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Assessing public awareness, barriers, and skill needs for climate action and sustainable practices in Ireland

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ABSTRACT

This study examines the knowledge, skills, and perceptions of Irish citizens in relation to climate action and sustainable practices, addressing a key gap in understanding how individual competencies support sustainability transitions. While existing research largely emphasises policy and technological solutions, this study focuses on the role of citizen skills and behavioural capacity. Guided by ecological modernisation and green growth perspectives, it explores how life and green skills influence engagement in sustainability practices. A national survey was conducted and analysed using descriptive and comparative methods to assess demographic patterns, climate-related knowledge, and practical competencies in biodiversity, the circular economy, and household sustainability. The findings indicate high levels of concern about climate change (81%) with considerable understanding of its causes and impacts (69%). Although 74% of respondents expressed a willingness to contribute to climate and biodiversity goals, only 46% felt adequately equipped with the necessary knowledge and skills. Key barriers to engagement include financial constraints, lack of practical knowledge, and low confidence. While biodiversity loss is widely recognised (74%), only 2% reported having expertise in this area. Awareness of circular economy concepts is increasing, particularly among women, with strong engagement in waste reduction and recycling. Participants also showed significant interest in developing skills in areas such as waste management, upcycling, conservation, and food waste reduction, favouring practical, community-based learning approaches. The findings suggest that current skill levels support incremental rather than systemic sustainability transitions, highlighting the need for targeted, citizen-focused interventions to enable a more effective shift to a low-carbon society.

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1. Introduction

In the context of increasingly dynamic and complex global environmental challenges, the development of robust skill sets is important for both individual advancement and the broader welfare of society (Baffo et al., 2024; Garito et al., 2023). Climate change, biodiversity loss, and increasing resource degradation require more than technological solutions, they demand citizens who have competencies to understand sustainability challenges, navigate uncertainty, and actively participate in climate action. To this end, life skills and green skills are increasingly recognised as critical capabilities that enable individuals to address the multifaceted environmental, social, and economic pressures of the 21st century while contributing to a more sustainable future (Auktor, 2020; CEDEFOP, 2015; Chandler et al., 2024; Holman & Švejdárová, 2023; Lagorio et al., 2024).

Life skills include a broad range of transferable abilities that support individuals in managing their personal and professional lives effectively (CEDEFOP, 2015). These competencies are not tied to a specific

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[†]David Williamson was a valued co-author and colleague whose contributions to this research were fundamental to its development. He passed away prior to publication. This work is dedicated to his memory.

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occupation or industry they are rather universally applicable across sectors and contexts. They include problem solving, emotional intelligence, communication, adaptability, and critical thinking (Hügel & Davies, 2024). Such competencies form an important foundation for green skills, as they enable individuals to interpret complex sustainability information, participate in constructive discussions with others, and devise practical responses to climate related problems (Abdelkareem et al., 2024; Cabral & Dhar, 2021; CEDEFOP, 2015). For example, communication skills are essential for advocating and normalising sustainable practices, while critical thinking and problem solving are important for driving innovative and context-sensitive solutions (Holman & Švejdárová, 2023; Hügel & Davies, 2024).

Green skills, on the other hand, are widely considered as key enablers of sustainability transitions (Fuchs, 2024; Kowalska et al., 2022). They include both technical abilities, such as energy efficiency, renewable energy technologies and sustainable agriculture practices and broader sustainability literacy, including awareness of biodiversity conservation, waste reduction through reuse, repair, and carbon footprint measurement. Green skills are also understood as involving attitudes and dispositions that promotes empathy, shared responsibility and social cooperation in the pursuit of environmental goals (Bianchi et al., 2022). As global challenges such as climate change and resource degradation intensify, skills development and improvement have become central pillars of environmental and educational policy across Europe and beyond (Garito et al., 2023; Kumar et al., 2023; Kwauk & Casey, 2022).

Understanding how these competencies translate into action requires engagement with environmental behaviour theories. Models such as the Theory of Planned Behaviour and the Value-Belief-Norm framework emphasise the role of knowledge, attitudes, and perceived behavioural control in shaping pro-environmental behaviour. In this context, life and green skills can be understood as enabling factors that enhance individuals' capacity to act while also interacting with social norms and structural constraints. This highlights the importance of examining what individuals know and how confident and capable they feel in applying that knowledge in practice. Through the development of both life and green skills, individuals can become effective agents of change, contributing to more resilient communities and adaptive responses to environmental risk (Gooding et al., 2024; Kwauk & Casey, 2022; Lubowiecki-Vikuk et al., 2021). Effective climate responses increasingly require the engagement and co-production of knowledge with local authorities and citizens to inform and support adaptive action (Ling et al., 2022; Neset et al., 2021). Skills development is therefore not a discrete intervention but an ongoing process involving education, practice and real world experience, embedded within broader institutional and policy framework (Chandler et al., 2024; Martínez-Peláez et al., 2023).

Like many other countries, Ireland faces significant challenge in planning for and responding to the climate crisis (Garito et al., 2023; Shtjefni et al., 2024). As a signatory to the European Green Deal, Ireland has committed, alongside other EU countries, to achieving net-zero greenhouse gas (GHG) emissions across the EU by 2050, with an interim target of reducing GHG emissions by at least 55% by 2030 (EPA, 2024; European-commission, 2024; Government-of-Ireland, 2024b). The Government of Ireland's Climate Action Plan (2024) highlights the critical role of skill development in advancing a sustainable, climate-neutral future and achieving targeted emissions reductions (European-commission, 2024; Government-of-Ireland, 2024a; Semple, 2024). Under the framework of Ensuring a Just Transition to Climate Neutral Ireland, the Plan emphasises the importance of forecasting future skills needs, strengthening the national skills environment and supporting sectors and communities at risk of displacement.

These policy frameworks recognise the importance of skills in enabling climate action. However, there remains a gap in empirical research evaluating how such competencies are understood, distributed, and applied at the individual level. Previous studies have focused on technological innovation and institutional responses with comparatively limited attention given to the role of citizen skills and behavioural capacity in supporting the transitions to sustainability. Particularly, there is a lack of evidence on how life and green skills influence engagement, perceived barriers, and participation in climate related practices across different demographic groups. Addressing this gap is important in translating policy ambitions into inclusive and effective action. Within the context of this policy, climate action is largely framed as a process of institutional reform, technological innovation, behavioural adaptation, and workforce reskilling occurring within existing economic structures. Given that alternative perspectives such as degrowth or sufficiency-based approaches advocate more radical structural transformation, this study reflects the policy

orientation embedded within Irish and European climate strategies. This positioning shapes both the scope of the research and the types of competencies evaluated.

In this context, this study investigates public perceptions of climate change and climate action in Ireland, identifies key barriers to engagement, and evaluate preferences for sustainability related skill development. Specific attention is given to how individuals perceive their competencies in areas such as waste reduction, carbon footprint measurement, repair practices and biodiversity. The study aims to contribute to both policy and academic debates by providing empirical insight into the role of skills in enabling citizen participation in transitions to sustainability, thereby informing the design of targeted and inclusive strategies for climate engagement.

2. Literature review and theoretical framework

2.1. Ecological modernisation and green growth

Ecological modernisation theory proposes that environmental protection, and economic development can emerge through institutional reform, technological innovation, and the gradual restructuring of production and consumption systems (Ali, 2013; Gouldson, 1997). Considering this, environmental problems are addressed through cleaner technologies, increased resource efficiency, regulatory frameworks, and the diffusion of environmentally responsible practices across society (Cai et al., 2025; Severo et al., 2018). The European Green Deal illustrate this approach by linking decarbonisation strategies with economic competitiveness and industrial transformation (European-Commision, 2025). Closely related is the concept of green growth, which emphasises the role of innovation, technological advancement, and skills development in fostering environmentally sustainable economic expansion (Caglar et al., 2024; Wang, 2023). Within this framework, workforce competencies are viewed as a key enabling factor for adopting new technologies and supporting structural shifts toward low carbon systems. As a result, skills development is positioned as central component of policy strategies aimed at accelerating sustainability transitions (OECD, 2025).

2.2. Environmental behaviour theories

While structural and technological changes are key to sustainability transitions, individual behaviour also plays an important role in shaping the environment (Dütschke et al., 2024). Understanding how individuals engage with climate action therefore requires engagement with established behavioural theories. The theory of Planned Behaviour is one of the widely applied frameworks in this field. It proposes that behavioural intentions are influenced by three key factors: perceived social norms, perceived behavioural, and attitudes toward the behaviour (Bosnjak et al., 2020; Paul et al., 2023). In the context of sustainability, skills development can strengthen perceived behavioural control by increasing individuals' confidence in their ability to adopt pro-environmental practices.

Similarly, the Value-Belief-Norm Theory explains environmental behaviour as a casual chain linking personal values, ecological beliefs, and moral obligations (Choi et al., 2015; Stern, 2000). Within this framework, knowledge and awareness contribute to shaping environmental beliefs, which subsequently influence behavioural commitments (Stern et al., 1999). Skills development may therefore strengthen pro-environmental values by enabling individuals to translate awareness into practical action. Another relevant framework is the Norm Activation Model, which emphasises the role of awareness of environmental consequences and feelings of personal responsibility in motivating environmentally responsible behaviour (Savari et al., 2023). When individuals recognise the impacts of environmental degradation and perceive themselves as capable of contributing to solutions, pro-environmental behaviours are more likely to occur.

2.3. Conceptualising life skills and green skills

Life skills are commonly described as transferable competencies that enable individuals to function effectively across personal, social, and professional contexts (Erbaş, 2025; Tanious et al., 2023). These competencies include communication, critical thinking, problem-solving, emotional intelligence, and adaptability. As such,

they provide a foundation for responding to complex and evolving societal challenges. Green skills, by contrast, are more directly linked to environmental action and sustainable decision making (Arthur, 2022). These include both technical capabilities and broader forms of environmental literacy. In practice, however, the difference between life skills and green skills is not always clear, as many sustainability-related competencies depend on underlying transferable skills such as critical thinking, collaboration, and communication.

In line with the context of sustainability transitions, green skills can be conceptualised across three interrelated dimensions: (i) technical green skills, including competencies related to renewable energy systems, energy efficiency technologies, and sustainable production practices, (ii) cognitive and behavioural green skills, such as carbon footprint literacy, biodiversity awareness, and sustainable consumption practices, and (iii) enabling life skills, including communication, collaboration, adaptability, and resilience, which facilitate engagement with sustainability challenges. From this perspective, green skills represent an integrated combination of technical knowledge, behavioural capabilities, and enabling competencies that support participation in a low-carbon transition (Arthur, 2022).

2.4. Conceptual framework

Drawing on ecological modernisation theory and environmental behaviour models, this study adopts a conceptual framework linking awareness, skills, and behavioural engagement. Awareness and perceptions of climate change influence individuals' attitudes and normative beliefs regarding environmental responsibility (Gazeloğlu, 2026; Perera et al., 2022). In turn, the development of life skills (such as problem solving, critical thinking, and communication) and green skills (technical expertise in sustainability) enhances perceived behavioural control and the practical capacity to act (Akinsemolu & Onyeaka, 2025; Galván-Mendoza et al., 2022; Kelkar, 2024). At the same time, perceived barriers such as limited resources, lack of knowledge, or institutional constraints may mediate the relationship between skills and behavioural engagement (Zamiri & Esmaeili, 2024). To this end, intended pro-environmental behaviours represent potential contributions to broader sustainability transitions. However, the framework recognises that skills alone are insufficient to drive behavioural change in the absence of supportive institutional conditions, social norms, and policy frameworks.

While the present study is situated around the context of ecological modernisation and green growth, it does not directly evaluate macro-level indicators such as economic growth or greenhouse gas emissions. The analysis rather focuses on individual-level skills, perceptions and behaviours that underpin engagement with sustainability transitions. This demonstrates the understanding that large scale system change is in part contingent on the capacities of individuals to adopt, support and participate in low carbon actions. Skills related to waste reduction, sustainable consumption, and resource efficiency explored in this study are therefore interpreted as foundational components of broader green growth processes. To this end, the study embraces a micro level perspective to analyse climate policy and economic transition.

3. Materials and methods

3.1. Sampling and survey design

The study employed a nationally representative survey to assess sustainability skills and awareness among the Irish population. The survey was designed using the Nomenclature of Territorial Units for Statistics (NUTS 2) regional classification, which is widely applied in Irish demographic studies and analysis (CSO, 2024). The sample distribution was aligned with national population percentages across the three regions:

- Northern and Western (IE04): 680,333 (17.6%)
- Southern (IE05): 1,275,887 (33.0%)
- Eastern and Midland (IE06): 1,905,858 (49.3%)

3.2. Household survey sampling

The household survey sampling was conducted by Bilendi, on behalf of Ireland's Knowledge Centre for Carbon, Climate, and Community Action (IKC3), Munster Technological University (MTU). Following a

tendering process, the survey was administered through Dynata Global UK Limited's online panel between December 18–26, 2023. The survey targeted the Irish population aged 18–74, with a sample size of 1,000 respondents. The survey participants were invited anonymously, with voluntary completion encouraged. The data were weighted to reflect gender, age, and regional distribution, ensuring a representative sample of the Irish population. Figure 1 shows the demography of the survey participants. Figure 2a and b present pie charts of the age brackets, genders, and locations of the participants.

3.3. Inform consent

Participation in the survey was entirely voluntary and written informed consent was obtained prior to the start of the study. Participants were invited to take part in the study through Dynata's online research panel, which recruits participants continuously across diverse demographic groups in Ireland. Invitations to participate were distributed through Dynata's secure panel platform or by email. Respondents who chose to participate gave implicit consent by clicking the survey link and proceeding with the questionnaire. Participant privacy and anonymity were fully protected through the process.

3.4. Survey thematic areas

The survey instrument was designed around five thematic areas, guided by established frameworks on environmental competencies and consultation with the Environmental Protection Agency (EPA) and the European GreenSCENT Project. These areas aim to assess knowledge, skills, and perceptions related to sustainability and climate action while identifying areas for further capacity building. The five thematic areas included the following:

1. Understanding climate change and action: Assess participants' awareness of climate science, the causes and consequences of climate change, and their familiarity with personal and collective climate actions.

Gender		How would you describe your living area? (choose most fitting alternative)		Which of the following options best describes your educational status?	
Male	49 %	Capital area	27 %	No formal education	0 %
Female	51 %	Another urban area	40 %	Primary Level	1 %
Age		Rural area	33 %	Junior Certificate	4 %
18 - 29	21 %	Which of the following options best describes your working status?		Leaving Certificate	19 %
30 - 39	19 %	Working in private sector	43 %	Technical or Vocational Qualification	13 %
40 - 49	22 %	Working in public sector	22 %	Third Level Qualification	17 %
50 - 59	18 %	Working in the social sector	2 %	Primary Degree	19 %
60 - 69	14 %	Self-employed	5 %	Postgraduate Diploma or Certificate	11 %
70 - 74	6 %	Pensioner	10 %	Postgraduate Masters	14 %
Where do you live?		Student	5 %	Doctorate (PhD)	2 %
Connacht	11 %	Stay-at-home mother/father	7 %	Other, what?	0 %
Dublin	29 %	Unemployed jobseeker	3 %		
Munster	35 %	Other	3 %		
Rest of Leinster	16 %				
Ulster	9 %				

Figure 1. Demography of the survey participants.

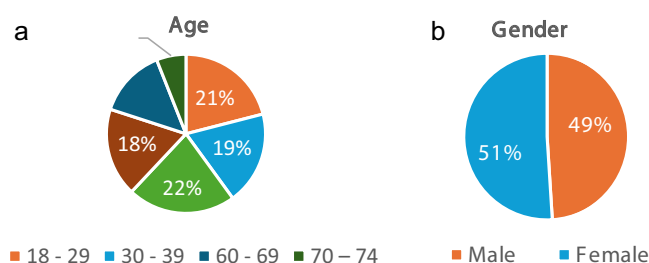


Figure 2. a. Age brackets of the survey participants. b. Gender of the participants.

2. Skills in Transitioning in the Home: Focused on household-level sustainability practices, including energy efficiency, renewable technology use, sustainable transport decisions, and carbon footprint awareness.
3. Skills in Biodiversity and Food: Explored participant knowledge and behaviours related to local biodiversity, food growth, nature-based solutions, and sustainable food systems.
4. Skills in the Circular Economy: Investigated habits related to consumption, reuse, repair, recycling, and waste reduction, including scenarios involving common household items to assess practical decision-making around circularity.
5. Preparing for the Future: Addressed participants' confidence in adapting to environmental change, willingness to learn new green skills, and openness to sustainable lifestyle.

The survey employed a mix of multiple-choice scales, Likert scales, and scenario-based questions, the latter designed to elicit practical decision making and emotional engagement with sustainable topics.

3.5. Behavioural and technological transition themes

In support of Ireland's net-zero targets, the survey further explored public attitudes towards clean energy technologies' willingness to transition from fossil fuels, and incentives that could promote adoption. It also examines behavioural change in energy, food, transport, and consumption, highlighting the public's readiness to contribute to a just and inclusive transition.

3.6. Survey analysis

Quantitative data were analysed using Statistical Package for the Social Sciences (v.29). Weighting adjustments were applied for sex, age, and region based on the most recent population data (CSO, 2024). This approach ensures that the sample accurately reflects the demographic profile of the Irish population. The analytical process followed a structured sequence. First, survey responses were exported to Microsoft Excel for preliminary organisation and cross-referencing. The data were then structured in a matrix format, with each row representing an individual respondent and each column corresponding to a survey item. This format facilitated multidimensional analysis by enabling comparisons across demographic variables and thematic question groups.

All background variables, such as educational attainment, geographic location, employment status, and age group, were included to enhance the depth of interpretation. Within SPSS, statistical significance testing (typically chi-square tests for categorical data and t tests or ANOVA where applicable) was employed to identify significant differences between subgroups, allowing for a nuanced understanding of trends within and across demographic categories.

This method allows for both a high-level overview of national attitudes and behaviours and the identification of statistically meaningful outliers and subgroup variations. Key patterns were highlighted in areas such as public awareness of sustainability initiatives, perceived confidence and competence in sustainable practices, and preferred learning methods for skill development. While further context may be drawn from the literature on Irish environmental attitudes and circular economy engagement, the survey findings presented here offer a robust, evidence-based foundation for understanding sustainability-related knowledge, attitudes, and behaviours across diverse population segments in Ireland.

3.7. Ethical consideration

Ethical approval for this study was obtained from Munster Technological University (MTU) Research Ethics Committee (Approval number: MTU-HREC-FER-23-025-A). Participation was voluntary, and all procedures adhere to the ethical standards, confidentiality, and data protection.

3.8. Potential biases and limitations

This study is subject to several potential sources of bias, as with all survey-based research. Response bias may arise due to the use of an online panel, as individuals who choose to participate in surveys may differ

systematically from the general population. Mitigation measures such as quota sampling and post-stratification weighing were applied to ensure representation across key demographic variables, including age, gender, and region. Social desirability bias also may have influenced responses, especially in relation to self-reported pro-environmental behaviours and attitudes. Participants may overstate environmentally responsible behaviour due to perceived social expectations. To mitigate this effect, the survey was conducted anonymously, and questions were framed neutrally to avoid leading responses. Furthermore, sampling bias related to digital access cannot be entirely excluded, as the survey was administered online. While the use of a large, established panel provider (Dynata) helps ensure broad population coverage, individuals with limited internet access may be underrepresented. Despite these limitations, the study provides a robust and representative snapshot of sustainability-related knowledge, attitudes, and skills within the Irish population.

4. Results

4.1. Understanding climate change and action

The survey revealed that 81% respondents expressed concern about climate change, indicating widespread recognition of the issue. However, this concern varied across demographic groups. Notably, women reported higher levels of concern than men, with 33% identifying as ‘very concerned’ compared to 26% of men, as shown in Figure 3, suggesting a gendered dimension in climate risk perception. Similarly, higher educational attainment was associated with increased concern as presented in Figure 4, indicating that education may play a key role in shaping environmental awareness.

Comfort in discussing climate change was highest within informal social contexts, such as family (92%), friends (91%), and colleagues (85%), but declined in more formal or unfamiliar settings, including political parties (65%) and strangers (52%). This pattern suggests that climate discourse remains largely confined to personal networks, potentially limiting broader societal and political engagement. Gender differences were also evident, with men reporting greater comfort in community discussions than women, pointing to potential disparities in participation or confidence in public-facing dialogue. Age related differences further highlight uneven engagement. Younger respondents (18–39) reported lower comfort levels in formal discussions compared to older groups, suggesting potential barriers to participation in institutional or policy related conversations. In contrast, older respondents (50–74) were more likely to report being well informed as presented in Figure 5, although this was often accompanied by limited self-reported expertise, indicating a gap between general awareness and deeper knowledge.

Awareness of climate-related policies and frameworks followed a similar pattern. As shown in Figure 6, while a large majority (83%) had heard of the Irish Climate Action Plan, most reported only superficial knowledge, and 17% had no awareness at all. Awareness of concepts such as Just Transition was particularly low. These findings suggest that although general awareness of climate change is high, understanding of policy frameworks and their practical implications remains limited.

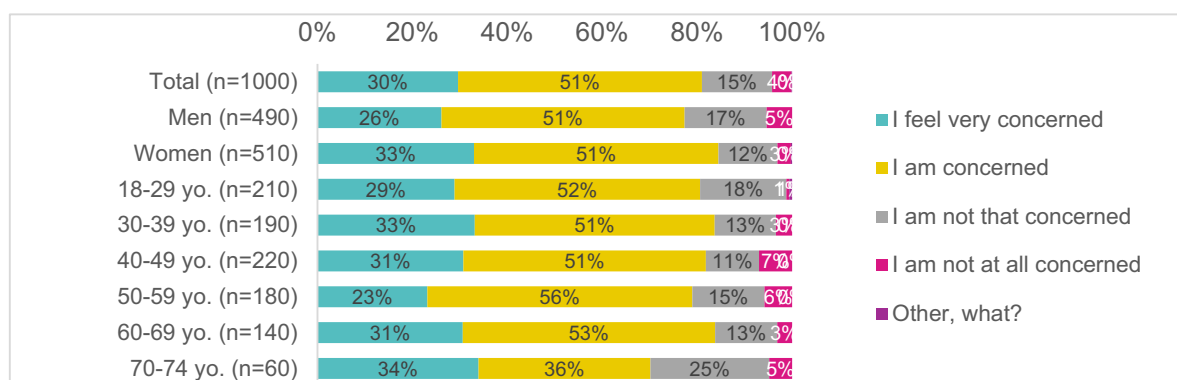


Figure 3. Gender variation and age groups in response to climate change awareness.

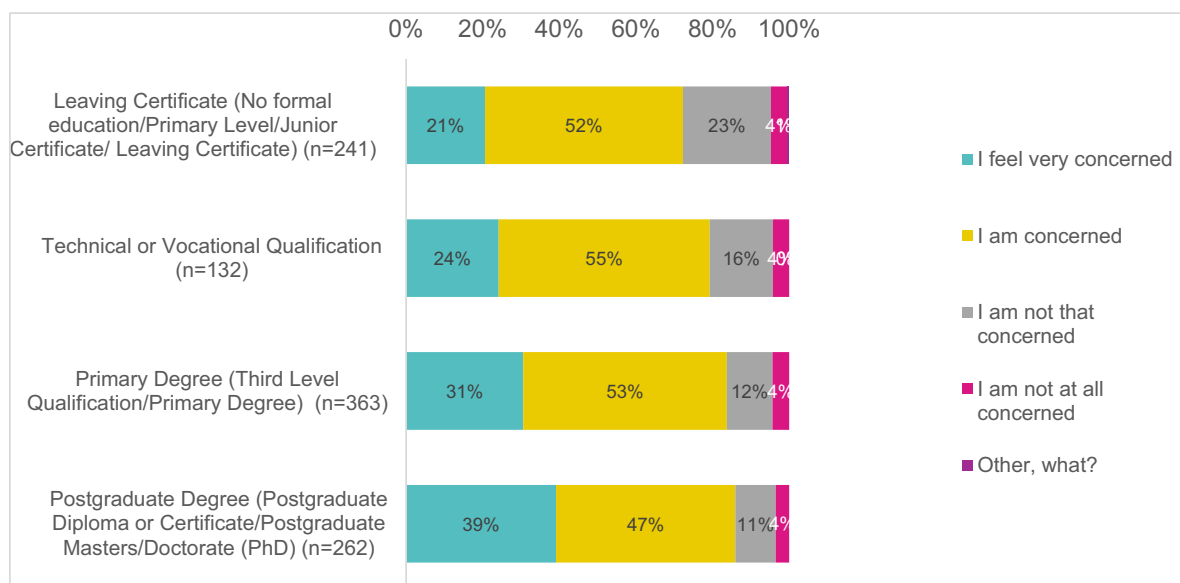


Figure 4. Education level of respondents on climate change awareness.

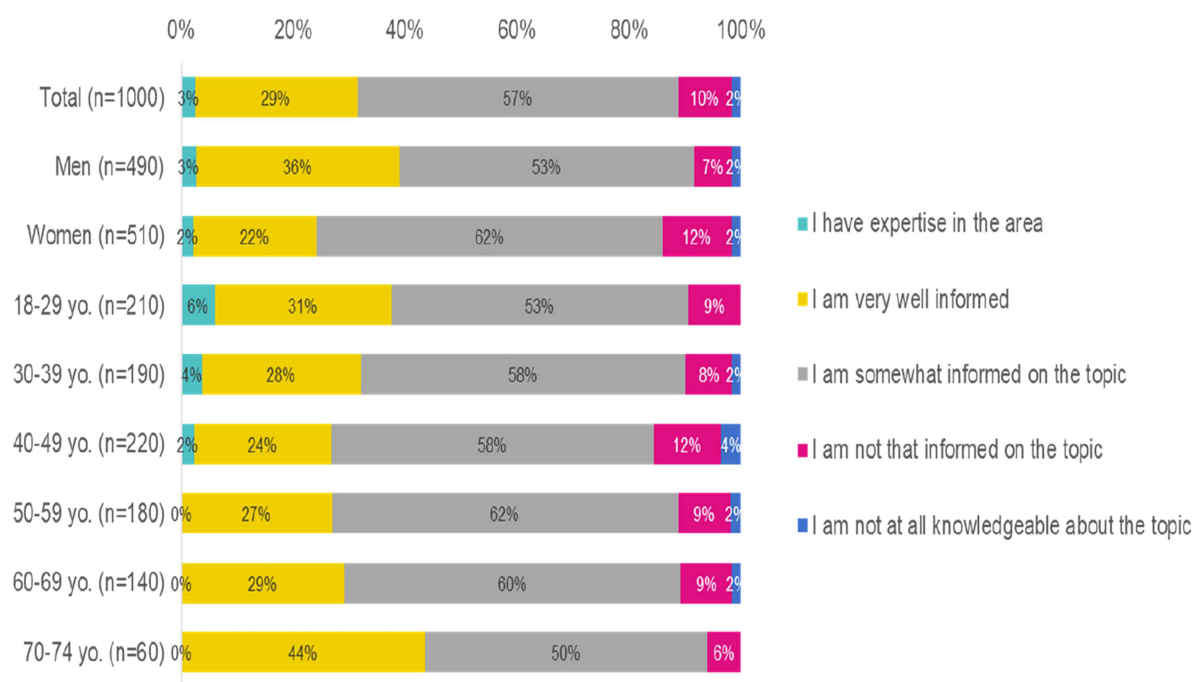


Figure 5. Knowledge and expertise in climate change across age groups.

4.1.1. Adaptation and mitigation

Figure 7 presents participants familiarity with commonly promoted mitigation. They demonstrated high familiarity with commonly promoted mitigation and adaptation strategies, particularly energy efficiency (93%) and renewable energy technologies (91%). This suggests that widely communicated climate solutions have achieved strong public visibility. However, gender differences were evident, with men reporting higher familiarity with renewable energy technologies than women, indicating uneven knowledge distribution. Age differences were also apparent, with younger respondents showing greater engagement with renewable technologies, while older groups were more likely to report only basic familiarity. This suggests

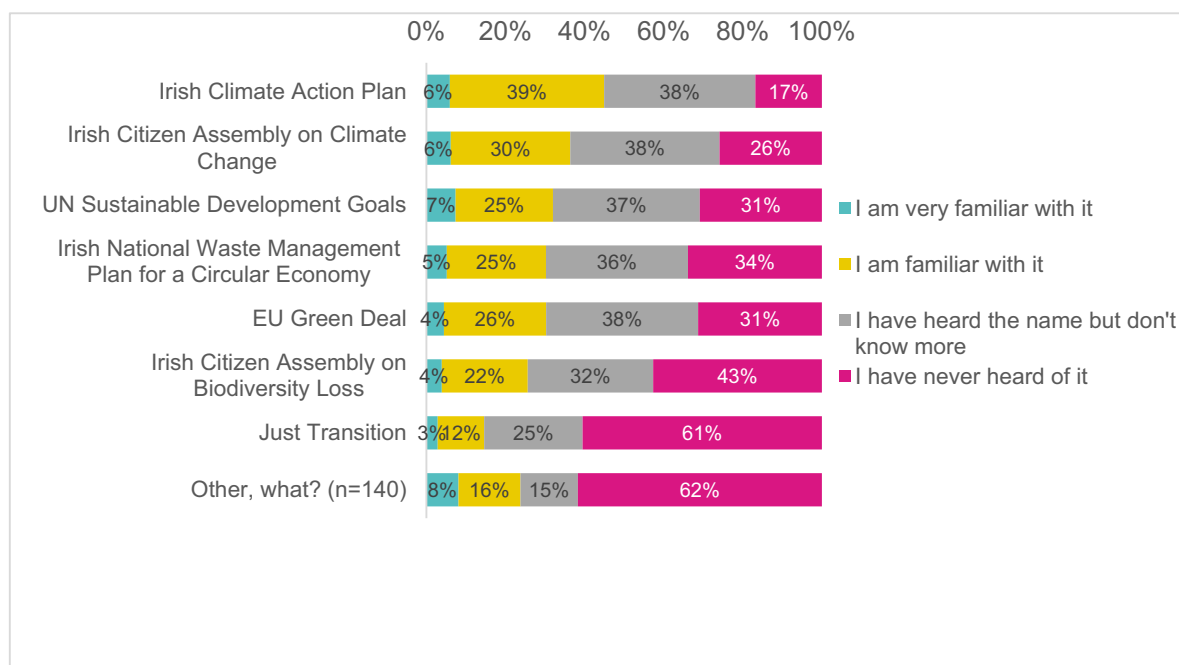


Figure 6. Participants' awareness of Irish, the European Union (EU), and global sustainability, frameworks, or action plans.

that while awareness is widespread, depth of understanding varies across demographics. These findings indicate that familiarity is concentrated around well-established solutions, while more nuanced or technical understanding may be lacking.

4.1.2. Engagement and challenges

Younger age respondents, particularly those aged 18–34, reported higher level of participation in collective climate action compared to older groups. This suggests that younger individuals may be more engaged in active forms of participation, even if they report lower confidence in formal discussion. Despite this engagement, several key barriers to climate action were identified. Financial constraints (39%) emerged as the most significant limitation, followed by perceptions that individual actions are insignificant (34%). A lack of confidence in knowledge and skills (23%) and uncertainty about where to begin (21%) further highlight structural and informal barriers. These findings suggest that motivation alone is insufficient to drive action; rather, practical, financial, and cognitive barriers play a critical role in limiting engagement.

4.2. Skills in transitioning in the home (carbon footprints, transport, energy use, products and waste)

Concern about carbon footprints was reported by 59% of respondents, with slightly higher concern among younger and older age groups (18–29, 30–39) and (70–74). However, engagement in carbon footprint monitoring was relatively limited, although younger respondents showed greater participation. A notable finding is that over half of respondents expressed interest in calculating their carbon footprint but did not know how to proceed. This indicates a clear gap between interest and capability, suggesting that individuals are motivated but lack the practical tools or knowledge to act. This reinforces the broader pattern of high awareness but limited actionable skills.

4.3. Green technology

As presented in Figure 8, familiarity with widely used green technologies, such as LED lighting and smart metres, was high, indicating strong adoption of accessible and cost-effective solutions. However, awareness

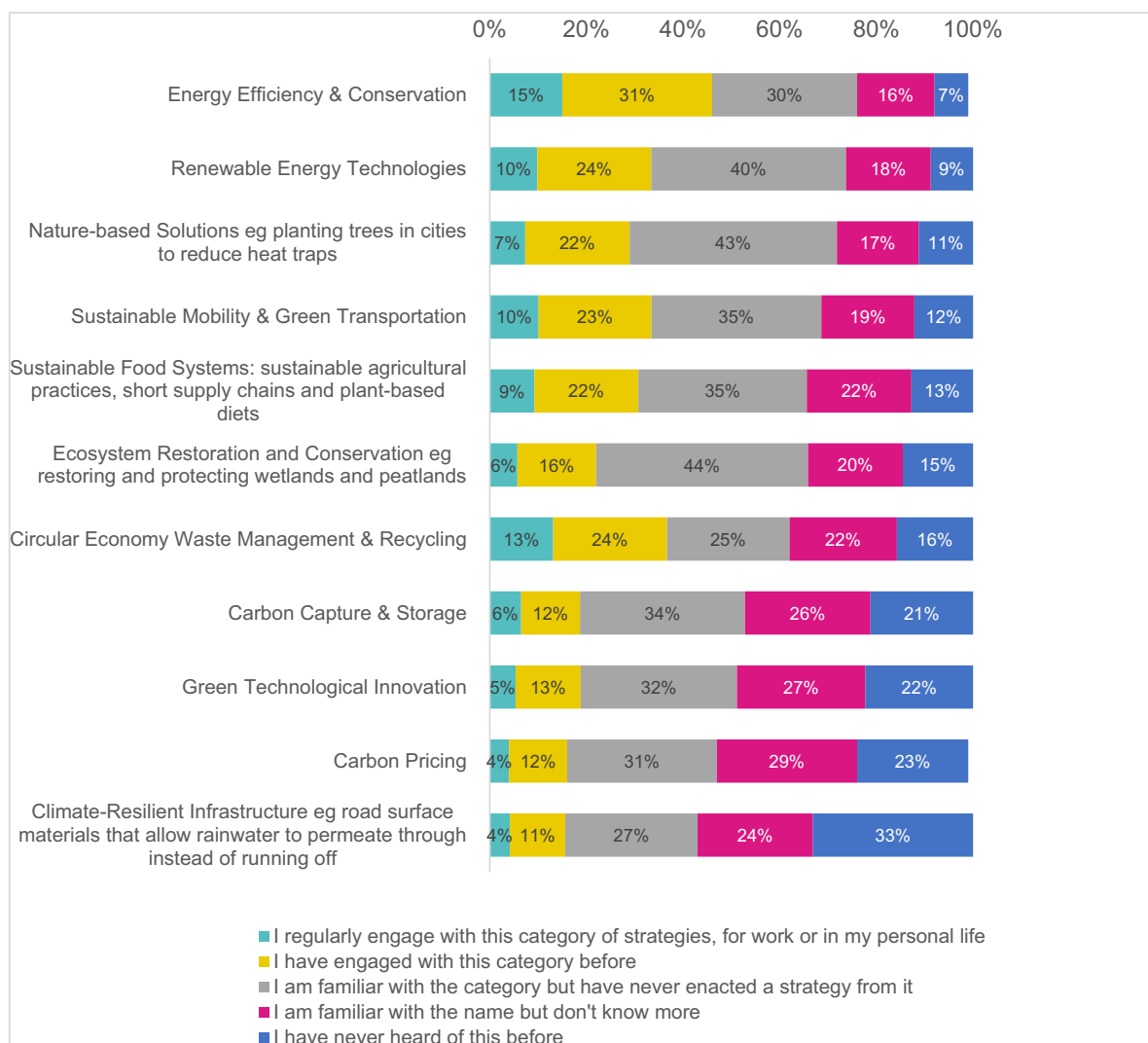


Figure 7. Participants' familiarity with adaptation and mitigation measures.

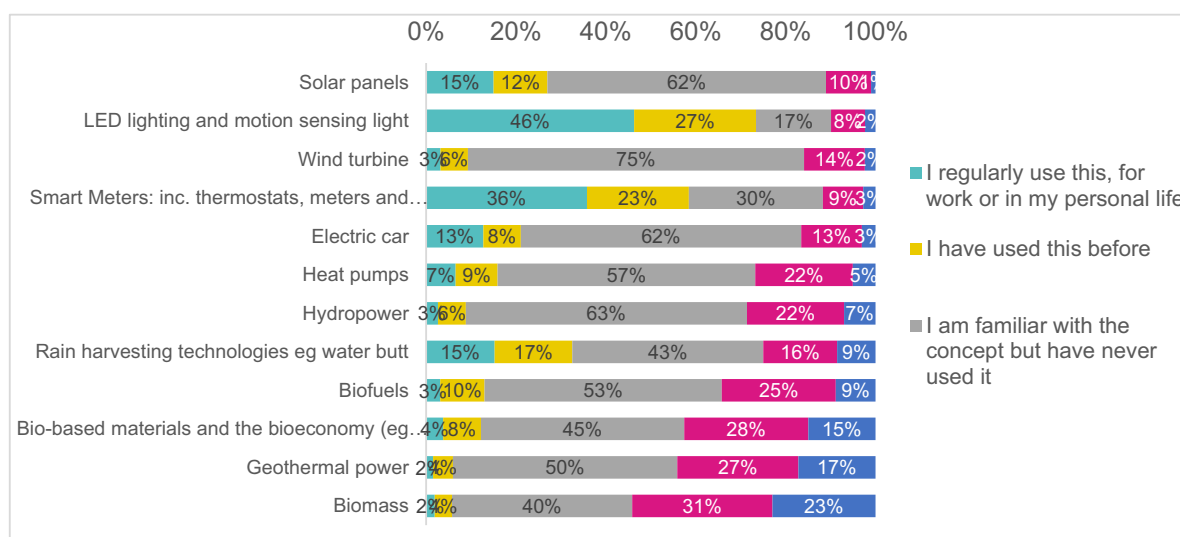


Figure 8. Respondents' awareness of green technology.

of less visible or more technical innovation, such as biobased materials and geothermal energy was significantly lower. This implies that public engagement with green technology is largely shaped by visibility, accessibility, and everyday relevance. Technologies integrated into household practices are more readily adopted, while more complex or less accessible innovations remain outside mainstream.

4.4. Planning and reporting

Engagement in sustainability planning was relatively low, particularly at community and organisational levels. As presented in Figure 9, while younger respondents showed slightly higher involvement, overall participation in structured planning activities remained limited. Awareness of sustainability reporting frameworks such as CSR, ESG, and CSRD was moderate, but actual use was minimal. This shows a gap between recognition and application, suggesting that these frameworks are perceived as distant or irrelevant to everyday practice. The findings highlight a disconnect between formal sustainability tools and public engagement.

4.5. Policy and incentives

Figure 10 presents awareness of green finance policy and incentives. Awareness of green finance policies and incentives was generally low, with only a small proportion of respondents considering themselves well informed. Many reported partial awareness, but in-depth understanding was lacking. Access to government supports was also limited, particularly among women, suggesting potential inequalities in access to information or resources. Although younger respondents showed slightly higher engagement, overall

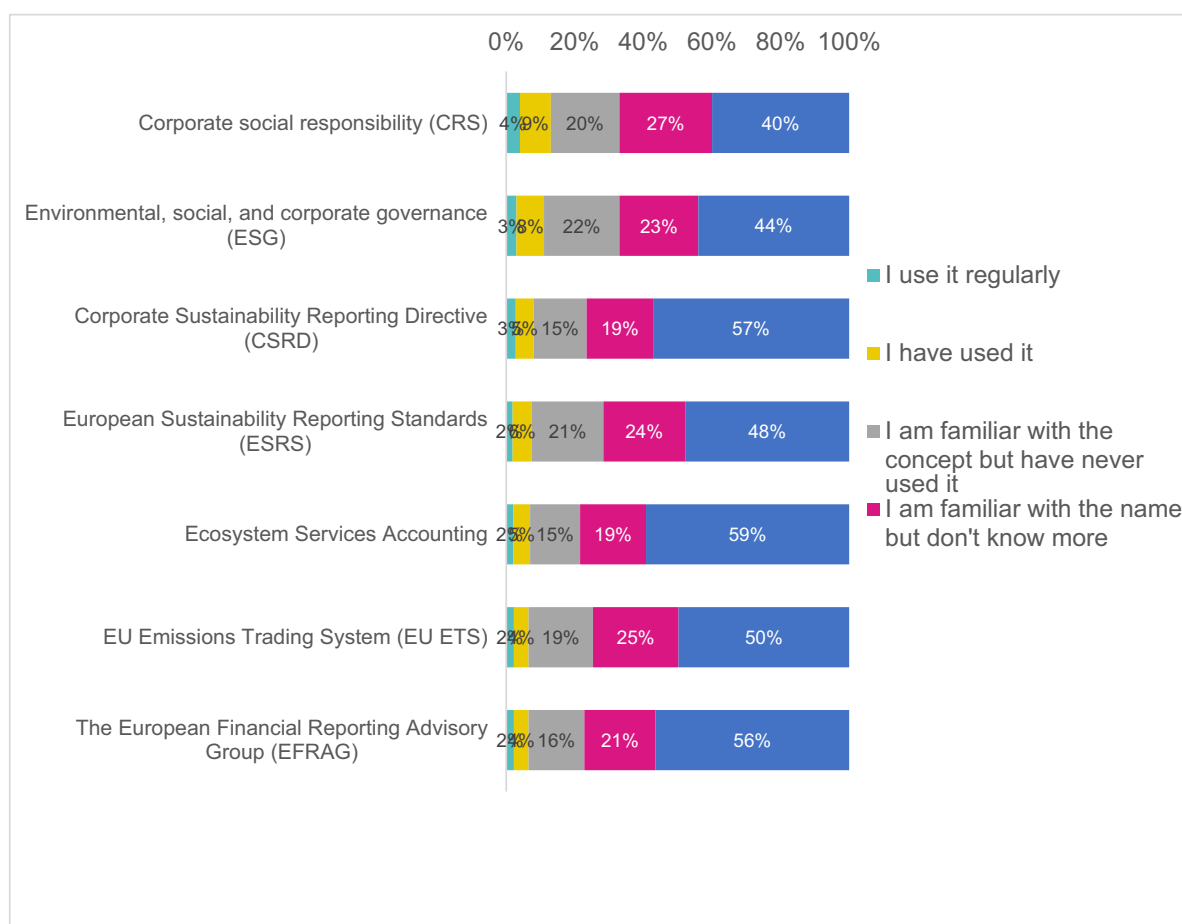


Figure 9. Participants' familiarity with sustainability reporting approaches.

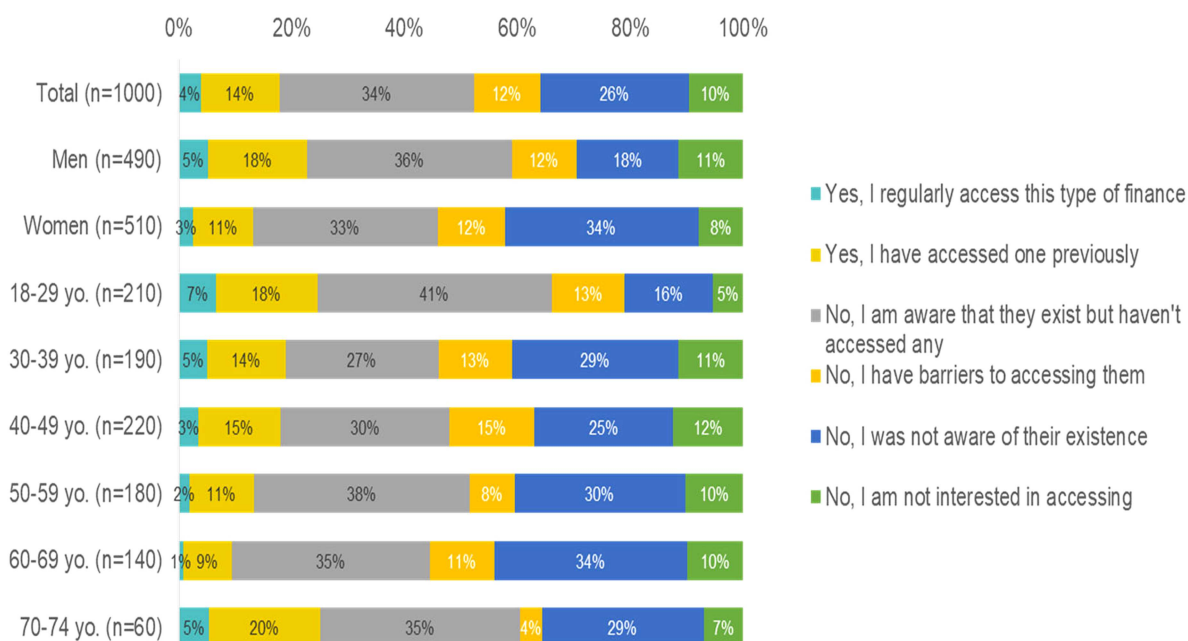


Figure 10. Gender and age differences in awareness of and access to government support.

uptake remain low. These findings indicate that policy mechanisms are not effectively reaching or engaging the public, limiting their potential impact.

4.6. Skills in biodiversity and food (grow your own, protecting local biodiversity and ecosystems, supporting local growers)

Concern about biodiversity loss was high (74%), yet knowledge and expertise in this area were limited. Only a small proportion of respondents reported expertise, indicating a significant knowledge gap despite strong concern. Participants were most familiar with practical, everyday activities such as growing plants and food, but engagement in broader biodiversity supporting practices was limited. Barriers such as lack of space, financial constraints, and low confidence were frequently reported. These findings suggest that while interest exists, structural and knowledge-based barriers constrain meaningful engagement.

4.7. Skills in the circular economy (assessing scientific evidence, designing local projects, communicating climate action)

While many had heard of the circular economy, most knew only a little or were entirely unfamiliar with it. Women were more familiar (30%) than men were (21%), and approximately 10% across all education levels reported a strong understanding of the concept. Notably, those with only a Leaving Certificate were less familiar with the circular economy (35%) than those with a postgraduate degree (21%). The top five elements of a circular economy that resonate with the participants are reducing waste and maximising reuse and recycling (50%), reducing pollution (32%), composting and “giving back to nature” (31%), supporting long-lasting products (31%), and promoting sustainable behaviours such as sharing, buying second-hand, and learning to repair (29%). The primary factors driving purchasing decisions included price (77%), quality and durability (61%), trends (24%), support for local sourcing (23%), and value through promotions (20%).

As part of the circular economy, a sharing economy promotes resource efficiency by encouraging the collective use of products and services. The sharing behaviours or platforms, as presented in Figure 11, show that the most common sharing behaviour involved exchanging second-hand items within personal networks, with 72% indicating participation at least once this year, especially among women, 64% of whom



Figure 11. Participant use of sharing behaviours and platforms.

regularly share in this way, compared with 42% of men. Other frequently reported behaviours included borrowing or lending items with family, friends, and community members (64%), with higher participation among women (68%) than men (59%) and the 18–24 age group (39%). Additionally, 52% hire or rent products from organisations instead of purchasing, and 37% have used an accommodation-sharing platform such as Airbnb or CouchSurfing at least once in the past year. While such platforms were included as examples of sharing economy practices, their sustainability impacts are context-dependent and may not always result in reduced environmental footprints. A notable portion (8% to 25%) were either unaware of or uninterested in accessing sharing platforms. Participation in local sharing services, such as lift-sharing, food-sharing, or swap events, was popular among younger respondents: 45% of the 18–29 age group engaged in these services at least once this year, whereas 25% did. Similarly, 36% of the 18–29 group and 30% of the 30–39 group used transport-sharing platforms (e.g. BlaBlaCar, GoCar, or bike sharing) within the past year, as opposed to only 21% of the overall population.

Figure 12 presented the results, highlighting some notable trends in sustainable behaviours. While 26% would recycle leftover paint, 15% would upcycle it, with a particularly high percentage (25%) of 18–29-year-olds opting to upcycle. Conversely, 27% would dispose of paint as waste, with this choice peaking in the 60–69 age group (35%). Food waste management shows promising habits, as nearly two-thirds (63%) of individuals regularly compost, despite nearly a quarter of food still being disposed of as waste. Although 12% admitted to discarding plastic packaging, a substantial 82% recycle it, with women (86%) and respondents aged 70–74 (88%) most likely to recycle it. Approximately 54% would use a repair service

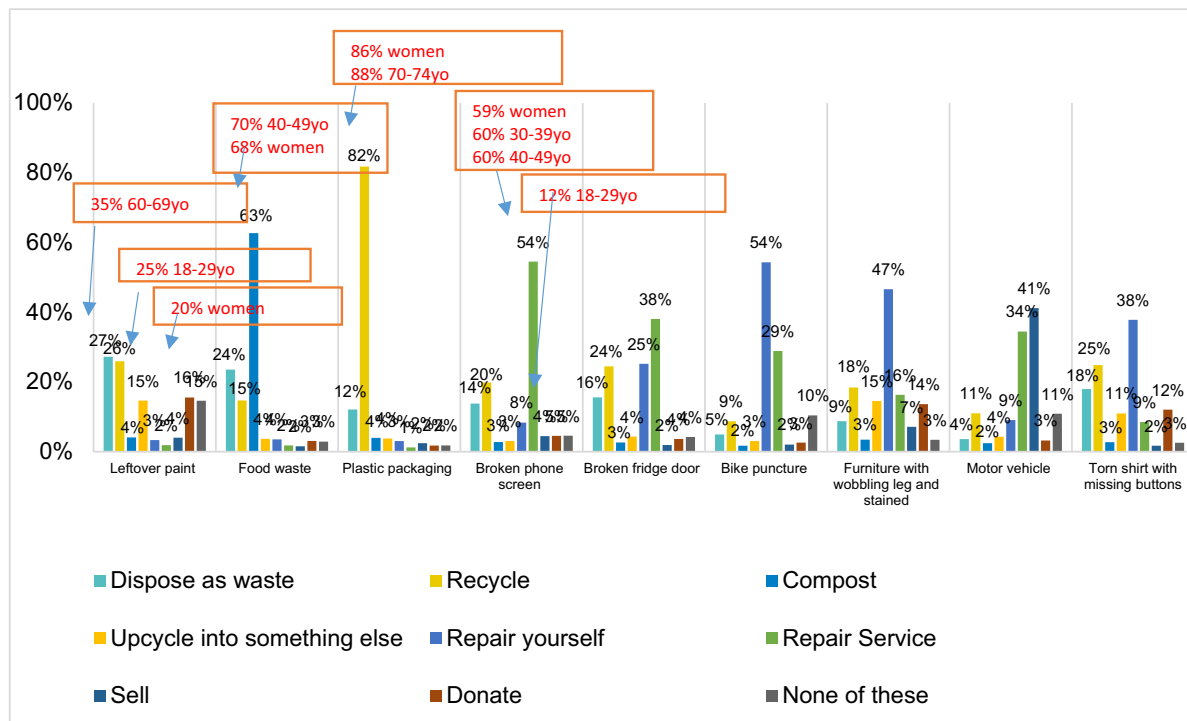


Figure 12. Participants' likely actions for damaged or unusable household items.

to fix broken appliances, and 8% would repair broken items themselves, although 14% would dispose of a broken mobile phone screen. For a broken refrigerator door, 16% would dispose of it, 38% would opt for professional repair, and 25% would attempt self-repair.

In terms of transportation, 41% would sell a damaged motor vehicle, whereas 34% would have it repaired; only 8% would attempt self-repair. In contrast, bicycle repairs are more commonly practiced by owners themselves, with 54% choosing to repair a puncture either personally or via a repair service, while 9% would recycle, and only 5% would discard a damaged bicycle. For furniture, 47% would repair a stained or slightly damaged piece, 18% would recycle, 15% would upcycle, and 14% would donate it. Similarly, with a torn shirt missing a button, 38% would repair it themselves, while 12% would donate, 11% would upcycle, and 25% would recycle it.

4.8. Preparing for the future

A strong willingness to act was evident, with 73% expressing a desire to do more in response to climate and biodiversity challenges (Figure 13). However, fewer than half felt equipped with the necessary knowledge and skills, highlighting a significant capacity gap. Differences across demographics suggest that younger individuals and those with higher education levels are more likely to feel capable of acting. However, even within these groups, confidence remains limited. This reinforces the broader pattern of high motivation but insufficient preparedness. Preferences for skills development emphasised accessible and practical learning formats, including free online courses, community-based learning, and hands-on workshops. Interest was strongest in applied areas such as waste management, repair, and biodiversity, suggesting a focus on tangible, everyday actions. Notably, no single skill area dominated, indicating diverse and distributed learning needs. This suggests that effective interventions should be flexible, practical, and tailored to different contexts, rather than relying on a one-size-all approach.

5. Discussions

The findings highlight important patterns in participants' engagement with climate action, sustainability awareness, and skills development, revealing a consistent gap between high levels of concern and relatively

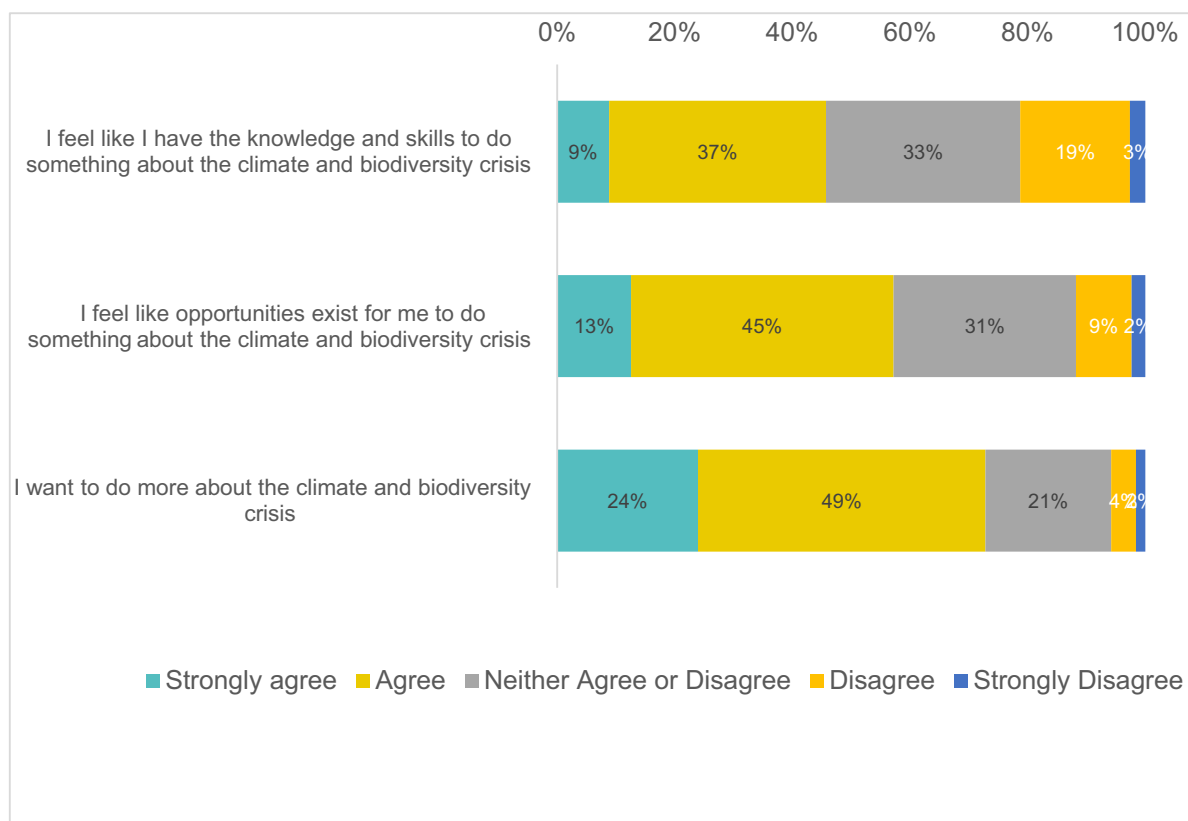


Figure 13. Participants' perceptions of their knowledge, opportunities, and willingness to address the climate and biodiversity crisis.

low levels of actionable capability. Figure 14 presents the key findings on green life skills as an accelerator for the transition to net zero. While the study does not explicitly differentiate between transition and transformation, the results suggest that current skill levels and preferences are more closely aligned with incremental transition processes than systemic transformation. This distinction can be interpreted through socio-technical transition frameworks, which differentiate between gradual behavioural adjustments and deeper structural change (Sorrell, 2018). The dominance of practical, household-level skills indicates engagement at the level of niche practices, rather than participation in broader systemic reconfiguration.

The gap between awareness and action is consistent with the well-established value-action gap in environmental behaviour literature (Portus et al., 2024). Although a large proportion of respondents expressed concern about climate change, fewer felt equipped with the knowledge and skills necessary to act. This suggests that concern alone is insufficient to drive behaviour change and must be supported by practical competences, enabling infrastructures, and social support systems. Findings further reinforce behavioural theories such as the Theory of Planned Behaviour, where perceived behavioural control reflected here in low confidence and lack of know-how acts as a critical limiting factor (Conner, 2001; Norman & Conner, 2017).

Age-related patterns reveal an interesting dynamic. Younger respondents demonstrated higher levels of engagement in climate action but lower confidence in formal discussions and institutional engagement. This may reflect generational differences in forms of participation, where younger individuals favour informal, network-based or action-oriented engagement rather than traditional political channels (Brady et al., 2020). This suggests a need to reconfigure engagement structures to better align with these participation preferences. Findings show a relatively low awareness of key policy frameworks, including the concept of Just Transition. Given the prominence of these frameworks in policy discourse, this suggests a disconnect between policy-level narratives and public understanding. The implication is that policies are not only insufficiently communicated but may also lack translation into everyday relevance, limiting their

Key findings on green life skills as an accelerator for the transition to net zero



Figure 14. Key findings on green life skills as an accelerator for the transition to net zero.

uptake. Similarly, the findings on circular economy practices reveal a narrow interpretation of sustainability, primarily centred on recycling and waste reduction (Greene et al., 2024). While these are important, they represent only a small component of systemic circularity. This reflects what has been described in the literature as the “recycling bias”, where public understanding of sustainability is confined to visible and familiar actions, rather than systemic redesign. This suggests that current communication strategies may inadvertently reinforce limited conceptualisations of sustainability.

The persistence of financial constraints as a dominant barrier aligns with findings by (Liu & Xu, 2024; Vargas-Santander et al., 2025), highlighting the structural nature of sustainability transitions. However, the coexistence of financial barriers with perceptions of individual inefficacy points to a deeper issue related to agency and empowerment. This suggests that individuals lack resources and a sense of meaningful impact, reinforcing the importance of collective action frameworks and community-based approaches. From a policy perspective, the findings suggest that current strategies may be overly focused on awareness-raising, without sufficiently addressing the capability and opportunity dimensions required for behaviour change. Drawing on Capability, Opportunity, Motivation and Behaviour model, while concern is relatively high, both skills and opportunity remain constrained. This indicates that effective policy interventions must move beyond information provision towards integrated approaches that combine education, financial support, and accessible infrastructures. Policy coherence and institutional alignment play a critical role in enabling behavioural change. Importantly, the findings highlight a potential misalignment between current skill development efforts and the requirements of a transformative transition. The emphasis on household-level skills, while valuable, may not be sufficient to support broader systemic change. This raises important questions about how green skills are conceptualised and delivered, and whether current approaches risk reinforcing incrementalism rather than enabling transformation.

5.1. Potential strategies to address the identified skill gaps

Addressing the identified gaps requires a shift from awareness-driven approaches to capability-building strategies. Community-based learning models, including local sustainability hubs and peer-to-peer

learning, can play a critical role in bridging the gap between knowledge and action by embedding learning within social contexts. Interventions should also prioritise accessibility and inclusivity, particularly in addressing gender and socio-economic disparities. This includes targeted outreach, financial supports, and flexible learning pathways such as micro-credentials, which can enable broader participation in green skills development. Furthermore, there is a need to translate abstract policy frameworks into practical, relatable actions, ensuring that concepts such as Just Transition and circular economy are grounded in everyday experiences. This may involve co-design approaches, where communities actively participate in shaping sustainability initiatives. Finally, aligning education systems with sustainability goals will be essential. Integrating climate literacy across all levels of education, alongside practical skill development, can help build the competencies required not only for behavioural change but also for participation in a low-carbon economy.

6. Conclusions

The findings from this study highlight the complexity of public engagement with climate change and sustainability in Ireland, revealing a persistent gap between high levels of concern and limited capacity for action. While individuals across demographic groups demonstrate awareness and willingness to engage, their ability to translate this into meaningful behaviour is constrained by lack of skills, confidence, and access to enabling resources. The findings show that climate concern is widespread, especially among women and more highly educated groups, while older individuals report greater confidence in their knowledge. In contrast, younger cohorts demonstrate higher levels of engagement in climate-related activities but lower confidence in formal or institutional contexts. This indicates that engagement is not uniform, but shaped by differing forms of knowledge, participation, and confidence across demographic groups. Although awareness of climate policies and sustainability concepts is relatively high, this knowledge is often superficial. Participants are generally more familiar with practical, everyday actions than with broader systemic frameworks, limiting their ability to engage with more complex dimensions of climate response. Similarly, while there is strong interest in developing sustainability related skills, most individuals report feeling underprepared to act efficiently. A key contribution to this study is the identification of a clear imbalance between transition-oriented skills, focused on individual and household-level behaviours and more complex competencies required for systemic transformation. This suggests that current patterns of engagement are more closely aligned with incremental change than with the broader structural shifts required to meet long-term climate goals. This study confirms the importance of tailoring sustainability strategies to the lived realities and capacities of diverse demographic groups. Interventions must go beyond awareness campaigns to include sustained, community-embedded support systems that empower individuals to develop the knowledge, skills, and confidence required for long-term behavioural change. Future climate action initiatives would benefit from integrating participatory, place-based approaches that address both emotional and practical dimensions of climate engagement, strengthening connections between individuals, their communities, and the ecosystems they inhabit. Strong policy responses should prioritise scalable, inclusive models of sustainability education and engagement supported by continuous investment. Without addressing these underlying constraints, there is a risk that public participation will remain limited to incremental actions, constraining progress toward more transformative climate outcomes.

Author contributions

CRedit: **Emmanuel Alepu Odey**: Conceptualization, Writing – review & editing; **David Williamson**: Conceptualization, Writing – original draft; **Zoe Rush**: Data curation, Formal analysis, Methodology; **Nicholas M. Holden**: Writing – review & editing; **Quentin Crowley**: Writing – review & editing; **Claire Downey**: Writing – review & editing; **Helena McMahon**: Funding acquisition, Project administration, Resources, Validation, Writing – original draft, Writing – review & editing.

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The authors report that there are no competing interests to declare.

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Data availability statement

The data that support the findings of this study are available from the corresponding author, [HM], upon reasonable request.

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