autonomy, levels of financial stress, and ability to prioritise their own wellbeing (Blanco et al., 2021; Martin-West et al., 2021). B-MINCOME's active policies had additional empowerment benefits, giving women access to a "new world" outside the home (Blanco et al., 2021, p. 80). This facilitated changes in women's roles in the labour and community spheres and, in some cases, led to them becoming the main breadwinner. The financial independence from the cash, and the social networks from the active policies, also helped some women exit unhealthy relationships. YBI's first quarter survey found an increase in perceptions of gender equality, although interest in gender discrimination did not change (Gyeonggi Research Institute, 2019).

Participants in B-MINCOME's Community Participation active policy improved their view of neighbourhood diversity and reduced stereotyping. However, some difficulties in relationships between people of different origins remained (Blanco et al., 2021).

6.5 Working Hours and the Autonomous Sphere

6.5.1 Interventions' Designs

Labour supply effects were a key focus area for several interventions. Increasing labour market participation was the primary objective of YBI, FBIE, and OBIP (Forget et al., 2016; Gyeonggi Research Institute, 2019; Kangas, 2016). FBIE and OBIP sought to understand BI's effect on work (dis)incentives (Hamilton & Mulvale, 2019; Kangas et al., 2019); whether it could "promote more active participation and provide a stronger incentive to work than the present system" (Kangas et al., 2019, p. 7).

FBIE's definition of "work" centred around paid labour. Changes in labour supply were monitored using official employment registers, taxable income, and participation in employment-promoting measures (Kangas et al., 2019). Students and elderly citizens were excluded from the intervention as they were not actively seeking employment (Kangas, 2016). A participation income was considered but rejected as too broad a definition of "participation" was thought to reduce supply for the "open labour market" (Kangas, 2016, p. 43).

SEED, PPG, and B-MINCOME took a more neutral stance towards work. PPG and B-MINCOME aim(ed) to create conditions in which people could choose not to work if desired and examined how a guaranteed income changes attitudes towards work (Colini, 2017, 2018a; Keller & Lieder, 2020). However, the relatively small transfer values in both interventions are unlikely to fully remove the need for employment. There is also ambiguity in PPG's design as one of the conditions cited as necessary for a BI is that it "does not reduce the incentive to paid employment" (Keller & Lieder, 2020, p. 8).

Two of B-MINCOME's active policies focused on participation in work. One supported participants in developing employment plans while another encouraged them to create or join cooperatives or community-interest projects: "The best formula in the situation of poverty is to activate participants' entrepreneurial capacities and motivations in the social economy sectors" (Colini, 2017, p. 13).

6.5.2 Interventions' Findings

Evaluations of PFD and FBIE suggested no changes occurred in days employed or earnings from self-employment (Jones & Marinescu, 2018; Kangas et al., 2019). OBIP and B-MINCOME reported declines in labour market participation, particularly full-time (Blanco et al., 2021; Laín, 2019; McDowell & Ferdosi, 2021). However, YBI saw an increase in working hours (Gyeonggi Research Institute, 2019, 2020b). SEED demonstrated an increase in full-time employment as participants used the cash to take time away from part-time work, improve their skills, and find better, full-time jobs. SEED participants also increased their participation in non-labour market activities (Martin-West et al., 2021). It is not clear whether the same participants that moved to full-time work also increased participation in non-labour activities, for example, by swapping multiple part-time jobs for one full-time job and therefore reducing labour total hours, or whether some chose full-time work while others exited the labour market. Overall, across the interventions, there is no clear consensus on labour market effects.

However, the desire to work, contribute socially, and be financially independent was present across the interventions (Gyeonggi Research Institute, 2019; Hamilton & Mulvale, 2019; Riutort et al., 2021). Uptake of the B-MINCOME Training and Employment active policy was high even when not a condition of the cash (Riutort et al., 2021).

6.6 Social Participation

6.6.1 Interventions' Designs

The targeting and/or randomisation approaches employed by most interventions limit any analysis of collective changes as not all members of a community receive the BI. While B-MINCOME also targeted low-income participants, they were

concentrated in certain communities giving greater insight into social participation effects. The active policies added to this.

Despite the limitations, all interventions, aside from PFD, analysed social participation to some extent. FBIE monitored changes in time use, including of non-labour market activities, and trust in social institutions (Kangas et al., 2019). B-MINCOME, OBIP, and YBI monitored changes in domestic and community relationships as well as time spent on volunteering, community, and social activities (Basic Income Canada Network, 2019; Gyeonggi Research Institute, 2019).

B-MINCOME aimed to improve participants' "sense of belonging to their neighbourhoods" and increase their involvement in activities to improve it (Riutort et al., 2021). The active policies, specifically, focused on community solidarity. The Social Entrepreneurship policy intended to "familiarise participants with the social, solidarity and cooperative economy as an alternative to the traditional labour market" (Riutort et al., 2021, p. 10). The Community Participation policy "promoted the involvement of participants and their families in the social and community life of their neighbourhoods", creating space for group cohesion and shared projects (Riutort et al., 2021, p. 10). Under the Training and Employment Planning policy participants maintained common and public spaces in order to "improve co-existence" and create "quality community relationships" (Colini, 2018b, p. 9). They also delivered food from local markets to residents with mobility issues, reinforcing "the neighbourhood based economy of proximity" (Colini, 2018b, p. 14).

SEED's "Community Dashboard" gave partial ownership of the intervention to residents, encouraging them to co-construct the learning agenda and address questions they felt important. SEED also featured "Reinvent Roundtables" which promoted dialogue on poverty and inequality by linking BI to issues of race, gender, and economic justice (Martin-West et al., 2019).

YBI's "local currency" can only be used at markets, restaurants, and shops within Gyeonggi Province in order to benefit the local economy. B-MINCOME also piloted a local currency.

PPG will analyse changes in "social cohesion" and examine whether BI promotes cooperation over competition and causes participants to base decisions on the "best interests of society". It also aims to reduce social division (Keller & Lieder, 2020, p. 55).

6.6.2 Interventions' Findings

Participation in volunteering, extra-curricular activities, and community events was more likely under FBIE, OBIP, and B-MINCOME, particularly under the Community Participation active policy and when the BI was conditional (Basic Income Canada Network, 2019; Blanco et al., 2021; Kangas et al., 2019; McDowell & Ferdosi, 2020, 2021; Riutort et al., 2021).

Improved domestic and community relationships were reported under OBIP, B-MINCOME, and SEED (Blanco et al., 2021; Hamilton & Mulvale, 2019). Participants spent more time with family and friends (Basic Income Canada Network, 2019), increased frequency of socialisation (McDowell & Ferdosi, 2020, 2021), and time spent helping others (Blanco et al., 2021). B-MINCOME's active policies again increased this impact, particularly the Community Participation policy. Again, the largest effects came when the cash was conditional (Riutort et al., 2021).

Trust, both in other people and in social institutions, increased under FBIE and YBI. Participants also felt they had greater influence on social issues and on decision-making processes (Gyeonggi Research Institute, 2019; Kangas et al., 2019). B-MINCOME participants had an improved view of their neighbourhoods and an increased motivation to participate in activities to improve them (Blanco et al., 2021; Riutort et al., 2021). No interventions reported changes in democratic participation or in collective action.

The 'local currencies' introduced by YBI and B-MINCOME increased revenue for local businesses (Gyeonggi Research Institute, 2020a; Riutort et al., 2021) as participants shopped more locally (Ock, 2020; Riutort et al., 2021).

6.7 Value Change

6.7.1 Interventions' Designs

Value change featured less prominently in the designs of most interventions. However, B-MINCOME hoped to promote ethical social and economic values (Colini, 2018a). Value change is also a focus of PPG. It will examine how desires, fears and time-use change under the security of BI: "Do I really want to work that much in this job? What is behind the need for a luxury item or long-distance holiday? What do I really want?" Specifically, PPG aims to understand whether BI leads to more pro-social behaviour which will be needed to "solve the world's major crises" (Keller & Lieder, 2020, p. 23). YBI analysed changes in participants attitudes towards gender equality, government, society and universal welfare (Gyeonggi Research Institute, 2019) and OBIP examined changes in participants' outlook on life (McDowell & Ferdosi, 2020).

6.7.2 Interventions' Findings

OBIP reported 77% of participants having a more positive outlook on life following the intervention (McDowell & Ferdosi, 2020). In addition, early results from YBI suggest an increase in trust in society, in laws and institutions, in politicians, and in the media (Gyeonggi Research Institute, 2019, 2020b). B-MINCOME encouraged

participants to imagine fairer ways of working with participants in the Social Cooperative active policy increasing their motivation to work to benefit their communities (Colini, 2018a).

7 Discussion

7.1 Political Economy

The analysis sought to assess the extent to which BI interventions aligned with principles of an EBI, and therefore contribute to the understanding of BI's ecological impacts. The paper cannot provide overarching conclusions on the ecological credentials of BI given variation in interventions' alignment with BIEN's definition, alongside limitations in the interventions' transfer size, duration, targeting, and design foci. However, aggregate conclusions are not the outcome of realist syntheses and important insights can still be drawn by examining the specific principles.

The desire to stimulate growth was evident in most interventions. Gyeonggi Governor, Lee Jae-Myung, argued that YBI would stimulate demand, enhance spending capacity, and contribute to economic growth (Ock, 2020). OBIP was seen as a means for stimulating inclusive growth (Glass, 2017) while FBIE aimed to increase labour supply. However, PPG's design document recognises that the crises "are the result of an economy that has been for centuries geared towards growth" and will examine how BI might empower people to live more sustainably (Keller & Lieder, 2020, p. 76). Kalaniemi et al. (2020) considered their findings from a post-growth perspective.

Government priorities and precedents set by previous pilots influenced the foci and targeting criteria of the interventions. YBI reproduced many of the evaluation metrics used in FBIE (Gyeonggi Research Institute, 2019) while FBIE's focus on stimulating employment and streamlining the welfare state was an objective of the Finnish government (Kangas et al., 2019).

7.1.1 Human Needs, Poverty, and Inequality

While none of the interventions addressed HN frameworks explicitly, there were examples of alignment. As advocated in the literature, the interventions demonstrated improvement in life satisfaction indicators. Improvements in health (particularly mental health), housing, access to education, and, to some extent, autonomy, suggest that BI contributes to HN satisfaction. By improving public health, it can also reduce the burden on health systems (Nurse et al., 2014).

HN satisfaction improvements were highest among low-income participants, women, and marginalised communities, supporting BI's equality credentials (Standing, 2017). The cash allowed female participants of SEED to prioritise their own wellbeing; something they craved for its own sake (Martin-West et al., 2021). In this example, BI contributed to their HN for "identity" (Max-Neef, 1991). The findings on poverty, equality, and life satisfaction align with results from a previous study of BI interventions in the Global South (Langridge, 2021).

Participants largely returned to education to increase employability. However, given the disconnect between the labour market and wellbeing (Graeber, 2019), this does not necessarily correlate with increased HN satisfaction. The mixed findings regarding autonomy were likely due to the small transfers and the short durations of the pilot interventions, both of which restricted exit from the labour market. Wider improvements in HN satisfaction could therefore be expected if future interventions specifically aligned with HN frameworks, were longer, included larger transfers, and/or were accompanied by increased access to public services.

7.1.2 Ecological Focus, Consumption, and Material Throughput

Before the primary research, a Google Scholar search was conducted using the intervention or country names, plus the phrase "basic income" and any of the following words: "green", "sustainable", "sustainability", "ecology", "ecological", "environment", "environmental", "sustainable", "climate change", "degrowth", "post-growth" (search completed 01/06/2021). Kalaniemi et al.'s (2020) study was the only result, reinforcing MacNeill and Vibert's (2019) view that the ecological implications of BI are under-researched.

This assertion was supported by the primary research. No interventions addressed the "non-hazardous environment" characteristic of HN from an ecological perspective nor considered ecological footprints (beyond Kalaniemi et al., 2020). Only PPG included an environmental section in its design document, although consumption changes are out of scope. Those interventions which did monitor consumption did not then consider the ecological impacts. This is an area for future research.

The results suggested that consumption increases tended to align with HN satisfaction. This is unsurprising given that most participants were poor. However, evaluations of PFD, which is not targeted, suggest that consumption of unnecessary goods increases when the dividend is paid, fuelled by timed marketing campaigns (Kueng, 2018). This supports calls for limits on advertising and for policies which limit the consumption of the wealthy. Research on an EBI's contribution to limiting such consumption is also needed.

Kalaniemi et al. (2020) found that, under business-as-usual, consumption at the FBIE income level still exceeds carbon budgets. This demonstrates the need for

changes beyond wealth redistribution. However, they did not study FBIE participants directly and so did not account for the potential societal changes facilitated by an EBI, including in values, behaviours, time use and the role of non-material satisfiers.

7.1.3 Work and Labour

No intervention targeted reductions in labour market supply. Instead, FBIE, OBIP, and YBI hoped to increase it. BI's potential to reduce supply was regarded as "one of the biggest objections" (Gyeonggi Research Institute, 2019, p. 42). This view on labour aligns more with green growth than post-growth perspectives. However, PPG, SEED, and certain B-MINCOME modalities did promote a more socially focused view of work and sought to understand how behaviour changes when labour is not necessary.

By receiving government funding, B-MINCOME, FBIE, OBIP, and YBI likely experienced greater pressure to align with their governments' economic policies, including on growth and labour. PPG and SEED, in contrast, included independent funding and so likely had increased freedom. B-MINCOME appears an exception to this rule: Despite being local government funded, the intervention included challenges to business-as-usual. However, this aligns with the more "radical" politics of Barcelona (Gessen, 2018). Targeting low-income participants may also have influenced attitudes to labour. Reducing labour hours and shifting to less materially intensive leisure (Devetter & Rousseau, 2011) is most applicable to wealthy groups working too many hours (Kallis et al., 2012) and not those targeted in the interventions.

Given these differing objectives, the inconclusive findings on labour supply are not surprising. However, no correlation was observed between the desire to increase supply and the resulting effects. This suggests that, under the right conditions, a BI could help break the link between income and labour. In the interventions studied, small transfers and short durations likely restricted exit from the labour market. Paid jobs were still required to fully meet participants needs and they also had to plan for post-intervention.

People's desire to work and contribute to their communities was not reduced by the interventions. Volunteering and participation in extra-curricular activities increased. Recipients also re-evaluated how their work could benefit their communities. This reinforces the importance of social participation to wellbeing (Gough, 2017).

If an EBI could facilitate exit from labour, therefore, citizens would likely still participate socially in their communities. This would, of course, include some paid labour, which would still be necessary. However, given similarities in the consumption of working and non-working low-income households (Kalaniemi et al., 2020), exiting the labour market alone is not sufficient to reduce environmental pressures. An EBI must also support changes in behaviour and values, particularly around consumption.

7.1.4 Changing Values and Social Participation

Transitioning to post-growth societies requires changes at the communal and political levels (Kallis et al., 2020). However, FBIE, OBIP, SEED, YBI, and PPG gave transfers to isolated individuals rather than whole communities. This somewhat limits changes in social behaviours, values, and participation.

Despite this, PPG expects its intervention to increase social cohesion. Reduced pressure on time and finances will lead to less competition and greater priority being given to the wellbeing of others. However, individual behaviour is affected by social influence (Walker, 2015) and creating change at societal level requires change in a significant minority (Centola et al., 2018). Creating social change through a randomised BI therefore appears unjustifiably optimistic and suggests that future interventions should instead adopt community-wide approaches. The publication of PPG's findings will help to determine whether this is true.

Results from the interventions studied suggest that BI improves household and community relationships. As above, participants also spent more time on voluntary and community activities. The findings appeared strongest in community wide interventions, with complementary policies also increasing the effects. However, the use of some community services declined. OBIP recipients reported a decline in accessing soup kitchens. While a positive outcome, this highlights warnings in the literature that BI could undermine collective institutions, reduce community interaction, and increase individualism (MacNeill & Vibert, 2019). An EBI needs to form part of an evolution in community services and not a replacement.

Analysis of the impacts of the local currencies concentrated on benefits to local businesses. However, increased participation in local economies may also have quality of life, social cohesion, and sustainability benefits (Kwon et al., 2019; Sanz, 2016). Further research on the connection between BI, local currencies, wellbeing, and ecological footprints is required.

Finally, EBI interventions should consider the impacts of increased trust in society, institutions, politicians, and the media, found under FBIE and YBI. On the one hand, this could enable more robust ecological public policy and social action. However, on the other, it could help preserve the status-quo and environmentalism approaches.

7.1.5 Additional Remarks

The interventions demonstrated the importance of appropriate complementary policies: Health and dietary improvements were higher under B-MINCOME when combined with active policies. Equality improvements were also higher as the associated mutual support systems increased women's autonomy and

empowerment. Equality benefits would be maximised if BI was accompanied by progressive taxation (Goldsmith, 2010). Finally, complementary activities increased community participation, trust and solidarity, and reduced ethnic divisions. EBI interventions should consider complementary policies, services, currencies, or activities which can maximise HN satisfaction and increase social cohesion, mutual support, and community participation.

The interventions also appeared to reduce household debt. B-MINCOME reported reduced borrowing from friends and family (Blanco et al., 2021) while nearly half of OBIP respondents used the money to pay off loans (Basic Income Canada Network, 2019). Studies of PFD also found that recipients use the dividend to reduce debt (Goldsmith, 2010). Spending, rather than loaning, money into the economy (in line with MMT), through policies like BI, could therefore reduce the ecological impacts of debt. However, the relationship between BI and debt is not straightforward. As income security increases, low-income groups have easier access to loans. The relationship between BI, debt, and MMT is therefore another area for further research.

Alongside the attention given to MMT, the literature suggests that funding a scaled-up BI should come from a combination of Pigouvian taxes on carbon and resources, and progressive taxes on wealth, inheritance, and investments (Howard et al., 2019; Pinto, 2020). While the PFD is largely funded through returns on investments of natural resource revenues, there are questions about the how well this model can be sustained and generalised. Additional funding sources which seek to reduce wealth inequality without relying on capital accumulation will be required. Gyeonggi Province intends to implement a tax on technology and the private use of commons and citizens' data (UBI Lab Leeds, 2020; WSJ, 2020).

Prioritising non-material HN satisfaction could reduce BI's funding requirements. This would require shifts to the autonomous sphere, widespread systems of mutual aid and support, and value change to prioritise the wellbeing of others and the environment. This would be easier in an economy which is not geared towards the pursuit of growth. Given public services are more cost effective than the private sector (Hickel, 2020), a combination of BI and UBS could be an appropriate way forward (Buchs, 2021).

8 Conclusions

The social and ecological crises form the major challenge of the 21st century. The literature suggests that the crises are self-reinforcing and responses should address both simultaneously. Dominant strategies centre on stimulating green growth. However, post-growth scholars provide convincing reasons to be sceptical. The

precautionary principle therefore dictates that more radical approaches, in line with post-growth positions, be explored.

BI is a radical policy proposal advocated in the post-growth literature. However, its ecological credentials are under-examined and the principles for a BI compatible with post-growth positions are under-developed. This paper attempted to develop such principles. It argued that an EBI should improve HN satisfaction, reduce inequalities and unnecessary material throughput; facilitate a shift from waged labour to activities in the autonomous sphere, and promote value change at the individual, communal and political levels, particularly regarding individualism, consumption, community, and nature.

Using realist synthesis, the paper analysed the alignment of selected BI interventions in the Global North against the principles of an EBI, and what their findings inferred about BI's ecological credentials. The interventions were found to align more with green growth than post-growth positions. This is likely due to the dominance of green growth in policy and academic discourse and also funding requirements. Ecological considerations are largely excluded, with little analysis of BI's impact on material or ecological footprints.

However, alignment with green growth was not universal and did not preclude an EBI being part of the solution to the crises. Despite not embracing HN frameworks, the interventions demonstrated the potential for BI to increase HN satisfaction. An EBI specifically aligned with such frameworks, and offering transfers at the level of sufficiency, could generate greater impact. The interventions also showed improvements in economic, social, and gender equality.

Despite being the aim of several interventions, BI's effect on labour supply was inconclusive and requires further research which is not focused exclusively on the poor and unemployed. It is, however, clear that the transfers did not weaken motivation to participate in society, instead increasing it. An EBI should capture this motivation and direct it towards ecologically and socially beneficial activities, both in the labour market and, increasingly, in the autonomous sphere.

Alongside payment size and intervention duration, complementary policies appeared to have the most influence on the impacts of the interventions, increasing benefits to health, equality, and social participation. This supports calls for an EBI+, whereby cash is accompanied by policies which encourage exit from the labour market, increase social cohesion and mutual support; and change values around consumption and nature. Interventions should also adopt whole-community approaches rather than selecting participants at random. Benefits could be furthered if accompanying policies limit wealth accumulation by the richest.

The papers' findings are subject to several limitations. First, few interventions met the full definition of BI. Second, there was a lack of attention given to ecological footprints and higher-income groups. Both these areas, along with the relationship

between BI, local currencies, and material throughput, and between BI and debt, should be included in future research. Third, targeted BI pilot interventions only offer insight at the individual and the local level, making conclusions at the level of the community or economy as a whole difficult. There is therefore a need for larger, longer-term, saturation pilots which pay a sufficiency-BI to participants from across the socio-economic spectrum. Alternatively, the phased implementation of an EBI with in-built evaluation, feedback, and correction loops would allow further insights to be gained. Given the state involvement this would require, and therefore the likely requirement for a BI to promote economic growth, lobbying to present post-growth positions as the preferred alternative is vital.

Aside from funding considerations, this paper has not covered the means for shifting the dominant discourse towards post-growth positions and, therefore, towards support for an EBI. This is a daunting challenge requiring further research and urgent political engagement based on current understanding of the ecological crises and the limitations of economic growth. This paper does not propose that an EBI be advocated as a next-best option to green growth, but as a preferable alternative in its own right. An EBI aligned with post-growth principles could help avert the social and ecological crises and increase HN satisfaction, by removing the false consciousness of consumerist culture. It could therefore be an effective policy for opening the door to further research addressing the obstacles to post-growth transitions.

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