Responsible Consumption and SDG 12: A Comparative Policy and Case Study Analysis

Nishita Chatradhi[1]

Abstract

The paper repositions Sustainable Development Goal 12, Responsible Consumption and Production, as a central social policy concern, extending beyond its dominant treatment as an environmental or economic objective. The study draws on sustainable welfare theory, the capability approach, and international policy frameworks. It uses secondary analysis of global and national reports, supported by illustrative cases from the European Union, Canada, India, and South Korea, to develop a conceptual and policy framework that embeds SDG 12 within welfare systems. The study finds that welfare systems remain locked in a growth-first paradigm, creating a structural disconnect with SDG 12: overconsumption in affluent groups and under-consumption in marginalized groups generate inequities that current systems fail to address. Subsidies and transfers frequently reinforce unsustainable practices, while innovations such as South Korea's RFID-enabled food waste system and Canada's integration of Indigenous reconciliation illustrate how ecological responsibility can be embedded into welfare. The analysis highlights a pressing need for a systemic shift toward "responsible welfare systems" that align welfare with ecological sustainability and social justice. The paper advances sustainable welfare scholarship by introducing the concept of "responsible welfare systems," reframing SDG 12 as a social policy imperative and offering new directions for theory and practice.

Keywords: SDG 12, Responsible consumption and production, Social policy, Sustainable welfare, Circular economy, Capability approach, Welfare systems, Sustainability transitions

Introduction

Sustainable Development Goal 12 (SDG 12) is a cornerstone of the global sustainability agenda, seeking to ensure responsible consumption and production patterns. It addresses the environmental, economic, and social challenges of the Anthropocene, an era marked by resource depletion and ecological disruption (Brinkmann, 2021). Closely interconnected with other goals, such as climate action (SDG 13), affordable and clean energy (SDG 7), and sustainable cities (SDG 11), SDG 12 plays a central role in advancing broader sustainability objectives (Raman et al., 2024). Achieving this goal requires robust legal frameworks and international cooperation, yet current trade and investment regimes often privilege economic liberalization over environmental and social concerns (Mitkidis & Sefcikova, 2021; Partiti & Arcuri, 2021). The European Union's adoption of circular economy principles demonstrates the transformative potential of SDG 12, though persistent challenges remain, particularly in addressing transboundary impacts (Amos & Lydgate, 2020). Higher education institutions also contribute by acting as laboratories for sustainable practices, advancing research, and

[1] Policy Advisor, Government of Alberta, Edmonton, Canada. E-mail: shastri.nishita@gmail.com*

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strengthening community engagement (Martínez-Acosta et al., 2023). Still, progress is constrained by systemic barriers such as asymmetric information between producers and consumers, which calls for greater cooperation among economic actors. The success depends on aligning global, national, and corporate reporting metrics to ensure accountability and enable shifts toward sustainable consumption and production (Milutinović & Malinić, 2024).

While scholarship and policy initiatives often emphasize environmental and economic dimensions, there is increasing recognition of the need to integrate welfare and social policy perspectives. Environmental and economic measures that fail to account for social outcomes risk undermining policy effectiveness, as shown in analyses of parking policies that call for explicit attention to welfare implications (Russo et al., 2019). Concepts such as transformative resilience and just transitions highlight the capacity of welfare states to mediate socio-ecological adaptation, though this relationship remains underdeveloped in the literature (Neuhuber, 2025). Recent initiatives like the European Green Deal and the Farm to Fork Strategy reflect efforts to incorporate redistribution and citizen participation into eco-social frameworks, but systematic evaluation of these dimensions is still lacking (Cotta, 2024).

The relationship between welfare regimes and environmental sustainability remains a relatively unexplored frontier. Existing debates on sustainable welfare emphasize the need to move beyond growth-dependent models of social security and to incorporate social compensation mechanisms for climate policies (Chatradhi, 2025). Evidence from performance evaluation frameworks suggests that balanced attention to environmental, economic, and social dimensions enhances outcomes, whereas prioritizing one can undermine the others (Niu et al., 2024). The emerging eco-welfare paradigm seeks to integrate environmental sustainability with social rights, directly challenging the growth imperative (De Vidovich, 2024). The research on welfare under no-growth conditions indicates the need for governance models that combine redistribution with environmental policy and address inequality (Paliwal et al., 2024). Although links between climate change and social policy are beginning to be recognized, further research is needed on degrowth pathways and the financial sustainability of welfare states during ecological transitions.

While the relationship between welfare systems and sustainability has been explored in debates on *sustainable welfare* and *eco-social policy*, much of the literature has centered on issues such as climate mitigation, green taxation, or energy transitions (Hirvilammi & Koch, 2020; Chatradhi 2025; Partiti & Arcuri, 2021). Far less attention has been given to SDG 12: Responsible Consumption and Production, which emphasizes reducing waste, promoting circular economies, and fostering sustainable lifestyles. SDG 12 also raises questions about how welfare systems shape patterns of consumption and production. For instance, subsidies and transfers may at times perpetuate unsustainable practices, but they could equally be redesigned to support more sustainable choices. For example, housing subsidies may unintentionally promote resource-intensive urban sprawl, while unemployment benefits linked to green job training can actively contribute to sustainability transitions. The gap points to an urgent need for integrating ecological responsibility into welfare design, ensuring that social protection mechanisms not only redistribute wealth but also align with planetary boundaries and intergenerational equity.

Research Objectives

1. To examine how current welfare systems address (or fail to address) issues of responsible consumption and production under SDG 12.
2. To analyze selected international policy examples that demonstrate efforts to integrate sustainability principles into social policy.
3. To propose a conceptual framework for "responsible welfare systems" that links social protection with ecological responsibility and equity.

The study makes three key contributions to the fields of social policy and sustainable development. First, it extends sustainable welfare theory by explicitly linking *responsible consumption and production* (SDG 12) with welfare design, thereby moving beyond traditional redistributive approaches to include ecological responsibility and intergenerational equity. It advances social policy debates by proposing the concept of "responsible welfare systems," which reframe welfare not only as a mechanism of social protection but also as a driver of sustainability transitions. Third, at a practical level, the study contributes to policy discussions by identifying international examples of innovative practices and distilling them into actionable recommendations that align welfare outcomes with sustainability objectives.

Literature Review and Theoretical Framework

SDG 12: Global Framing and Gaps

The United Nations frames Sustainable Development Goal 12 (SDG 12) as central to advancing sustainable consumption and production, emphasizing efficiency, decoupling growth from environmental degradation, and doing *"more with less"* (Sylvester, 2024). While this framing provides a unifying vision, scholars argue that its formulation reflects a production and design-centered perspective shaped by business interests, privileging technological fixes and regulatory frameworks that remain business-friendly (Gasper et al., 2019). The orientation has led to targets and indicators that are less ambitious than earlier transformative visions of sustainable consumption and production, raising questions about whether SDG 12 embodies the systemic change it proclaims (Partiti & Arcuri, 2021).
A further tension lies in the legal underpinnings of SDG 12. While its targets require robust legal frameworks to guide implementation, these are often overshadowed by international trade and investment regimes that prioritize liberalization over ecological and social concerns (Kateřina & Adriana, 2023).

The circular economy, widely invoked under SDG 12, illustrates both the promise and limitations of the UN's framing. On the one hand, it promotes resource recirculation and waste minimization in industries such as textiles (Gabriel & Luque, 2020; Taranov, 2022). On the other, critics point out that its application often remains technocratic and sector-specific, failing to address the deeper behavioral and systemic shifts required for sustainable production and consumption (Broderick & Usher, 2024). Some regional frameworks, such as the Yangtze River Delta model, demonstrate that integrated assessment tools can capture these complexities (Zhong et al., 2024), yet such approaches remain the exception rather than the rule. The framing of SDG 12 establishes an essential global agenda but reflects persistent compromises: it emphasizes production efficiency over sufficiency, reporting over regulation, and technological solutions over socio-political transformation. Scholars therefore highlight the need to strengthen its targets and indicators, align its legal framework with social and environmental priorities, and move beyond a business-oriented narrative if SDG 12 is to drive genuinely transformative change (Chatradhi, 2024; Partiti & Arcuri, 2021).

Sustainable Welfare Theory

Sustainable welfare theory seeks to reconcile social protection with ecological limits, aiming to meet human needs within planetary boundaries while moving away from growth-dependent models of welfare (Bao, 2022). The urgency of this paradigm shift is highlighted by the limited success of countries in decoupling economic growth from resource use and greenhouse gas emissions at rates sufficient to meet climate targets (Lee et al., 2023). Scholars argue that welfare states must therefore be reconfigured to become resilient to economic fluctuations and environmentally sustainable, prioritizing wellbeing and sufficiency rather than expansion (Büchs, 2021). Eco-social policies, that simultaneously pursue social and ecological objectives, are seen as essential for advancing sustainable welfare, though their emergence is highly contingent on political and institutional contexts (Mandelli, 2023). Proposals range from universal basic income and services to eco-social insurance schemes that link welfare entitlements to ecological objectives (Bohnenberger, 2023). In the Global South, localized approaches emphasizing subsidiarity, self-governance, and community participation appear most effective in aligning welfare outcomes with sustainability (Tobing-David et al., 2024).

Recent research further reinforces the relevance of integrating welfare and environmental frameworks. A study by Nordbrandt et al. (2024) shows that broader social insurance coverage significantly increases public support for carbon taxes in Europe, demonstrating that welfare institutions can actively enable climate policy legitimacy rather than merely buffer negative impacts. Likewise, Hasanaj (2023) provides empirical evidence of a global shift toward eco-welfare state models and refines theoretical interpretations of how welfare and sustainability are increasingly interlinked across national systems.

At the theoretical level, sustainable welfare builds on the eco-welfare concept, which reframes welfare systems as active agents in socio-ecological transformation rather than passive compensatory mechanisms (Bailey, 2015; Koch, 2022). Different strategies have been proposed, such as ecological modernization, Green New Deal frameworks, and post-growth approaches, each offering distinct ways to balance social equity with ecological imperatives. Yet, as critics note, many of these approaches remain aspirational, with limited evidence on their feasibility within existing welfare regimes (Hu et al., 2025).

Degrowth-focused scholarship highlights similar concerns. Kongshøj (2023) argues that transitioning to post-growth welfare models requires restructuring financing mechanisms, reducing system dependence on continuous GDP expansion, and addressing the political legitimacy challenges of more radical reforms. Related work also examines options such as universal basic income and socio-ecological public services to support welfare without requiring material growth (Theuer & Hopp, 2019).

Despite conceptual advances, research has yet to fully resolve how welfare systems can be practically transformed into eco-social states, or how trade-offs between sufficiency, equity, and political feasibility should be managed. Current evidence shows that support for eco-social policies varies across welfare regimes and socio-demographic groups (Hirvilammi & Koch, 2020), raising questions about the political sustainability of post-growth welfare models. The sustainable welfare theory contributes a powerful vision of welfare systems that create a *"safe and just operating space"* (Ensor & Hoddy, 2021), but its operationalization requires deeper empirical grounding and institutional innovation.

The Capability Approach

The Capability Approach (CA), developed by Sen and Nussbaum, evaluates well-being by individuals' real opportunities to achieve what they value, rather than GDP or material resources (Paliwal & Chatradhi, 2025; Robeyns, 2010). It offers a multidimensional lens for justice, inclusiveness,

and agency across policy design, social arrangements, and SDGs (Comim et al., 2024). Challenges include measurement difficulties, individualistic focus, and limited engagement with structural inequalities (Przybylinski & Sidortsov, 2023). Nonetheless, CA informs climate adaptation by identifying vulnerable groups, enhancing resilience, and supporting lifelong learning beyond economic contributions (Wasito, 2023). In the context of responsible consumption, CA highlights the interplay of personal motivation, societal influence, and policy. Individual agency drives choices in networks like the Galician Conscious and Responsible Consumption Network (Lema-Blanco et al., 2023), while collective frameworks, such as food citizenship, link consumption with political participation and sustainability (Bindi & Belliggiano, 2023; Parvatiyar & Sheth, 2023). Education and policy can further reinforce these choices without constraining personal freedom (Simões, 2013).

The CA also emphasizes well-being beyond material wealth. Social relationships, autonomy, and community engagement shape life satisfaction more than income alone (Frey, 2018). Alternative measures, Ecological Economics, Quality of Life indices, WELLBY, and Bhutan's Gross National Happiness, capture these multidimensional aspects, integrating ecological, social, and subjective factors (Panbangred, 2023; Cooper et al., 2023). Social determinants, including fairness, generosity, and positive connections, are crucial for sustainable well-being and inform welfare policy design (Barrington-Leigh et al., 2019; Helliwell & Helliwell, 2019). These perspectives align with degrowth literature that calls for shifting societal definitions of well-being away from material accumulation toward needs-based and eudaimonic conceptions of human flourishing (Kongshøj, 2023), reinforcing CA's compatibility with post-growth welfare models. The CA approach offers a human-centered, multidimensional framework linking freedom, justice, and well-being, making it especially relevant for analyzing welfare systems that aim to promote responsible consumption and ecological sustainability within social policy frameworks.

Towards Responsible Welfare Systems

SDG 12, focusing on responsible consumption and production, aims to decouple economic growth from environmental degradation, advancing sustainable development in line with welfare economics principles (Amos & Lydgate, 2020). Its core objective,, achieving more with fewer resources, emphasizes reducing ecological pressures while enhancing quality of life, aligning with foundational welfare goals (Castellano et al., 2024). Integrating SDG 12 into welfare systems, however, requires a coherent theoretical synthesis. The proposed Responsible Welfare Systems (RWS) framework brings together three strands: SDG 12, Sustainable Welfare Theory, and the Capability Approach, each offering a distinct analytical perspective.

SDG 12 provides the macro-level mandate for transitioning economies toward responsible consumption and production through global targets emphasizing ecological sustainability. Sustainable Welfare Theory complements this by highlighting the institutional role of welfare states, advocating for redesigning taxation, redistribution, and support structures to avoid reinforcing environmentally harmful, growth-dependent models. The Capability Approach adds a human development lens, evaluating welfare in terms of individuals' real freedoms and opportunities to lead meaningful lives, thereby emphasizing sufficiency, equity, and agency over material expansion.

The RWS model positions SDG 12 as the "direction of travel," Sustainable Welfare Theory as the "institutional mechanism," and the Capability Approach as the "evaluation and justice framework." Together, they provide a coherent foundation for analyzing how welfare systems can promote ecological responsibility while safeguarding human well-being. This synthesis also clarifies why current welfare structures face trade-offs: policies encouraging sustainable practices may constrain

short-term benefits or challenge established political expectations (Neve & Sachs, 2020). RWS reframes these tensions as design challenges, emphasizing transparent governance, equitable redistribution, and investment in capabilities rather than consumption.

A systems-oriented approach is essential, recognizing synergies among interconnected SDGs, particularly SDG 12, SDG 7 (clean energy), and SDG 13 (climate action), to support inclusive wealth accumulation and long-term welfare outcomes (Barbier & Burgess, 2017; Raman et al., 2024; Sugiawan et al., 2023). Effective implementation also requires multilevel governance, reconciling environmental imperatives with social welfare objectives to enhance policy legitimacy and delivery (Amos & Lydgate, 2020). Regional welfare frameworks increasingly see welfare not merely as an outcome of development but as a catalyst for it (Shlyapina & Tretyakova, 2025). By articulating the conceptual linkage between SDG 12 (policy goals), Sustainable Welfare Theory (institutional pathways), and the Capability Approach (human well-being evaluation), the RWS model establishes a robust theoretical basis for aligning redistributive mechanisms with ecological sustainability and intergenerational equity.

Research Design and Methodology

Research Design

The study adopts a qualitative comparative policy analysis. The focus is on analysing welfare systems, policy documents, and institutional strategies to understand how social policy and sustainability intersect. By combining conceptual analysis with illustrative case studies, the study seeks to develop a forward-looking theoretical and policy framework for what may be termed *"responsible welfare systems."* Conceptual analysis here refers to a structured examination of secondary sources to identify patterns, thematic linkages, and institutional approaches rather than numerical measurement. It draws on both the content and framing of policy and sustainability documents, considering how different organizations (e.g., UN, WB, national governments) prioritize welfare and environmental objectives.

Data Sources

The study relies exclusively on secondary data drawn from credible international and national sources, appropriate for its conceptual and comparative focus (Young & Ryu, 2000; Yanow, 2007). It includes global and national sources selected to reflect both welfare- and sustainability-oriented mandates.

Global datasets include United Nations SDG Progress Reports (2016–2024), UNEP publications on SDG 12 (2017, 2021, 2022, 2024), OECD sustainability metrics (2020), and World Bank SDG 12 sustainability reports (2018, 2022). The UN datasets and UNEP reports adopt a normative, goal-oriented framing emphasizing SDG targets, alignment with international norms, and social inclusion aspects, whereas World Bank reports adopt a development-centric framing, emphasizing economic efficiency, poverty reduction, and country-level implementation trade-offs.

National datasets include EU Circular Economy Action Plan (2020–2025), Canada Federal Sustainable Development Strategy (2022–2024), India Waste-to-Wealth Mission & Swachh Bharat Abhiyan (2024–2025), and South Korea food waste reduction & recycling policy reports (2017–2025). These were selected to illustrate diverse welfare and sustainability trajectories and enable cross-case comparisons of policy integration and social outcomes.

Table 1 Summary of Secondary Sources

Level	Source	Years	Focus
Global datasets	UN SDG Progress Reports	2016–2024	Global tracking of SDG progress
	UNEP SDG 12 Publications	2017, 2021, 2022, 2024	Sustainable consumption & production
	OECD Sustainability Report	2020	Policy and economic sustainability metrics
	World Bank SDG 12 Sustainability Reports	2018, 2022	Development-focused sustainability analysis
National datasets	EU *Circular Economy Action Plan* + supporting reports	2020–2025	Circular economy, waste management
	Canada *Federal Sustainable Development Strategy*	2022–2024	National SDG implementation framework
	India *Waste-to-Wealth Mission* & *Swachh Bharat Abhiyan*	2024–2025	Waste management, urban policy
	South Korea food waste reduction & recycling policy reports	2017–2025	Waste innovation and recycling

To illustrate diverse welfare and sustainability trajectories, the study purposely selected four cases: the European Union, Canada, India, and South Korea. These cases were chosen to capture variation across levels of economic development, governance structures, and welfare models (Weimer & Vining, 2017; Bartlett & Vavrus, 2017). The European Union represents advanced welfare systems that are pioneers in circular economy legislation; Canada offers the example of a high-income welfare state with evolving sustainability initiatives; India illustrates the tensions between rapid development and sustainability imperatives in an emerging economy; and South Korea demonstrates a technologically advanced welfare state with innovative approaches to waste management. The theoretical sampling does not aim for statistical generalization but instead allows for a nuanced understanding of how different welfare contexts engage with SDG 12.

Data Analysis

The analysis employed a thematic document analysis of policy texts, sustainability strategies, and related literature (Rihoux & Lobe, 2009). Initially, all policy texts and reports were read in full to gain a comprehensive understanding of the content and context. Relevant excerpts related to SDG 12 and social policy were then highlighted and coded using a combination of deductive codes (pre-defined categories such as policy integration, welfare outcomes, sustainability trade-offs) and inductive codes that emerged directly from the data, capturing context-specific nuances (Fereday & Muir-Cochrane, 2006). Codes were iteratively reviewed to consolidate overlaps, ensuring consistency and reliability. Themes were then grouped into conceptual categories illustrating how welfare systems either reinforce unsustainable practices or promote responsible consumption and production. This step explicitly connects policies to welfare system characteristics without merely describing initiatives, enabling analytical insights into governance capacity, inclusion, and trade-offs. The approach ensured analytical rigor by combining cross-case comparisons with critical interpretation of institutional framing, rather than merely cataloguing initiatives (Proudfoot, 2022; Sylvester, 2024). Reflexivity was maintained by interrogating aspirational narratives against implementation realities. The study ensured

reliability and validity through the careful selection and systematic analysis of secondary data. Only authoritative sources, such as UN agencies, OECD, World Bank, and official government policy documents were included (Weimer & Vining, 2017), supplemented by peer-reviewed literature to triangulate theoretical and policy insights. Thematic document analysis combined deductive coding, based on pre-identified themes of welfare integration and sustainability trade-offs, with inductive coding that allowed new categories to emerge (Olabode et al., 2018). This approach balanced consistency with sensitivity to context. Cross-case comparisons emphasized patterns and contrasts rather than causal claims, reducing the risk of overgeneralization (Bartlett & Vavrus, 2017). Reflexivity was maintained by critically interrogating the aspirational framing of official documents against implementation realities.

Limitations

As a conceptual and document-based study, the analysis is limited by reliance on secondary data and official policy reporting, which may emphasize aspirations rather than outcomes. However, this approach remains appropriate for the paper's aim of developing a theoretical and policy framework, and it provides a foundation for future empirical studies that can assess the lived impacts of responsible consumption and production policies on welfare systems.

Findings and Analysis

Foundational Disconnect: Why Welfare Systems Struggle with SDG 12

The Sustainable Development Goals Report 2024 shows that only 17% of SDG targets are on track globally, with nearly half showing minimal or moderate progress and over a third stalled or regressing. Setbacks are driven by systemic shocks, pandemics, conflicts, geopolitical tensions, and climate emergencies, creating a policy dilemma: urgent social protection needs often overshadow long-term sustainability priorities. Persistent unsustainable consumption exacerbates this issue. The global economy remains only 8.6% circular, and even welfare-strong regions like the EU exceed global average material footprints, highlighting a fundamental tension between traditional growth models and ecological limits.

Traditional welfare states, designed to address industrial-era social risks through production, consumption, and redistribution, now contribute directly to ecological degradation, threatening future well-being. The OECD Environmental Outlook to 2050 warns that a quadrupling of global GDP by 2050 could increase greenhouse gas emissions by 50% and create severe water shortages for 3.9 billion people. A world economy four times larger would still rely on fossil fuels for 85% of energy, demonstrating that growth-focused welfare systems externalize environmental costs, undermining long-term citizen welfare. 21st-century welfare systems face unprecedented risks: climate-induced food and water insecurity, increased disease burdens, and climate migration. Environmental injustice compounds these risks, as high-consumption populations in the Global North impose ecological and social costs on marginalized groups, exemplified by e-waste management. SDG 12 thus represents both an environmental and social justice imperative, linking responsible consumption with global equity.

International Policy Case Studies

1. The European Union

The European Union's approach to SDG 12 is a comprehensive, top-down legislative framework stemming from the European Green Deal. The Circular Economy Action Plan (CEAP, European Commission, 2020, 2025), adopted in March 2020, is a cornerstone of this strategy.4 Its goal is to *"make sustainable products the norm"* by addressing the entire life cycle of products, from how

they are designed to how waste is prevented and resources are reused. This a fundamental shift from simply managing waste at the end-of-life stage to re-engineering the entire economic system. Key legislative measures include the Ecodesign for Sustainable Products Regulation (ESPR) and the Right-to-Repair Directive (European Environment Agency, 2023), both effective from 2024. These initiatives aim to transform market dynamics and empower consumers, aligning consumption with ecological goals (UNEP, 2017; 2021; 2022). The *"Right to Repair"* directive directly challenges the linear "*take-make-dispose"* model by extending product lifespans. By empowering consumers with better information at the point of sale and providing legally enforceable rights to repair goods, the EU is attempting to change market dynamics and producer behavior. It is a top-down, systemic strategy to influence consumption without necessarily altering consumer purchasing power or lifestyle choices in the short term. The administrative and regulatory capacity to combine these ecological interventions with social protections is provided by the EU's high-income, institutionalized welfare system. Policies that demonstrate how environmental goals are integrated into more general social objectives include eco-conditional subsidies, sustainable public procurement, and inclusive green job initiatives. These initiatives boost economic possibilities, labour inclusion, equity, and sustainability outcomes by focusing on the full product lifetime and encouraging public participation.

Table 2 Comparative Case Overview

Region	Primary Policy Mechanism	Key Instruments	Focus Area	Technology Role	Social/Equity Linkage
EU	Legislative/Regulatory	Circular Economy Action Plan, Right to Repair Directive	Full product life cycle	Enabler for design, tracking, information	Consumer empowerment, inclusive green jobs
South Korea	Incentive-based/Technological	Weight-Based Food Waste Fee, Pay-as-you-throw	Food waste reduction, recycling	RFID tracking and billing	Behavioral change, cultural shift
India	Campaign/Governance	Swachh Bharat Abhiyan, Waste-to-Wealth Mission	Urban/rural sanitation	Specialized excavators	Livelihood creation, citizen dignity
Canada	Decentralized/Framework-based	Federal Sustainable Development Strategy	Cross-cutting sustainability	Data management, fleet electrification	Indigenous reconciliation, social inclusion

2. South Korea

South Korea is widely considered a global leader in waste management. Over the past three decades, the nation has achieved a food waste recycling rate that has risen from a minimal 2% to an astonishing 97-98%. The remarkable success is not due to a single policy but is the synergistic effect of a policy evolution that linked economic incentives, technological innovation, and public education. The country's Weight-Based Food Waste Fee (WBFWF) system and "pay-as-you-throw" principle are supported by advanced RFID technologies, which track household waste and calculate fees accurately (Choi & Hong, 2019; UNDP Seoul Policy Centre, 2017). The core of this model is the *"pay-as-you-*

throw" principle, which provides a direct economic incentive for citizens to reduce the amount of waste they generate. The system is made precise and fair through the use of technology, such as RFID-equipped smart bins, that tracks and bills households based on the weight of their disposed food waste. The approach proved highly effective. Initial concerns about illegal dumping were largely overcome, and the system resulted in a significant reduction in overall waste generation and a massive spike in recycling. The success stems from a self-reinforcing system of behavioral change. The economic incentive created a strong motivation for citizens to reduce waste (Bassi & Guidolin, 2021). The RFID technology made this system transparent and reliable, building public trust. The revenue generated from the fees helped fund the recycling infrastructure, which then transformed the waste into valuable products like biogas, fertilizer, and animal feed, effectively closing the waste loop. The design of these programs leverages municipal capacity to connect environmental outcomes with social participation. By aligning household incentives with public service delivery, the policies create a self-reinforcing cycle of ecological and social benefits, supporting behavioral change, trust in local governance, and community engagement. These outcomes demonstrate how robust municipal services in a technologically advanced welfare state can integrate sustainability with everyday social welfare, ensuring that environmental programs also contribute to citizen well-being and equitable participation.

3. India

India's Swachh Bharat Abhiyan (SBA) and the "Waste-to-Wealth" Mission represent a massive, government-led effort to tackle sanitation and waste management on a national scale. The mission, which has received strong political sponsorship, aims to make "sanitation and hygiene" an intrinsic part of citizens' values". Significant progress has been made, with solid and liquid waste management systems established in hundreds of thousands of villages, and a competitive tool known as the "*Swachh Survekshan"* awards used to drive performance and peer learning among cities. However, a critical analysis of the program reveals a significant challenge: achieving genuine, sustained outcomes versus simply meeting measurable output targets (Ministry of Housing and Urban Affairs, 2024, 2025).

The mission has been criticized for its "target-driven approach" which prioritized toilet construction and diverted funds from solid waste management. The data indicates that, in the haste to meet construction targets, underlying systemic issues were not addressed, such as a lack of focus on behavioral change at the grassroots level and the use of inappropriate containment systems in flood-prone areas. The shift toward initiatives like the "*Swachh City Partnership*[2]*"* to mentor underperforming cities suggests a recognition of this problem. These initiatives show how welfare interventions in emerging economies combine infrastructure provision with behavioral change and citizen engagement. The programs not only improve physical sanitation but also generate livelihoods through emerging green jobs and community participation. While challenges remain in integrating sustainability criteria fully into social transfers, these policies demonstrate the potential of adaptive welfare strategies to address ecological, economic, and social needs simultaneously, reflecting the evolving nature of India's welfare state in linking social protection and environmental sustainability.

4. Canada

Canada's Federal Sustainable Development Strategy (FSDS) provides a framework for multi-level governance, with the federal government outlining goals while relying on provincial and local governments to drive implementation. The approach is notable for its explicit integration of social

[2] Swachh Shehar Jodi ("Clean City Pair") is a national mentorship program launched in September 2025 by India's Ministry of Housing and Urban Affairs under the Swachh Bharat Mission-Urban. It pairs 72 top-performing (mentor) cities, chosen based on Swachh Survekshan cleanliness rankings, with 200 lower-ranked (mentee) cities. During a 100-day pilot, mentor-mentee pairs create joint action plans to improve waste management, sanitation governance, citizen engagement, and visible cleanliness.

justice concerns, particularly its commitment to *"reconciliation with Indigenous Peoples"* and its focus on reducing inequality. Key initiatives related to SDG 12 include a national Zero Plastic Waste strategy and targets for zero-emission vehicles (Environment and Climate Change Canada, 2022; Government of Canada, 2024). The FSDS's explicit inclusion of Indigenous reconciliation is a unique aspect of its framework. It suggests a recognition that environmental degradation disproportionately affects marginalized groups and that long-term sustainability requires addressing historical inequities (Raman et al., 2024). However, the decentralized approach can also lead to policy gaps. Despite the significant impact of household consumption, SDG 12 is noted as "*one of the least funded goals in Canada,"* receiving only a fraction of foundational funding compared to other areas. Indicating that while a decentralized framework can empower local action and integrate complex social goals, it may also lack the centralized mandate and funding to drive transformative change on a national scale (UNEP, 2024; World Bank, 2022).

Table 3 Comparative Analysis of SDG 12 Integration

Region	Welfare System Characteristics	SDG 12 Integration	Key Strengths	Key Gaps
European Union	Advanced welfare states, high-income, strong governance	Circular economy frameworks, eco-conditional subsidies, sustainability reporting	Comprehensive policy frameworks, institutionalized circular economy	High consumption levels; transboundary impacts often overlooked; gaps in social equity outcomes
Canada	High-income, decentralized federal system	Integration of sustainability criteria in federal programs; green job initiatives	Innovative public procurement; citizen engagement	Limited coverage in social transfers; inconsistent monitoring of SDG 12 in welfare programs
India	Emerging economy, diverse welfare interventions	Waste-to-Wealth, Swachh Bharat programs; urban sanitation focus	Community participation; emerging green jobs	Short-term relief focus; limited inclusion of sustainability criteria in social transfers; inequities in access
South Korea	Technologically advanced welfare state	Food waste reduction policies, municipal recycling initiatives	Strong local governance; technology-enabled solutions	Inequality in access to sustainable consumption options; welfare programs not fully eco-conditional

Thematic Analysis

Theme 1: Technology and Innovation as Policy Enablers

The analysis reveals that technology and innovation function as critical enablers in aligning welfare objectives with ecological goals. Across the regions, technological solutions, ranging from South Korea's RFID-equipped smart bins to India's specialized amphibious excavators, demonstrate how innovation can bridge gaps between policy intent and citizen behavior. These interventions highlight that technology is not merely a tool for operational efficiency; it actively shapes participation, accountability, and equity outcomes. By enabling transparent monitoring and incentivizing pro-

environmental behavior, technology transforms traditional welfare mechanisms into instruments capable of simultaneously delivering social protection and ecological impact.

Theme 2: Behavioral Transformation versus Top-Down Mandates

A second theme emphasizes the importance of behavioral transformation over top-down mandates. The EU's legislative approach exemplifies systemic regulation aimed at reshaping market dynamics at the macro level, yet its success in achieving sustainability outcomes is tempered by persistent overconsumption patterns. In contrast, South Korea's incentive-based model illustrates the effectiveness of creating conditions where sustainable behavior aligns with personal and cultural motivations. India's experience reinforces the limitations of infrastructure-heavy, output-focused interventions: despite high levels of investment and political commitment, the absence of strong behavioral engagement at the grassroots level constrained long-term impact. This indicates that welfare systems must be designed to integrate social norms and cultural incentives, making sustainable choices the path of least resistance.

Theme 3: Linking Ecology and Equity

A recurring finding is that sustainability and social equity are inseparable in the design of responsible welfare systems. High-consumption populations, predominantly in high-income countries, often diverge the ecological costs of their behavior onto marginalized communities both domestically and globally, as evident in the increasing e-waste exported from the Global North to regions with limited waste management infrastructure. Canada's Federal Sustainable Development Strategy demonstrates a deliberate integration of social justice, explicitly linking environmental policies with Indigenous reconciliation and the protection of vulnerable populations. The localized programs in India and South Korea show that welfare interventions can provide both ecological benefits and social inclusion when designed thoughtfully. The analysis highlights that without explicitly incorporating equity considerations, welfare systems risk perpetuating environmental injustice and undermining the social legitimacy of sustainability policies, emphasizing that ecological responsibility must be operationalized alongside measures of fairness and inclusivity.

Theme 4: Policy Gaps in Current Welfare Models

Despite notable innovations, the analysis identifies persistent gaps in the alignment of welfare systems with SDG 12 objectives. Existing subsidies and social transfers frequently incentivize environmentally harmful behaviors; for instance, fertilizer subsidies (specifically for Urea) and state-level free electricity for irrigation have driven soil degradation and severe groundwater depletion (Gulati & Juneja, 2022), while India's Pradhan Mantri Ujjwala Yojana (PMUY) subsidizes fossil-fuel-based LPG consumption rather than incentivizing renewable cooking alternatives (Aggarwal et al., 2022). Furthermore, many programs remain focused on short-term relief without embedding sustainability criteria: the Public Distribution System (PDS) ensures food security but entrenches a preference for water-intensive rice and wheat over climate-resilient millets (Pingali et al., 2019); India's Pradhan Mantri Awas Yojana (PMAY) addresses housing poverty using high-carbon materials without mandatory green building codes (Khosla & Sheth, 2018); and the Swachh Bharat Mission (SBM) has historically prioritized rapid toilet construction for immediate sanitation needs over long-term, sustainable wastewater management mechanisms (Hueso & Bell, 2013). The EU and Canada illustrate how monitoring and reporting mechanisms can support policy coherence, but challenges remain in consistently linking welfare provision to responsible consumption outcomes. In South Korea, local successes in food waste reduction are not consistently mirrored in broader social welfare measures, demonstrating the difficulty of scaling effective innovations across systemic structures. These gaps underline the systemic disconnect between traditional welfare objectives and contemporary ecological

imperatives, signalling the need for integrated policies that consider environmental, social, and economic dimensions simultaneously.

Theme 5: Innovations Linking SDG 12 and Welfare

The study highlights several practical approaches where social welfare and ecological sustainability intersect successfully. Circular economy policies in the EU create inclusive green jobs, aligning social and environmental objectives while fostering economic opportunity. Canada's federal programs leverage sustainable public procurement to encourage local sourcing and reduce environmental impacts, simultaneously promoting social benefits. In emerging economies, community-driven initiatives such as Repair Café Bengaluru / the Repair Café Collective India (organized by a network of volunteers offering repair workshops) and the Korean Packaging Recycling Cooperatives (industry-based cooperatives that help municipalities meet recycling targets) illustrate how localized innovations can integrate social inclusion with environmental goals. While high-income countries benefit from robust institutional support and monitoring capacity, emerging economies demonstrate the potential of adaptable, context-specific interventions, despite the persistent challenge of scaling these innovations. These findings suggest that embedding sustainability principles into the design, funding, and governance of welfare programs can provide a roadmap for developing responsible welfare systems that deliver ecological and social co-benefits.

A Conceptual Framework for "Responsible Welfare Systems"

The limitations of the traditional, growth-centric welfare state underscore the need for a fundamental conceptual shift. Scholars increasingly advocate moving beyond conventional social policy toward an **"ecosocial"** framework, which seeks to reconcile human well-being with ecological sustainability. At its core, this approach emphasizes the decoupling of welfare outcomes from economic expansion, while simultaneously addressing the emergent risks posed by climate change, resource scarcity, and environmental degradation, challenges that conventional welfare systems are ill-equipped to confront. Rather than reacting to the historical social vulnerabilities of industrialization, such as poverty and unemployment, this paradigm adopts a proactive stance, anticipating and mitigating the intertwined social and ecological crises of the twenty-first century. Achieving this not only requires incremental adjustments but a system-wide transformation of prevailing economic and policy models, embedding sustainability, equity, and resilience as central objectives of social protection.

Core Principles of a Responsible Welfare System

Drawing on the analysis, a "Responsible Welfare System" must be built on the following core principles:

1. Equity: The system must address both social and environmental equity. The principle encompasses the need for "recognition, redistribution, and parity of participation" to address issues of injustice and ensure fair burdens and benefits. Canada's explicit link to Indigenous reconciliation is an example of how this can be operationalized.

2. Ecological Responsibility: Grounded in the principle of "Eco-Prosumption," meaning both production and consumption must be socially and environmentally responsible. It requires a move toward circularity and away from the linear economic model. The EU's "Right to Repair" is a perfect policy mechanism for this principle, as it extends product lifespans and empowers consumers.

3. Resilience and Safety: The system must build resilience to "new risks" like climate shocks, food insecurity, and resource depletion. It means moving beyond traditional social safety nets to include climate adaptation and resource security. India's efforts to create waste management systems in villages, for example, contribute to this principle by improving public health and safety.

4. Behavioral Transformation: Policy must be designed to foster a cultural shift, as seen in South Korea's success. This involves leveraging incentives and technology to change consumption patterns and align individual self-interest behaviours with collective sustainability goals.

5. Multi-level and Multi-Stakeholder Governance: Acknowledging that action must occur at local, national, and international levels, involving governments, businesses, and civil society, as seen in the Canadian and EU examples.

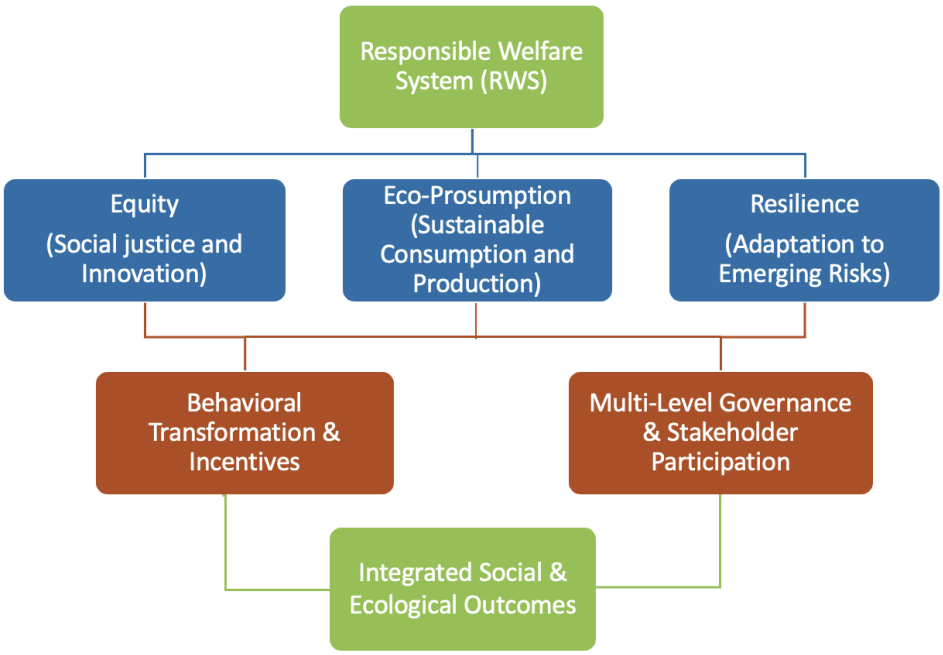
Table 4 Core Principles

Principle	Social Dimension	Ecological Dimension	Policy Examples
Equity	Protects vulnerable groups, ensures parity of participation	Fair resource access, environmental burden distribution	Canada's Indigenous reconciliation; India's sanitation worker programs
Eco-Prosumption	Informs consumer choice, extends product lifespans	Promotes circular economy, reduces waste	EU Right to Repair; South Korea pay-as-you-throw
Resilience	Protects against climate shocks, ensures food/water security	Prevents resource depletion	India's rural waste management initiatives
Behavioral Transformation	Incentivizes responsible consumption	Reduces ecological footprint	South Korea WBFWF system
Multi-Level Governance	Involves local, national, international actors	Enables coherent ecological interventions	EU CEAP, Canada FSDS

The Linkage Model: Interdependence of Social Protection and Ecological Sustainability

A central insight from the thematic and comparative analysis is that social protection and ecological sustainability are mutually reinforcing rather than competing objectives. Social programs can bolster ecological goals by enabling just transitions for workers in carbon-intensive sectors, supporting education and skill development for green jobs, and funding inclusive green infrastructure. Conversely, ecological policies can generate social benefits by creating livelihoods through circular economy initiatives, reducing environmental hazards, and enhancing community well-being. The integration of social and ecological objectives ensures that welfare systems are both sustainable and socially just, avoiding the pitfalls of traditional models that offset environmental costs onto marginalized populations.

Figure 1 Linkage Model



The Responsible Welfare Systems framework can be operationalized through several key mechanisms:

- **Eco-conditional social transfers:** Welfare benefits and subsidies can be linked to environmentally responsible practices, incentivizing sustainable consumption.
- **Integration of SDG 12 indicators in monitoring:** Welfare systems should track ecological and social outcomes concurrently, ensuring policies are aligned with long-term sustainability goals.
- **Inclusive green jobs and community initiatives:** Public investments in circular economy programs, repair cafés, and recycling cooperatives can simultaneously address unemployment, social inclusion, and environmental objectives.
- **Multi-level governance and stakeholder participation:** Coordinated action across government, private sector, and civil society ensures accountability, responsiveness, and scalability of responsible welfare programs.

Theoretical and Policy Implications

Theoretical Implications

The findings of the study contribute to the advancement of sustainable welfare theory by extending it toward the concept of *"responsible welfare systems."* Traditional welfare frameworks have largely emphasized redistribution and poverty alleviation, often within a growth-first paradigm. However, the case studies and cross-cutting analysis highlight the need to reframe welfare as a multidimensional construct that simultaneously addresses social equity, ecological responsibility, and long-term sustainability. It requires integrating the Capability Approach with intergenerational justice, emphasizing not only what individuals can achieve today but also the preservation of environmental and social assets for future generations.

The evidence shows the importance of behavioral dimensions in welfare outcomes. Incentive structures, cultural norms, and social expectations significantly shape the effectiveness of welfare

interventions, suggesting that theoretical models must incorporate insights from behavioral economics. The study highlights the centrality of multi-level governance, as responsible welfare systems operate across local, national, and global scales, demanding institutional coordination and policy coherence. Technology emerges as a critical mediator of welfare capabilities, demonstrating that innovations in monitoring, feedback, and service delivery can enhance both social equity and ecological outcomes. Incorporating these insights theoretically expands welfare frameworks beyond conventional metrics, positioning them as dynamic systems capable of responding to complex socio-ecological challenges.

Policy Implications

The findings suggest that welfare programs can be designed to include eco-conditional transfers, linking subsidies and social benefits to environmentally responsible behaviors, thereby incentivizing sustainable consumption and production. Aligning welfare policies with green jobs and skills development programs can simultaneously address social protection and promote inclusive, low-carbon livelihoods, enhancing resilience and long-term economic security. Integrating SDG 12 indicators into welfare monitoring and evaluation frameworks allows policymakers to track both ecological and social outcomes, facilitating evidence-based adjustments and adaptive governance. Drawing on the thematic analysis of case studies and policy documents, the study demonstrates how welfare systems in diverse contexts, such as the EU, Canada, India, and South Korea, have experimented with linking social programs to environmental objectives, thereby providing concrete examples of eco-social integration. Achieving policy coherence across social protection, economic development, and environmental sustainability ensures that interventions are mutually reinforcing rather than contradictory, reducing trade-offs between short-term relief and long-term ecological goals. Welfare systems should prioritize resilience-oriented design, incorporating measures for climate adaptation, disaster preparedness, and resource security to safeguard vulnerable populations. Leveraging participatory mechanisms and technological innovations, such as real-time data systems and citizen engagement platforms, can enhance transparency, improve policy targeting, and foster behavioral shifts toward sustainability. The welfare systems can be reimagined to integrate ecological responsibility, moving beyond conventional social protection toward frameworks that support both human well-being and environmental sustainability.

Conclusion

The study has examined how welfare systems can be reimagined to integrate ecological responsibility, advancing the concept of a responsible welfare system that simultaneously addresses social protection, sustainability, and equity. The analysis demonstrates the persistent tension between traditional growth-oriented welfare models and the imperatives of sustainable development under SDG 12. The findings highlight several critical insights. Technological innovation emerges as a key enabler, facilitating transparency, efficiency, and behavior change. Cultural and behavioral shifts remain central to achieving lasting impact, illustrating that policy effectiveness goes beyond infrastructure or regulation. Equally important, social welfare must explicitly account for ecological justice, ensuring fairness and inclusivity while avoiding the externalization of environmental costs onto vulnerable populations. Data limitations and the lack of integrated monitoring systems continue to constrain policy design, emphasizing the need for comprehensive frameworks that track both social and environmental outcomes in real time. The proposed linkage model provides a conceptual foundation for harmonizing social protection with ecological sustainability, offering a pathway to transform welfare systems beyond incremental reforms.

The study also identifies several avenues for future research. Empirical studies could evaluate the effectiveness of eco-conditional social transfers and other responsible welfare interventions across different socio-economic contexts. Research could examine the sustained behavioral and ecological impacts of integrated welfare-sustainability initiatives, particularly in emerging economies. Further investigation into the role of digital tools and technological systems in enabling adaptive, real-time governance could strengthen policy design. Comparative research on the intersection of welfare, sustainability, and intergenerational equity would refine theoretical frameworks and policy recommendations. A participatory approach involving communities, policymakers, and private stakeholders could illuminate practical strategies for implementing context-sensitive and scalable responsible welfare models.

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