



# Creating a Sustainable Global Society

Recommendations for UMT
Prepared by the Theme 1 Steering Committee,
chaired by Triona McCormack and Tasman Crowe

October 2022



SUSTAINABLE
DEVELOPMENT
GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEATH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIP FOR THE GOALS

## Membership of the theme 1 steering committee

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## Preamble

UCD is at a critical point. It's time to decide what our ambition *really* is as a university. We recognise that sustainability isn't the only thing that UCD is doing and that becoming a leader in sustainability means uncomfortable organisational changes. It is important at this stage that we pause; look at the whole landscape of UCD, the organisation, its strategy and its values. It is only in this context that we can decide around where our sustainability north star should be.

> "Science, research and innovation at this point, this particular point, must give courage to politics; it must give hope to citizens; it must give inspiration to entrepreneurs; and it *must give* respite to the nature. We need to step up and step forward as a research and innovation community in this decisive decade."
>
> He proposed that perhaps the next peace process on the island could be making peace with nature and Ireland can become "the green heart of the Green Deal …. and demonstrate that better is possible next."
>
> *John Bell, Director, Healthy Planet , DG RTD EU Commission and UCD Alumnus*

Meeting the ambition of our strategy will require us all to move together as a whole community with leadership from the top, rather than just rely on good ideas and initiatives driven by committed individuals. It will require investment and it will require us to make difficult decisions as we wrestle with the transformation of our organisation from today's societal and economic norms to those that will be the norms of a new sustainable world.

The need for universities to step up to the plate "in this decisive decade" could not be more clearly articulated than by John Bell's words. Given our role in society, our size and our interdisciplinary expertise we have a responsibility to lead. It is time to put our strategies and values into practice and action.

## Context

**Creating a sustainable society is *the* major challenge of our time**.
The UN's Sustainable Development Goals (SDGs) set out an ambitious and necessary framework for a sustainable future for our people and planet. It is seven years since UCD alumnus David Donoghue co-negotiated the SDGs and with seven years to go before 2030, we are struggling globally, nationally and locally to build a fair, equitable society in a sustainably resourced world. The 17 Goals span environmental, economic, societal and governance dimensions and UCD embraces the full breadth of their ambition.

**International students are increasingly looking at a university's commitment to sustainability when making decisions about where to study.**
Making UCD an attractive place to study and work is central to our future growth, performance and profile. Our colleagues in UCD Global report that commitment to sustainability and evidence of such is an increasingly important criterion for international students in selecting an overseas university. UCD is reliant on the fee income from this group and needs to consider how we continue to attract good international students. The efforts we make here will equally apply to national students and staff. International rankings are an important indicator for incoming staff and students. Whilst UCD has dropped out of the top hundred in the Times Higher Impact Rankings it is the only university with Gold ranking for environmental impact in the very recent QS WUR. Capacity to understand and to coordinate the University with respect to sustainability is critical.

**The Climate Action Plan places obligations on us as a public sector organisation.**
As a public sector body UCD must, under the Climate Action Plan, put in place a Climate Action Roadmap by the end of 2022 and "nominate a member of the Management Board as the Climate and Sustainability Champion with responsibility for implementing and reporting on the mandate." Public bodies already report their energy usage through the Public Sector

Monitoring and Reporting Tool. While UCD's energy usage has decreased and we are close to achieving our 2030 target, we are still only mid-table in performance across the HEI sector. Reporting on this platform will likely be expanded in the future to include aspects like business travel and indirect emissions.

**Donors, funders and partners are making investments based on an organisation's environmental, social and governance (ESG) credentials and are engaging with third level institutions for their expertise in sustainability.**
The World Bank's introduction of Sustainable Development Bonds in 2018 signalled a change in approach to investing that is now becoming prevalent across the finance sector. Many of the development banks followed suit and hedge funds and corporate investors are all now engaging in ESG investing. Organisations are responding to these financial signals as well as pressure from activists, investors, customers and the public and are putting ESG at the heart of what they do. This is giving rise to a requirement for new skills and knowledge across all sectors. While the HE sector has not traditionally engaged with investment funds, there are indications that these funds might be willing to invest a small percentage in new knowledge and capacity building aligned with their ESG ambitions. If this is the case, they will look for sectoral leaders to invest in and UCD should be prepared to actively engage with them.

UCD is the largest third level institution in Ireland, with the largest campus and the greatest diversity of staff and students, giving us unique strength in depth. The intersection of teaching, research and the organisation provides fertile ground for new approaches and insights and could become one of UCD's greatest strengths. We are an outward looking university that can develop practical sustainability solutions that are adopted by industry and society. We are recognised for our expertise and influence in policy nationally and internationally. Working in partnership and engaging our full community of staff and students to work in this way can be a differentiator for UCD. **Given who we are, we have a responsibility to lead.** We recognise this responsibility and have set out a clear ambition in our Strategy 2020-24 below.

## Theme 1: Creating a Sustainable Global Society

### As a matter of urgency, humanity must learn to live sustainably without degrading its shared planet.

Food must be produced sustainably to feed a stable human population. Energy must be provided from renewable sources, and the processes of generating and storing that energy must not impact negatively on the environment. Material goods of all types must be made from recycled and/or renewable materials. There must be reduced levels of inequality within and between communities. These goals require significant development of technologies and infrastructure, and changes in human behaviours and institutions.

UCD has a long-standing commitment to sustainability. Members of the UCD community have been to the fore in shaping the UN Sustainable Development Goals. We have led in research areas such as the bioeconomy, agri- food and renewable energy and have developed education programmes in sustainable development and humanitarian assistance. **We will now build on this expertise to deliver a holistic response to the challenges of sustainability that spans and unifies our activities in this area.**

We will embed the principles of a sustainable society in our University community. Undertaking research which advances the 17 UN Sustainable Development Goals through generating, sharing and applying knowledge for maximum impact, we will **deliver interdisciplinary educational programmes** which support our students and graduates to contribute most effectively to the development of a sustainable society.

**New governance arrangements for sustainability will enable the University to develop, communicate, implement and adapt its ambitions to the challenges faced by the world. This will ensure that our campus demonstrates the principles of sustainability across policies and operations** in respect of estates, energy, technology, procurement, HR, governance and **partnership with our neighbours and wider community. The University will set ambitious targets and will report annually against these targets, becoming a 'living lab' for a sustainable community**.

### In 2022, UCD is not on track to reach the ambition set out in our strategy.

Not only are we not on a path that would see us realise some of the ambition set out in the strategy, we are falling behind our national competitors and wider society and are being perceived as such. The strategy is a good one, ambitious but achievable with organisational commitment, focus and investment. We have said what we want to do; now we must do it.

### There is significant energy and commitment among staff and students who want to create a more sustainable global society.

They want to be proud of UCD's role as a thought and action leader. They want our campuses and operations to be a resource to develop and test innovations for sustainability and that showcases and demonstrates our commitment to it.

In preparing this report, we consulted with staff and students, with external partners and with leaders in this area nationally and internationally (Appendix 1). Their broader recommendations were remarkably consistent and are contained in the recommendations that follow. Many of these can be achieved through existing structures, budgets and resources, all will require clear organisational commitment and some will require new budgets and organisational structures (Table 1).

Despite real concern that we need to do more to advance the sustainability agenda, there is also a clear sense that UCD is doing many things very well, particularly in terms of research, but also in aspects of teaching and, indeed, in operations, but that we are not conveying this message well, either to internal or external audiences. We also currently lack the resolve and capacity to stimulate or coordinate ambitious initiatives. In contrast to many of our competitor institutions, there is no strong sense of the university as a committed leader in sustainability. There were repeated calls to continue to foster and support bottom-up activity, but also to greatly improve the level of central leadership, strategy and visibility for sustainability at UCD.

The actions we take must support our ambitions around international leadership in this area and be a driver of increased profile and enhanced reputation for UCD.

## Table 1: Summary of recommendations

Items in square brackets [ ] denote linked recommendations.

| Area | | Recommendation | Delivered by | Timing | Estimated scale (€) |
|---|---|---|---|---|---|
| Governance & resourcing | 1.1 | Appoint a VP and establish a sustainability unit to develop a to develop and implement a road map for Sustainable UCD | President | 22/23 | 0.7M pa |
| | 1.2 | Review all current policies through the lens of sustainability & ID policy gaps. Build organisational capacity through training | All policy units | 22/23 | Existing resources |
| | 1.3 | Establish a sustainable procurement framework | Procurement | 23/24 | Ext. advice 10-50K |
| | 1.4 | Resource an investment fund and recurrent funding for sustainability initiatives [2.5; 3.1; 3.4] | Finance/ units | 23/24 | 100-500k pa |
| | 1.5 | Evaluate our partnerships through the lens of sustainability and develop guidelines for staff | President's Office / CEBAS | 22/23 | Existing resources |
| Campus & operations | 2.1 | Overarching: Sustainability is a central decision-making criterion for all investments [1.3; | President's Office | 22/23 | Existing resources |
| | 2.2 | Assess our capital programme against sustainability impacts [2.1] | CPG/ Estates | 22/23 | Existing resources |
| | 2.3 | Tell the story of sustainability in each building | VP Sust/ Estates | 23/24 | 0.5-1M |
| | 2.4 | Manage the biodiversity of our green and woodland assets to increase their positive environmental impact | VP Sust/ Estates | 23/24 | 100-500k pa |
| | 2.5 | Use the Estate to actively support teaching and research. Establish a process to support this | VP Sust/ RI/ T&L/ Est. | 23/24 | See 1.4 |
| | 2.6 | Implement a sustainable campus-wide waste management approach | Estates | 22/23 | 1M |
| | 2.7 | Increase our ambition around energy reduction and supply from renewables | Estates | 22/23 - ongoing | TBD |
| Research & innovation | 3.1 | Launch an internal strategic investment fund to seed innovative new sustainability research | UCD Research | 22/23 | Existing (S&MI) |
| | 3.2 | Evaluate the gap in university investment and supports for 'sustainable social systems' research | UCD Research | 23/24 | Existing resources |
| | 3.3 | Develop a sustainability policy advice mechanism [4.6] | UCD Research / Institutes | 22/23 | 1.5 FTE (ext. funding?) |
| | 3.4 | Encourage innovation and use the campus to test solutions [2.5] | VP Sust/ Nova & IA | 23/24 | See 1.4 |

| Area | | Recommendation | Delivered by | Timing | Estimated scale (€) |
|---|---|---|---|---|---|
| Education & student experience | 4.1 | Every student in UCD should have an experience of sustainability which emphasises the key principle that sustainability challenges require an interdisciplinary approach | Registry / UPB | 23/24 | Existing resources |
| | 4.2 | Produce and maintain an inventory of degrees and modules aligned with SDGs | Registry | 22/23 | Existing resources |
| | 4.3 | Maximise diversity of the student body … particularly from developing nations | UWP / UCD Global | Ongoing | 100-500k for scholarships |
| | 4.4 | Leverage UCD's campuses and educational partnerships around the world to yield insights into the diversity of perspectives on sustainability challenges and solutions | UCD Global | Ongoing | <100k for initiatives |
| | 4.5 | Engage with current students to develop a framework for the promotion of sustainability in the student experience | Registry | 22/23 - ongoing | Existing resources |
| | 4.6 | Establish a framework for delivery of high impact, professional short courses and micro-credentials | Registry / UPB | 22/23 | New hires in some units |
| | 4.7 | Engage with alumni and involve them in taught courses | Alumni Office + VP Sust | 22/23 - ongoing | Existing resources |
| | 4.8 | Engage with partner organisations and international networks to develop and influence best practice | UCD Global | 22/23 – ongoing | Existing resources |
| | 4.9 | Integrate sustainability messaging into student marketing and recruitment materials | Student recruitment | 22/23 – ongoing | Existing resources |
| Communications | 5.1 | Develop a sustainability website & identity | Comms & WG | 22 | Existing resources |
| | 5.2 | Launch 'The Community Effect' campaign to engage staff & students [2.5; 3.4] | VP Sust | 23 | See 1.4 |
| | 5.3 | Develop key messages to promote UCD's expertise across all external communications and marketing | Comms/ R, T&L | 22 | Existing resources |
| | 5.4 | Convene and host Citizens' Assemblies | VP Sust | 23 | see 1.1 |

## 1 Governance and resourcing

The gap between UCD's ambition, as set out in the strategy, and its practical implementation at the heart of our organisation is most clearly visible in our organisation and governance. Over 90% of UCD's strategy and planning documents assessed in a recent review contained references to sustainability. By contrast, only 5% of governance documents did[1].

This is not so surprising when we consider that UCD lacks centralised organisational focus, governance and management of our operations and infrastructure from a sustainability perspective. Our national competitors in the sector and our partners externally have appointed VPs/ Directors of Sustainability as senior decision makers in their organisations and are resourcing teams under these leadership roles. UCD's recent drop in the THE Impact Rankings, students and staff frustrated by perceived inaction and the lack of visibility of sustainability internally and externally all speak to the lack of governance and resource dedicated to this area.

We need to firmly underpin the actions we will take by aligning our policy, decision-making structures and organisational resourcing to our ambitions under this plan.

UCD and each publicly funded HEI is considered a 'public sector body' under the Climate Action Plan, which will include a portion of the sectoral 'budget' to achieve overall CO2 reduction of 51% (DECC, 2022a), and each will be required to comply with the following requirements:

- Develop a Climate Action Roadmap,
- Implement an organisational training and workshop programme,
- Achieve compliance with the public sector-wide Sustainable Mobility Policy
- Surpass requirements of EU Clean Vehicle Directive by purchasing only zero-emission vehicles (where possible) from 2023.
- Achieve ISO50001 or equivalent environmental standard
- Plan for 20% home / remote working as mandatory
- Establish 'Green Teams' to internally drive sustainability
- Assign a member of senior management as a 'Climate and Sustainability Champion'
- Provide mandatory reporting and target-based metrics on fuel used by owned and leased capital assets, electricity used by own and leased capital, included in annual report of organisation
- Provide mandatory corporate travel reporting; optional reporting includes Scope 3 emissions, all direct emissions, and all other non-energy emissions
- Comply with transparency measures and cut-offs with regards to fuel use, efficiency of buildings, etc.

UCD is aware of these obligations and is already on track to deliver or has delivered on some of the requirements, but these actions are fragmented and somewhat invisible.

**Recommendation 1.1: Appoint a VP for Sustainability and establish a Sustainability Unit**

The appointment of a VP for Sustainability is a clear signal internally and externally of UCD's commitment to be a leader in this area. The VP will:

[1] Towards a 'Generous' University: UCD's pathways to Embodiment of Sustainability, MSc Thesis, Mary Gallagher Cooke

i. Chair/support a new UMT Sustainability Group drawing representation from across the professional and academic experience, expertise and commitment across the University and linking to the Thematic Group/Forum on Sustainability;
ii. Develop the roadmap for a Sustainable UCD and source funding to deliver on it;
iii. Report regularly to UMT and GA and externally e.g., in relation to Climate Action Plan and THE Impact rankings on UCD's progress towards sustainability;
iv. Help identify and develop strategic priorities in research and education;
v. Engage with external partners for collaboration and impact;
vi. Communicate UCD's story, clearly, honestly and openly, building capacity for mutual learning with other organisations.

The appointment of a VP for Sustainability and team would provide a visible point of contact and focus as well as clear leadership in this area, helping to mainstream sustainability and to move it firmly to the centre of the organisation as a cross-cutting priority.

The VP Sustainability will engage with the research, teaching student and professional communities, including Estates, to explore ideas around sustainability in all its facets and to engage with the Registrar, VPRII, VP Global and their UMT sub committees on establishing new initiatives.

**Recommendation 1.2: Review and amend all current policies through the lens of our sustainability ambitions and identify specific policy gaps. Support policy implementation through organisational capacity building and culture change**
We currently have an aspiration-to-operation gap in sustainability, so clearly illustrated by the finding that only 5% of governance documents mention it directly. We must now start to close this gap in existing policies and identify areas where no policy or university guidelines currently exist.

There are a number of immediate priority areas that we must address. for example, UCD's currently travel policy makes no mention of sustainability, nor does it provide guidance on when not to travel. Universities internationally have used the development of travel policies as a strong signal internally of their commitment to sustainability and have put in place institutional carbon budgets for air travel, implemented "flying less" policies and encouraged a low carbon work culture. As it is likely that we will need to assess secondary emissions in the future in the public sector, this is an area we must address.


Meetings and events are a high visibility lens through which our UCD community and external partners will assess our sustainable and health practices. Despite the sheer number of meetings and conferences in UCD each day, there are no guidelines in place on how to conduct a sustainable event.

Embedding sustainability throughout our policies is an important starting point for UCD, but translating from strategy to policy and then to practice will require behavioural change throughout the organisation. The successful approach to embedding EDI by incorporating it in role profiles, staff training and awareness raising provide a good model for the organisation to follow.

**Recommendation 1.3: Establish a sustainable procurement framework that seeks to build integrity around sustainability throughout our supply chains**

Developing a sustainable procurement policy will be an important first step in delivering on this recommendation. Green Public Procurement is a key element of the All of Government plan for Climate Action. UCD spends in excess of €130M annually, orienting this spend to more sustainable options will decrease UCD's carbon footprint, but is also significant enough to drive changes in the marketplace that will lead to greater availability of sustainable products and services and promote improvements in social justice and equity in supply chains.

UCD's strategy for digital transformation and the requirement for online availability of teaching resources and research datasets will result in increased cloud storage requirements. In this context it is critical that we ensure sustainability to a central guiding principle in our enterprise and IT architectures.

**Recommendation 1.4: Resource an investment fund and ringfenced recurrent funding that will ensure UCD can deliver on its sustainability ambitions**

Financial structures and models are drivers of behaviours and of change in our organisation. We must ensure that our financial structures support our aspirations around sustainability and further that we recognise organisational investment in sustainability at all levels. In this context and given the suite of recommendations in this report that will require investment, we must assess how unit reserves and central funds can be used to support delivery of UCD's sustainability strategy.

**Recommendation 1.5: Evaluate our partnerships through the lens of sustainability and develop organisational policy and guidance on selecting partners that share our ambitions and values.**

Organisations are suffering reputational damage from association with companies that are not aligned with their values and ambitions around sustainability. The spate of director resignations, academic outcry and school teacher boycotts of the Science Museum in London over the last year is but one example of this.


UCD has an enormous network of partners and these operate at all levels of the organisation down to individual faculty. Currently, UCD doesn't have a CRM system to give a single view of its partnerships even at the organisational level. This places an even greater value on the development of organisational policy, or guidelines to help staff and faculty assess partners.

In addition, the university should ensure its investments are again aligned with its ambitions and values around creating a sustainable society through for example, signing up to the UN-supported Principles of Responsible Investment. Signatories to the PRI commit to only invest positively across a range of sustainability criteria including ethical and governance considerations.

## 2 Campus and operations

UCD is an incredible resource. If we were a town, the scale of our population would make us the 9th largest town or city in Ireland! We have a campus development plan that will see us investing over €1Bn in our infrastructure over the next 10 years and we spend over €600M annually, €136M of this on operating costs.

UCD Green Campus initiative has been the integrating banner for improvements by Estates in biodiversity; waste reduction and recycling; water conservation, energy efficiency and sustainable commuting. Some of the improvements delivered in these areas are not visible to staff and students, or are not consistently applied as an organisational norm, but are applied opportunistically where the team can get traction.

The campus and the actions we take as an organisation were the source of most feedback from students, staff and partners. The campus is an enormous resource and our staff and students are frustrated by the gap between what it could be and what it is. Issues like recycling, food waste and transport arose again and again as signals that the organisation isn't committed to sustainability and are obvious to anyone on or visiting the campus. The absence of recycling bins for example, is the message many visitors take away, rather than the many innovations we are contributing to through our research. In addition, we are not yet using our campus as a 'living lab'. The potential for research, demonstration and on the ground learning for students is immense and would be a real differentiator for UCD.

**Overarching Recommendation 2.1: Sustainability, through reduced use of resources and assessment of GHG direct and embedded impacts, is a central decision-making criterion for all investment decisions and actions.**

This overarching recommendation could also be termed a guiding principle. Much work is needed to assess the best assessment framework to suit UCD's needs.

**Recommendation 2.2: Assess our capital programme against sustainability impacts of construction and ongoing operation**

UCD's campus is a source of great pride for faculty, staff and students. Its continued development speaks to a dynamic institution that takes pride in its history while maintaining a future focus. Our buildings need to reflect who we are as an organisation and demonstrate the art of the possible now. The European Bauhaus initiative calls on us to imagine and build places that are enriching, sustainable and inclusive. Our campus should be place that inspires and supports others on their journey to sustainability. We are making and are planning on very significant investments in our capital programme and should pause where at all possible to assess our programme against sustainability impacts of construction and ongoing operation.

The Estates team have already made significant progress in areas of energy and water management, leading to ISO 50001 certification in these areas. New buildings are being designed to near zero energy building (NZEB) standard and we have exemplars of passive house and BREEAM excellent standard on our campus.


Passive reaches new heights at UCD student halls

The winner of the sustainability award at the 2011 Irish Architecture awards, Roebuck Castle student residence at UCD's Belfield campus is also the biggest certified passive house project built to date in Ireland and the UK.

*Figure 1: Headline from passhouseplus.ie (2012)*

The building design principles set out in the current campus development plan say that we will "strive to become an exemplar in the field of sustainable development". We must assess our current plans against this aspiration looking at embedded carbon, and building experimental

and innovative techniques into some campus buildings, leveraging the significant expertise of our faculty to help us.

**Recommendation 2.3: Tell the story of sustainability in each building**

Our buildings are much more than 'bricks and mortar', they are a visible sign of what we care about, prioritise and invest in. They tell the story of UCD - its history, ambition and values. Our campus should speak for itself, presenting its own sustainability story. Many of our colleagues don't realise that their building has solar PV on the roof, harvests rainwater, or actively manages energy, waste and water consumption. We need to tell this story, good and not so good, for each building and across all of these dimensions. If there are future plans for retrofitting to enhance sustainability we should make that clear too. We should say what the organisation has committed to doing and what the people in that building can do as part of that organisational commitment.

Building Metrics

| | |
|---|---|
| Gross floor area | 28,210m$^2$ |
| Laboratory space (m2) | 4,079m$^2$ |
| Classroom Facilities | 3,213m$^2$ |
| Assembly and Exhibition Facilities | 861m$^2$ |

Environmental Impact

| | |
|---|---|
| Electricity consumption (kWh/m2) | 160 kWh/m2/annum |
| Predicted fossil fuel consumption - kWh/m2 | 120 kWh/m2/annum |
| Predicted renewable energy generation | 10,000kWh/annum |
| Predicted water use - m3/person/year | 4.14 m3/person/year |
| Predicated quantity of rain water harvesting | 300,000 litres per annum |
| Annual predicted CO2 savings from CHP | 514 Tonnes per annum |
| % predicted water use to be provided by rainwater or greywater | 20% |

*Figure 3: O'Brien Centre for Science predicted environmental impact*

**Recommendation 2.4: Actively manage the biodiversity of our green and woodland assets to increase their positive environmental impact**

Our parkland campus and farm at Lyons are an enormous resource to demonstrate how active management of green areas can make a positive contribution to environmental and human wellbeing. Almost 70% of UCD's estate is green or woodland. Wild meadows, composting of green waste and limited pesticide use now operate campus-wide. Initiatives such as the pollinator plan, biodiversity mapping and tree planting all contribute to a positive environment for us, our neighbours and the environment. We must use the expertise on campus to advance the management of our green spaces actively tracking the impact of interventions, using for example, natural capital accounting. In doing so, we can identify ambitious targets for carbon capture and biodiversity.

**Recommendation 2.5: Establish the principle that we will use the Estate to actively support teaching and research, providing opportunities for our students and staff to experiment. Put in place the process and resources to enable this**

We are not suggesting here, that staff and students have limitless access to the Estate, but that actively supporting our teaching and research is a clear goal of the UCD Estate. We recommend that a point of contact be established and evaluation group set up to review and approve proposals for sustainability teaching and research on campus. Possible suggested strands could be:

- Projects under €2K – trial and error projects seeking small funding amounts
- Projects under €10K seeking approval and funding
- Teaching and research proposals requiring access to the Estate, Estate data, and /or resource exceeding €10K

This framework should be supported by an online system (it may be possible to repurpose the existing seed funding system) with workflow that enables input or approval by a number of different support units. Ultimately, proposals would be signed off by the VP for Sustainability. Linking this to other funding strands envisaged under this plan, this strand would be 'UCD Sustainability Awards - Demonstrating a Sustainable Future'.

**Recommendation 2.6: Develop and implement a sustainable campus-wide waste management approach**

Many buildings still don't have facilities to separate waste and there is little messaging on what staff and students should do. As a community we need to reduce the waste per person and when we do produce waste to increase the percentage that is recyclable. Work is underway as part of the Green Campus initiative and in 2022, we have a single waste contractor allowing us to track and log all the waste on the Belfield campus. This will also allow us to tell the story of the end destination for UCD's waste.


As an immediate priority we should implement the 'binless office' and segregation of waste at a building, residence, communal bins and licensee level expanding the current pilot study to all campus areas in Belfield and Blackrock. We should fund and extend the 'My Green Lab' initiative currently running in pilot at a number of locations across campus.

**Recommendation 2.7: Increase our ambition around energy reduction and supply from renewables**

UCD Strategic Campus Development Plan 2016-21-26:

Reduce Greenhouse Gas Emissions by 51% by 2030 from a baseline of 2016-2018.
Increase the improvement in energy efficiency in the public sector from the 33% target in 2020 to 50% by 2030.

Put in place a Climate Action Roadmap by the end of 2022.

UCD commits to achieving these targets and intends to demonstrate best practice in carbon-management, to become a 'living lab' and to visibly demonstrate UCD's commitment through the design, operation and renewal of our buildings and campus infrastructure.

We have made significant advances in our energy practices already, installing 470kWp of solar PV across campus and assessing the opportunity for geothermal sources. UCD is on target to achieve the 51% reduction by 2030 mandated by the Climate Action Plan and aspires to be a net zero carbon campus by 2050. Many universities internationally have set significantly more ambitious timeframes to achieve net zero (Waseda – 2032; MIT – 2026; Edinburgh – 2040). Could we have the same aspiration, but seek to achieve it by 2040? We will need to assess the viability and investment required to reach this goal.

## 3 Research, innovation and impact

In research, we have built a strong profile in environment, energy, agri-food and other areas. The Institutes create the environment for interdisciplinary research that is so vital to addressing the challenges we now face. The social sciences and the humanities offer critical insights on cultures, behaviours, and policy actions so important to framing how we will create a sustainable society. It is essential that we advance mechanisms to facilitate truly interdisciplinary working in partnership with other actors and make this a distinctive strength for UCD.

**Recommendation 3.1: Launch an internal strategic investment fund to seed innovative new sustainability research and from this base leverage external investment**
UCD Research has already aligned the work of the research partners with each theme and developed a campaign-based model for new research initiatives. Each campaign is interdisciplinary and emerges from a bottom-up process of engagement. We have agreed that this process will be integrated into the thematic governance model. A detailed landscape research assessment has been completed for this theme and work is underway to identify the most promising campaign areas. A support package including access to research partner support, buy out of the lead academic's time, non-pay budget for meetings and communications and project officer support will be available to each campaign depending on its scale and will be funded from a combination of UCD Research and Strategic and Major Initiative Fund resources. The bottom-up approach supported by the campaign model will be supplemented by a fund to seed other smaller-scale research initiatives. A number of the Institutes already run seed programmes of this type and we will work with those already in place to ensure simple and coherent messaging to the community and no duplication of funding. Linking this to other funding strands envisaged under this plan, this strand would be 'UCD Sustainability Awards - Researching a Sustainable Future'.

**Recommendation 3.2: Evaluate the gap in university investment and supports for 'sustainable social systems' research**
UCD has enviable strength in integrated interdisciplinary working across earth systems sustainability (iCRAG), energy systems sustainability (Energy Institute, NexSys), food systems sustainability (Institute of Food and Health, FHI) and sustainability in its wider sense (Earth Institute, BiOrbic). These interdisciplinary programmes are built on strong foundations of academic excellence, collaboration and investment by our cognate schools. Many of these interdisciplinary programmes, particularly where externally funded, are STEM-led with input from social science, arts and humanities and business and legal scholars and teams. Where we have more latitude we have been able to demonstrate AHSS leadership, e.g. in the Earth Institute where two of its seven themes are AHSS led.

If we are to truly be part of the transformation from today's societal and economic norms to those that will be the norms of a new sustainable world, we must place the same emphasis on social systems sustainability as we do on earth, food and energy systems. We recognise the difficulty in doing so. External funding mechanisms have favoured large-scale STEM-led centres that underpin many of these areas in UCD. Therefore, we must advocate for change and at the same time identify alternative sources of external funding to deliver on UCD's full ambition and potential in this area. We have great strength in AHSS and more needs to be done to give it prominence in this debate.

With a balanced portfolio, we can improve integration across all of these systems and help resolve the apparent contradictions inherent in working towards a more sustainable environment while continuing to develop a just and prosperous society.

**Recommendation 3.3: Develop a sustainability policy advice mechanism**

A senior European policy maker once remarked that it was "as easy to make bad policy as good, depending on where you get your advice". The complex interdependencies of developing a sustainable world place a premium on quality sources of advice that are embedded in a systems approach. Nationally, Ireland has recognised the gap in science advice mechanisms (SAM) and is currently seeking consultation to develop its approach. As indicated above (Recommendation 3.2), such advice should not just draw on STEM evidence, but is critically dependent on the AHSS lens.

Many UCD faculty provide policy advice. As an institution we invest time and effort in this activity and rightly so. Advancing policy at national and international levels is one of the most significant ways for UCD to demonstrate its impact and influence in the world. However, it can be difficult for policy makers to access individual academic leaders and indeed, to integrate the advice coming from different areas. Imperial College London's Grantham Institute has developed a world-leading reputation in the area of sustainability. A recent visit to the Institute revealed that it was underpinned by, arguably, less integrated interdisciplinary programmes than UCD's with many similarities in areas of strength. The main observable difference being that the Grantham sourced funding from a foundation to put in place a small team (3.5FTE) of policy advisors and communications specialists who produced integrated policy briefings based on the work of Imperial's academics and positioned this with Whitehall's policy-makers. This small investment has led to an outsized impact on UK policy in the area of sustainability. UCD can build on the programmes that already exist in for example, the Geary Institute and its publicpolicy.ie platform, to create a coherent policy advice structure. As Government develops its SAM we will be well positioned to engage with it in a coherent and professional way.

**Recommendation 3.4: Encourage all our staff and students to bring creative and innovative thinking to resolving the challenges of sustainability and to use our campus and resources to test and demonstrate these solutions**

Creativity is at the heart of sustainability and rooted in all sustainable social, economic and environmental solutions. UCD can inspire and harness the power of creativity through the development of the 'UCD Sustainability Awards - Imagining a Sustainable Future'. This would be a university-wide flagship initiative that invites staff, students and academics to submit projects under categories that cater to both ideas/concepts right through to working solutions that are demonstrating impact. It is important to reflect the spirit of creativity through such an initiative and encourage projects to be designed, presented and communicated using different channels. Support from UMT in terms of finance and access to UCD resources will be important in setting both the standard and tone in which these awards will be received by the UCD population. There is an opportunity to use these awards to focus on identified areas of significant challenge for UCD and to encourage/ mandate an interdisciplinary approach for all submissions.


*Figure 4: An innovation project on campus led by the Innovation Academy in partnership with Revolution Farm & Kitchen and student volunteers using used coffee grounds to grow mushrooms*

There should also be a pathway created that facilitates the submission of sustainability ideas and solutions from the community outside of the awards framework.

## 4 Education and student experience

The greatest impact UCD will have on the future sustainability of our people and planet is through the over 30,000 student advocates on our campus here and the over 5,000 students overseas. It is essential that our students graduate with an understanding of sustainability and an enthusiasm for its implementation. It is becoming clear that prospective students are using institutional sustainability as a criterion for selecting courses. As such, sustainability must be an integral part of the recruitment of students, of their education and experience of UCD and a key aspect of its legacy.

Quality Education is itself a Sustainable Development Goal (SDG4), with targets focused on equality of access and acquisition of the knowledge and skills needed to promote sustainable development through global citizenship and appreciation of cultural diversity. Education also directly underpins almost all of the other SDGs and so is central to UCD's contribution to their achievement.

**Recommendation 4.1. Every student in UCD should have an experience of sustainability which emphasises the key principle that sustainability challenges require an interdisciplinary approach**

An increasing number of students of undergraduate and postgraduate courses are focussing on sustainability as their core area of study. For example, students of the innovative BSc in Sustainability gain a fully interdisciplinary perspective combining environmental, economic and societal dimensions and focussing directly on addressing sustainability challenges. The MSc in in Sustainable Development brings together diverse students and professionals from around the world to engage with UCD's leading experts in sustainability and gain key insights, skills and experience in sustainability.

**BSc Sustainability**

This innovative degree programme combines the environmental, societal and economic dimensions of sustainability and leverages UCD's diversity, collegiality and the Horizons framework to do so.

After a common first year, students choose to specialize in Sustainability with Environmental Sciences, Sustainability with Social Sciences, Policy and Law or Sustainability with Business and Economics. Throughout their degree they combine increasing depth of study within their chosen specialization with key knowledge and skills from the other two and direct experience of working in interdisciplinary teams to address sustainability challenges. It combines modules from all six of UCD's Colleges and is co-directed by representatives of the College of Science, the College of Social Sciences and Law and the College of Business with active engagement from all three College Offices.

The programme is attracting a lot of interest from students, with 1000+ CAO preferences in 2022, and also from corporate partners and state agencies, who have been offering internships and engaging directly in the career and project-based aspects of the programme.

www.myucd.ie/courses/sustainability/


UCD also has the opportunity, however, to ensure that all our graduates have some conception of sustainability challenges and solutions. This can be achieved initially through the mandatory inclusion of a 15 minute introductory segment in a core lecture in Stage 1 of each major programme. This segment should introduce the central concepts of sustainability and direct students towards UCD's modules, resources and initiatives in sustainability and encourage them to engage. Programmes can be encouraged to adopt sustainability modules in their structures and to recommend relevant electives and Discovery modules. A structured elective in sustainability should also be developed. In some degrees, sustainability arises in a

range of modules but needs to be more coherently highlighted and emphasised in course materials and could be established as a specific programme learning outcome.

Postgraduate research students are also required to undertake taught credits as part of their programme of study and should be encouraged to take a module in sustainability.

**Recommendation 4.2. Produce an inventory of degrees and modules with an emphasis on sustainability; align each with relevant SDGs and make it readily available to prospective and current students**

Preliminary work on this task has already been undertaken (Appendix 3), but further work is required to complete the task and to maintain and update the resultant inventory and make it widely accessible. It has been proposed that module descriptors should include information about relevance to specific SDGs, signposted using individual SDG icons, and that we should 'develop a showcase on how sustainability is embedded in our degree programmes and select some examples for particular attention'.

**Recommendation 4.3. Maximise diversity of the student body by continuing to promote widening participation and international student recruitment, particularly from developing nations**

The diversity of voices and perspectives in teaching and learning environments is an essential contribution to the educational experience and to the SDGs. UCD already achieves a high degree of success in widening participation and must continue to work hard to ensure access to education for all, including mature and disabled students and students from the full range of socio-economic backgrounds. Notwithstanding concerns expressed about the carbon footprint of international travel, the presence of international students also enhances the learning experience and broadens perspectives for all. Participation of students from developing nations should be particularly encouraged, for example through partnerships, exchange programmes and scholarships (in line with SDG Target 4.b and see suggestion in Appendix 1). Accommodation scarcity and cost can be a disincentive to study in Dublin and should be mitigated where possible for vulnerable groups.

**Recommendation 4.4. Leverage UCD's campuses and educational partnerships around the world to yield insights into the diversity of perspectives on sustainability challenges and solutions**

Pursuant of UCD's global vision, our overseas campuses and educational partnerships provide a great opportunity to explore innovative practices and alternative perspectives from around the world. Linked to Recommendations 2.5 and 3.4, there is scope to promote and support activities that encourage dialogue among students and faculty from across the full range of UCD's educational programmes.

**Recommendation 4.5. Engage with current students in relevant degree programmes, clubs and societies and the SU to develop a framework for the promotion of sustainability in the student experience**

In addition to weaving sustainability more strongly into taught classes, we must ensure that the wider student experience is sustainable and promotes engagement with sustainability. Most students are acutely aware of the climate and biodiversity crises and of the need for more sustainable lifestyle choices. Many are already vocal and active in this space, including through clubs and societies and initiatives such as UCD Green Campus, UCD Global Ethical Consumption and Sustainability Committee and UCD VO. These activities and initiatives should be made more prominent and encouraged and supported by UCD.

The establishment of the SPARC initiative was a valuable step in this direction, supporting projects such as the birds of Belfield and campus folklore guide, the food waste reduction campaign and reduce, reuse and recaffeinate. One consultee recommended that we 'set up debating competitions, outside of the curriculum, that involve students from all disciplines across the University to discuss and debate sustainability topics while respecting diversity and the different views of different student groups.' and 'Set up other sustainability competitions – with a particular emphasis on engaging and connecting students from UCD campuses around the world.'

Tangible and substantial contributions to sustainability should be highlighted on the degree supplement and explicitly promoted as part of the UCD Advantage Award.

**Recommendation 4.6. Establish a framework for delivery of high impact, professional short courses and micro-credentials**

Our partners in Government, private sector and third sector organisations admit that their people are struggling to understand what actions to take to build a more sustainable society. UCD has an opportunity to build our profile and to generate significant income through delivery of targeted, professional and integrated micro-credentials in this area.

The UCD Innovation Academy is already strongly active in this area, for example through its course on Design Thinking for Sustainability and its recent recruitment of dedicated staff in the area of sustainability.

**Recommendation 4.7. Engage with alumni and involve them in taught courses to provide insights to current students on promoting sustainability and putting it into practice in professional life**

Many of UCD's worldwide community of 300,000 alumni are engaged in professional practise related to sustainability and can be important voices in the development of our own leadership role in this area. They also have great potential to inspire and inform our students and should be included where possible as guest speakers and workshop leaders or highlighted as case studies in taught modules.

**Recommendation 4.8. Engage with partner organisations and international networks to develop and influence best practice in sustainability and sustainability education**

UCD is already active in this respect. For example, UCD contributed to the recent Climate Action Network for International Educators (CANIE) European Summit and Dr Orla Kelly (School of Social Policy, Social Work and Social Justice) led a recent World Universities Network project on tertiary education in a warming world. UCD Global also promotes the EU Commission's Green Erasmus+ initiative to support sustainable Erasmus projects and student mobility. Such initiatives should be further encouraged and engagement with Universitas 21 sustainability events and workshops by staff and students should be widely promoted and supported where possible. A significant step would be to establish UCD as a COP observer institution and enable staff and students to attend, learn and comment.

**Recommendation 4.9. Integrate sustainability messaging into student marketing and recruitment materials, highlighting UCD's commitment to sustainability and opportunities for study and experience**

As with other areas of UCD's activities (see Section 5), it is important to ensure that visibility of UCD's commitment to and actions in support of sustainability is given to prospective students. As indicated in the Introduction, sustainability is now an important criterion being

used by many prospective students to influence their choice of third level institution. UCD Global has developed a website on sustainability for prospective students and there is considerable scope to take further steps in this regard both for national and international recruitment, for example referencing sustainability in the prospectus and in talks at schools, higher options, etc. and giving prominence to sustainability at open days and other campus events.

## 5 Communication

UCD has a wealth of expertise and much to offer in helping to create a sustainable global society. Our students are gaining knowledge and expertise that they bring to the wider world in industry, policy making, community development and other areas of society. Our researchers are integrated in an interdisciplinary way, creating new knowledge that brings solutions to the challenges of sustainability in the areas of food, energy, environment, industrial production, society and the economy. There are also many on-campus initiatives and activities.

It is clear that UCD is doing much more in the sustainability space than is currently visible. It is essential that we promote and showcase our activities, strengths and excellence in this area to both internal (current students, staff) and external audiences (prospective students, industry, academic partners, investors) and engage them in our work to help address national and global sustainability challenges. In doing so, our approach will be embedded in the SDG framework and must be honest and avoid greenwashing.

**Recommendation 5.1. Develop and launch a UCD Sustainability website to showcase UCD's credentials in the area of sustainability, tell the story of UCD's successes, shortcomings, aspirations, targets and progress, and create a UCD 'sustainability' identity.**

The online content and material of UCD's sustainability activities are currently fragmented, out of date and, at times, inaccessible. We need to celebrate what we are doing well and to be transparent on our sustainability targets and performance.

A dedicated website will provide an excellent, engaging and easy to navigate platform to raise awareness and visibility of UCD's sustainability initiatives to the UCD Community, while also communicating our expertise and leadership nationally and internationally to prospective students, strategic partners, academic collaborators and investors. The website will demonstrate our educational, research and innovation, campus and community-based initiatives in an authentic and energetic way, and will create a 'sustainability' identity for UCD.

Work on the development of this website is already underway and will continue in Q4 2022. The website will provide a one-stop-shop online platform to improve awareness of the many sustainability initiatives happening across campus, as well as UCD's performance against agreed targets. It will tell a story from the perspective of students, staff, researchers, and external stakeholders (industry, policy makers, NGOs, community groups, wider society etc.) through engaging and topical case studies of sustainability in action across UCD.

UCD's sustainability story will be navigated through four main information domains: *Our Mission*, which outlines our plan, targets, progress and partners; *Topics*, which includes specific areas such as teaching and learning, research and innovation, campus environment,

procurement and more; *Programmes and Initiatives,* such as Green Campus and the UCD Sustainable Research Initiative; and *Get Involved,* where users can access tools and resources, interactive campaigns and key contacts. The website will also incorporate a dashboard or other visualisation of UCD's sustainability journey so that users can easily track our performance and learn from our experience.

**Recommendation 5.2. Launch 'The Community Effect' campaign to engage students and staff in sustainability activities and initiatives.**

To mark the official launch of the new website and to engage internal audiences, 'The Community Effect' campaign will be launched at the same time. This campaign is based on the idea that small actions by each of us add up to significant change over time. Drawing on the fact that UCD's staff and student population is equivalent in size to the ninth largest town in Ireland, the UCD Community will be encouraged to make one additional sustainable change in their life and to share it with us. These will be stitched together to create a powerful narrative that reflects the power of the UCD Community as a whole. This will be a university-wide campaign and schools, colleges, students and business units alike will be encouraged to tag the campaign into all sustainability communications.

**Recommendation 5.3. Develop key messages to promote UCD's expertise and leadership in sustainability across all external communications and marketing.**

A set of key messages around the university's sustainability credentials and leadership will be developed. These messages will be incorporated into existing communications and marketing campaigns to ensure that we are maximising all opportunities to tell our sustainability story. A strong and engaging brand visual identity will be designed that makes sustainability initiatives and communications easy to recognise and impactful. A full complement of materials and collateral will be prepared to support this, such as information packs, briefing notes for departmental heads and communications units, and branded documentary materials (print/slides), pull-ups, posters, social media graphics and social media content. A process for key messages to be reviewed and updated over time will also be established.

**Recommendation 5.4: Engage our partners in a dialogue about the future economic, societal and environmental framework for our world through a Citizen's Assembly series.**

Our colleagues in Theme 4: Empowering Humanity, have already proposed using a Citizen's Assembly approach. We love this idea for the challenging conversations around finding a path to a different future as we try to create a sustainable global society. The model of deliberate democracy underpinning the Assemblies nationally was developed in UCD. It is time to reclaim UCD leadership of the model and of our place in society through hosting these conversations.

Appendix 1 – consultation process and outcomes
Appendix 2 – landscape for research
Appendix 3 – programmes and modules

## Appendix 1 – stakeholder consultation process and outcomes

The text and recommendations in this report are derived from an extensive process of consultation, which is outlined below. All of the input we received is summarized in Table A1.1 below. Nevertheless, we emphasise that further consultation is essential to ensure that the widest possible range of views and ideas are captured as UCD develops and implements its sustainability policy and strategies. In particular, the timing of the process was such that we had only limited opportunity for consultation with students and student societies and we recommend additional engagement through a range of approaches and also engagement with alumni and additional external stakeholders.

***Internal***

*Staff*

A Google Survey was established to capture staff comments. It contained the following questions:

- What are UCD's strengths in relation to sustainability?
- What are UCD's weaknesses in relation to sustainability?
- We believe that UCD should have significant ambition in this area. What does setting our sights much higher look like?
- What could UCD do uniquely and innovatively to progress towards that vision?
- Which initiatives would you initially prioritise?

The survey was initially made available to the Theme Steering Group, which comprised 40+ voluntary members from across UCD's Colleges and roles. A consultative workshop with break-out group discussions was held on 8 February 2022 and the survey remained available after that for additional comments and input.

One-to-one interviews with UCD thought leaders on sustainability were undertaken in early 2022, structured around the same set of questions. The following were interviewed: Aoife Ahern (College of Engineering), Suzi Jarvis and Colman Farrell (Innovation Academy), Andy Keane (Energy Institute), Frank McDermott (iCRAG), Kevin O'Connor (BiOrbic), Oliver Kinnane (School of Architecture, Planning and Environmental Policy), Tom Curran (School of Biosystems and Food Engineering), Jez Simpson (College of Science), Cara Augustenborg (School of Architecture, Planning and Environmental Policy), Donna Marshall (College of Business), Niamh Moore Cherry (College of Social Sciences and Law), Nick Holden (School of Biosystems and Food Engineering), Tadgh Corcoran (Estates), Sheena McLoughlin (UCD Foundation), Fiona Doohan (School of Biology and Environmental Science), Francesco Pilla (School of Architecture, Planning and Environmental Policy), John Barry (President's Office).

After presentations to Governing Authority (GA) on 24 February 2022, a workshop session enabled members of GA to express views and make suggestions. A preliminary report was presented to UMT and discussed at a meeting on 21 June 2022. Additional comments and suggestions were made informally and via email by colleagues including Don Bredin (School of Business), Mary Cunneen (School of Mathematics and Statistics), Tom Curran (School of Biosystems and Food Engineering).

*Students*

Students' Union representatives were contacted but no engagement took place.

Stage 1 and 2 Sustainability students were surveyed at end of trimester 2 with the following questions:

- What do you think UCD's ambitions and aspirations in relation to sustainability should be?

- What could UCD do to progress towards that vision, e.g. can you suggest any changes or new initiatives that should be prioritised?

***External***

In preparing this report, opportunities were taken to engage with Tom Arnold (Chair, EU Commission's High Level Expert Group to assess the Need for an International Platform for Food Systems Science (IPFSS)) and with John Bell ('Healthy Planet' Director in DG Research and Innovation of the European Commission). Google, AIB, KPMG and SSE were among our industry partners who shared their organisational approaches to sustainability and gave their input on opportunities for UCD. Questions about sustainability at UCD were also posed to the Earth Institute External Advisory Group and drew responses from (Frank Convery (UCD and Envecon, chair), Marie Stenseke (University of Gothenburg), Larry O'Connell (NESC) and Hans Bekker (formerly National Department of Public Works, Netherlands).

Table A1.1. Synthesis of comments and suggestions from all consultations. This table does not include every comment in full, but does aim to capture all points made while avoiding duplication. A full listing of comments and suggestions from the surveys of staff and students is available on request.

| | **Overarching** | **Research and impact** | **Education** | **Operations/community** | **Integrated approach** | **Communication** |
|---|---|---|---|---|---|---|
| **Strengths** | Diversity and depth of expertise<br>Enthusiastic and passionate people; strong impetus from a range of staff<br>Size of university and campus (big campus in an urban area)<br>We have advantage of scale – economies of scale should enable investment in sustainability initiatives and we have a big voice to amplify<br>Already doing a lot of relevant research and teaching<br>Earth Institute seen as a strength, promoting interdisciplinary, inter-school collaboration and acting as point of contact<br>Reputation as a leader<br>National position, international linkages<br>High level involvement in conversation internationally, e.g. via Paul Walsh<br>Being open to changing how we operate and in terms of how we educate students<br>Success in adapting to covid shows potential to adapt quickly | Great strength in science, technology and engineering.<br>Unique strength in AHSS.<br>Strength in terms of practical solutions for climate mitigation and adaptation (e.g. through climate-resilient agriculture and carbon sequestration)<br>Food, ecology, sustainability, engineering, AHSS<br>Expertise in social and environmental policy and practice<br>Impact on public policy<br>Supports for translating research into spinouts<br>Lyons Farm presents a really significant opportunity for UCD to lead in the area of Sustainable Food Systems<br>UCD Centre for Humanitarian Action | BSc Sustainability<br>MSc Sustainable Development<br>Design Thinking for Sustainability<br>Many modules and programmes with sustainability in title<br>Widening participation | Commitment to EDI including gender equality action plan<br>Big campus with habitats for biodiversity<br>Campus thought to rank very high in terms of sustainable construction and building approaches (e.g. O'Brien Centre won BREEAM award)<br>Some green technology being used to heat and power the campus, such as CHP, solar PV etc so potential to be demonstrators<br>UCD Green Campus initiative | Student initiative to make use of campus coffee grounds to grow mushrooms (facilitated by Innovation Academy) | |
| **Weaknesses** | Proud to be in UCD, but embarrassed in relation to sustainability<br>Currently lagging behind in an Irish context<br>Not enough institutional support for sustainability<br>At times it seems to be mainly bottom up activity. To date a lack of top down centrally driven and funded initiatives.<br>No central resource to collate and support initiatives - which also results in poor visibility for the initiatives and "islanding" - the sum of the parts isn't bringing the value it could<br>No strong acknowledgement that we are in a climate emergency<br>Lack of support and recognition for social sciences<br>Disconnect – ideas initiatives established at leadership level are not trickling down and influencing activity | Need further collaboration<br>Need further coordination<br>Need more support for EU grants – especially in proposal preparation. | Not enough emphasis on sustainability or joined up thinking within degree programmes<br>Low awareness of green UCD among students; not systematically included as a theme across student education | Considered weak by many – initiatives not visible "how we operate and live on campus – energy, transport, waste management, food"<br>Procurement – ideas on social sustainability in supply chains being widely adopted but not in UCD<br>Students leaving the residences have no system for donating their surplus items, cutlery etc. to charity or recycling, etc.<br>There's a disconnect between the physical campuses.<br>Significant energy costs and usage due to globalisation<br>Need quicker responses to broken taps that keep on | Too much silo-ing, need to emphasise integration more, e.g. between themes on sustainability and empowering humanity<br>Research, education and other activities in the area of sustainability are not connected.<br>Not integrated enough – some done. Need so much more. | Website material on sustainability currently fragmented, inaccessible and out of date<br>So many initiatives - it's hard to know who's doing what and risks overlap and waste<br>Some institutions communicate more about less than UCD does |

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| | We need to be better at translating strategy documents into action | | | flowing, leaking toilets, etc. All very visible and immediately damage reputation / belief in UCD as an organization committed to sustainability | | |
| **Ambition/ vision** | Need to be a leader in Ireland and beyond.<br>Be the highest ranked university in Ireland on sustainability.<br>International recognition that we are a centre of excellence in this area.<br>Not just to do the right things but to be pioneers in certain areas. Having UCD as a blueprint that other organisations would want to emulate in this area would be a great achievement.<br>Be very ambitious; make it a differentiator for UCD<br>UCD as an anchor institution in critical sustainability transitions to reach sustainability is possible and highly likely if sustainability becomes a working value of the organisation.<br>Require measurable results<br>International ambition should be paramount<br>Identify a number of themes that could be prioritised and implemented<br>Develop measurable ambitions on a large scale<br>Identify visible targets<br>Must be fluid and flexible<br>Global vision, but local implementable initiatives<br>Ultimately we should be moving towards Ireland's greenest campus – carbon neutral campus – within a specified time frame, with a road map towards it – e.g. ramping up renewables on campus; could be tapping into UCD expertise – e.g. in geothermal.<br>Need to improve welfare of staff [demands are very high] Ireland's greenest campus, carbon neutral campus (be the first).<br>Align with global goals and have a roadmap towards achievement of targets | Further enhance sustainability as a central UCD research priority<br>Flexible and engaged research inclusive of Dublin 4 community and wider society<br>Develop a larger (in the sense that it should encompass more aspects of UCD) ethos to work with government, businesses and the media | For our students, particularly those engaged in some of our excellent programmes involving the crisis issues of sustainability, more imagination and inquiry into how to best support the students and faculty in these situations<br>For students (taught and research) not directly engaged, sustainability needs to be easily accessible if not a single core module / component of a core module<br>Issues that define our lifetimes should be embraced by the university's teaching and learning approach<br>Need to integrate sustainability into curricula across campuses<br>Every student leaving campus should have done at least something about sustainability, ideally a whole module<br>Encourage student activism<br>Teach students how to engage with industry about sustainability<br>Need to focus on student experience<br>Sustainability would be mainstream as a theme included in all courses so that students leaving UCD understand how their discipline can contribute to improving sustainability<br>UCD should try to raise interest and awareness of sustainability goals across a wider range of degrees. Many | Showcase sustainability best practice in waste management, transport, construction, energy, health and well-being, nature and biodiversity on campus. We have world experts in this area - they should be involved in how these things are embedded in campus life. Green Campus does this to a point, but it is a small initiative run only by part of the university and as a strategic priority this needs to be embedded at the core of what UCD does.<br>Operational initiatives on campus should be a high priority – as a demonstrator and innovator<br>Need much greener, biodiverse campus<br>Must not stop with small initiatives, e.g. about recycling – such steps just bring us to parity with others<br>Apply principles of circularity<br>Not just what happens on campus. Need to consider the Life Cycle of the university – consider emissions on the commute, supply chains, international student journeys, etc.<br>Eliminate needless consumption<br>Improve sense of ownership and engagement of staff in campus initiatives | Research in sustainability is cutting edge and communicated to students.<br>Leading research and education through all aspects of college life and courses. | Do more to celebrate what we do well<br>Need to do meaningful things – not just jump on the bandwagon<br>Must take great care to avoid greenwashing in communications.<br>Ensure there is solid reality behind stories being told. Also tell stories about what we are currently weak at but are working on. Honesty and humility much better than just telling the good stories. Establish targets and report on how well they are being met ('sustainability dashboard'). Trust is critical.<br>More transparency on sustainability targets and performance.<br>Our comms, global and commercial strategies will need to grapple with the changing world and the potential for clashes of priorities.<br>We need to be careful of the narrative regarding |

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| | Disruption, doing things differently, even if we fail as a result of trialling some new innovations/ initiatives as long as we speak about the experience to ensure learnings<br>Higher scale effort. UCD to be a forum for sustainability with key stakeholders; offers opportunity to be an influencer<br>Donut economics should drive our approach<br>Every student and every member of staff/faculty should come across and be able to participate in sustainability initiatives at UCD<br>Make sustainability a cross cutting theme/ requirement across all areas of UCD operations<br>Sustainability considerations need to be systematically integrated into every aspect for university functioning from research ethics to campus operations This requires a systematic review of university governance structures<br>UMT must lead from the top - culture change, less red tape to get initiatives started<br>Sustainability should be embedded in all our thinking, like Health and Safety and EDI<br>More focus on policy<br>Sustainability on campus needs to be driven from the highest level<br>The 17 SDG's are a blueprint for sustainable development and UCD's future ambitions and aspirations should be focussed on rolling them out, be it through education, reducing on site waste, promoting and supporting sustainable travel to and from the campus and creating more green spaces for students and staff to use and enjoy while also enhancing biodiversity. | | friends I have spoken in different courses (business, engineering, the arts, etc) do not understand the importance of sustainability and how it can interlink with their own studies | Living sustainably in our actions as a community and showcasing sustainability best practice on campus and in our own actions. We need to practice what we preach!<br>Should be transparent – audited externally<br>Be conscious of cost implications for students – e.g. SU shops have to be cheap | | Ireland's Global University and Ireland's largest University that it is not considered or communicated as unsustainable by some people/ competitors. |
| **Initiatives** | Be clear on what sustainability means to UCD<br>Need to map existing activities<br>Map initiatives to SDGs<br>Have concrete goals, e.g. specify time frame for net zero | Bring together key players from STEM and AHSS to facilitate collaboration.<br>Identify 2-3 big disruptive ideas and pursue funding from a range of sources. | A core module on good sustainable practices for individuals and societies needs to be introduced for all first year programs to cover the three pillars of | Explore sustainable finance<br>Enabler 4 should highlight sustainability<br>Develop guidance on running sustainable events | Promote two-way dialogue between teaching and research.<br>Need initiatives to break down barriers | In developing website, have different sections for different audiences, e.g. students, researchers, |

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| | Provide guidance on how to get to where we want to go<br>Align work that people are already doing<br>Establish central hub to support and communicate sustainability initiatives<br>Need to visibly commit resources<br>Need a VP for sustainability<br>Need a sustainability officer<br>Make strategic interdisciplinary (cross-school) appointments<br>Have a sustainability champion in each School<br>Draw on student expertise and enthusiasm, e.g. via student societies<br>Support and nurture student ideas and initiatives and reduce administrative barriers<br>Need to further develop networks internationally to further support reputation<br>Taking into account the size of UCD and the variety of services that the University offers: food, transportation, education and others; the generation of focus groups in charge of implementation of sustainability in each of these sectors, tackling specific challenges, should be considered as well as an overall group overseeing the process<br>A competition for students, staff, faculty, alumni and potentially partner universities and organisations, funds and philanthropists supporting innovation for sustainability<br>Citizens' Assembly in O' Reilly Hall for staff and students to ask how ambitious we should be (could team up with Empowering Humanity for some type of participatory approach). Needs an intergenerational lens and a global climate justice approach in UCD<br>Use the chairing of any roles to bring sustainability to the fore<br>UCD can influence the public sector, starting by looking at the opportunities in the Climate Action Plan<br>Create an environment and infrastructure that supports and encourages hybrid | 'Dragon's Den' approach to choose among ideas to support.<br>Examine the process and practice of interdisciplinary research itself (essential to addressing sustainability challenges) and perhaps develop a handbook to promote and guide it<br>Position Earth Institute as a problem-solving resource – more than just a space for people to meet and connect<br>Link to social entrepreneurs and promote social enterprise e.g. food sharing<br>Focus on practical solutions for adaptation to climate change, e.g. developing plans for different aspects – marine, agriculture, urban, etc. – and work with local authorities and others to inform implementation<br>Work on deep demonstrators, linking into society, e.g. Lyons farm, Farm Zero C<br>Prioritise ecosystems – natural capital, ecosystem services, biodiversity, etc. but link in with agriculture, forestry and the marine.<br>Focus also on urban sustainability, including work by architects and engineers, also including water capture and water use and biodiversity in urban settings.<br>Take a strategic approach - fundamental research + pathway to impact + demonstrator<br>Some initiatives in scoping out sustainable agricultural practice for example in protein production | sustainability with a real emphasis on what we as individuals can do to reduce consumption and create a sustainable future<br>Develop showcase on how sustainability is embedded in our degree programmes and select some examples for particular attention<br>Ensure that international students gain sustainability experience to take back to their home countries<br>Establish scholarships for students from developing countries<br>More project-based teaching, stakeholder engagement and project management as part of it – could target it on issues that UCD addresses.<br>What are the careers in sustainability and what alumni are working in this area?<br>Set up debating competitions, outside of the curriculum, that involve students from all disciplines across the Univeristy to discuss and debate sustainability topics while respecting diversity and the different views of different student groups.<br>Set up other Sustainability Competitions – with a particular emphasis on engaging and connecting students from UCD campuses around the world. Anything that would encourage greater engagement among international students and national students would be particularly beneficial<br>Promote all the Discovery modules relating to sustainability | Where are UCD's data stores - green credentials?<br>Water fountains for filling water bottles<br>More charging points for electric vehicles<br>Retrofit buildings to reduce heat loss<br>Improve public transport to campus<br>Transport improvements, e.g. car pool initiative with app and incentives, e.g. free parking; incentivize use of public transport<br>A biodiversity focus needs to be introduced at high level and involve on campus expertise in this field<br>Minimise plastic bottles and food waste<br>Consider adopting a single-use plastic free policy like other universities and secondary schools around the country<br>Decarbonization and restoration of biodiversity<br>Soil and tree preservation, lowering CO2 emissions<br>Display units highlighting UCD energy use/ generation and waste from each building<br>Segregated waste in all buildings on campus [very frequently raised + seen as critical due to visibility].<br>Cut energy use, install more solar panels<br>Reduce food waste<br>Printing out anything should always be discouraged wherever possible<br>Select waste management contract on basis of best | between disciplines and with operations, HR, etc.<br>Use campus as a living lab – exploring and showcasing innovative approaches<br>Establish a point of contact in Estates for research and teaching initiatives relating to campus and operations (e.g. to enable a class visit to a building or initiative)<br>Sustainability across all labs both teaching and research<br>UCD Sustainable Research Initiative - to raise awareness of the environmental impact of lab research (water, energy, plastic, waste), how researchers working in labs can achieve a meaningful reduction of environmental impact at the bench, and the roll-out of My Green Lab certification across the University.<br>We need to use better the expertise on campus, i.e. Estates can take technical advice from different schools. But investment Is required to ensure that Estates have the capacity to act on ideas/advice | stakeholders (business, policy, NGOs, community groups, wider society); provide points of contact for further info.<br>Improve internal awareness of initiatives across campus<br>Provide updates on screens / in emails / on website about global events and campus initiatives – e.g. geology earthquakes screen, energy usage on campus, proportion of renewables in the irish grid, etc.<br>Use social media effectively<br>Leverage UCD Festival<br>Major PR campaign to highlight our experts<br>Much higher awareness among students and staff of sustainability and on-campus initiatives<br>The art of storytelling – identify and develop some really good case studies of sustainability in action – e.g. UCDVO or partnerships between faculty with Wolaita Soda University in Ethiopa for example or in the Agricultural Extension, UCD VO etc. |

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| | events/ participation without compromising experience<br>Identify partners that can help us provide measurable solutions<br>Leverage our relationship with SDSN<br>Review sustainability strategies and policies in other Irish and international universities (for example, UCC, UL and NUI Galway all have advanced sustainability agendas) to see what we can learn from them...or what we can do better!<br>Sustainability Sabbaticals (for staff and faculty) to reorient their work and purpose towards a sustainable way of conducting their work<br>Internally - staff training and awareness is critical, acknowledgement of scale of issue has to start with our own community<br>Training staff - starting with UMT and ELG<br>Cultural change<br>Getting buy-in and engagement is critical<br>Changes in systemic thinking needed; changing what we think and feel to change our habits<br>Benefit from our global engagement, e.g. learn about differences in perception of sustainability on campuses in China<br>We need a social reconstitution of university relations to reflect the urgency of the climate crisis | EBOBROKER networking platform needs elaboration and further trust-building exercises around it<br>Use Wicked Lab to map expertise across UCD and beyond<br>https://www.wickedlab.co/toolforsystemicchange.html<br>In terms of research, our partnerships, strategic, commercial, academic and other, should be hugely leveraged to large, impactful research of scale<br>Encourage research that has a sustainable aspect<br>Need to bring people together and motivate them Need also to engage with government and funding agencies to get it supported<br>Seed funding to support sustainability initiatives<br>Research funding<br>Reward and recognise innovation and success<br>Becoming difficult to attract and retain researchers. Need to address cost of housing in Dublin – e.g. by supplement to PhD stipends and postdoc and staff salaries | Work with lecturers from the different Schools and help them to integrate sustainable thinking into lessons, to boost students' knowledge of sustainability issues, challenges and possible solutions, and hopefully boost interest Incorporate the IPCC or related research into all curriculums, showing what's happening and providing actual tools that are useful to help minimize GHG emissions and transition the fossil fuel system (systems change) with policy implementation and protests<br>Ensure sustained and fair living and learning conditions for students, particularly those more dependent on stable conditions (such as international students or those coming from lower socio-economic backgrounds) | practice rather than lowest price<br>Create composting resource<br>Improve water usage<br>Use all renewables and stop using single use papers and tests<br>New residences will decrease students overall carbon footprint<br>More cycling infrastructure on campus<br>Compostable cups<br>Vegetarian menus<br>Help students in campus residences to recycle their fixtures and fittings when leaving accommodation. This needs much improvement particularly in relation to international students. | Think about incorporating all levels of university in sustainability issues - from academics to operations and management. We have world class experts on many sustainability issues as academics at UCD - let's use their expertise to inform what we do! | Make training available for all post docs, lecturers and profs in this field - need to ensure their communication skills can get the messages across - and to ensure that there is racial, ethnic, gender diversity in those who are available and comfortable to give those messages. |

## Appendix 2 – landscape for research

### 1. Introduction

The island of Ireland is facing increasing uncertainty and some of the greatest challenges of our time. The COVID-19 pandemic, Brexit, geopolitical crisis in the Ukraine, climate mitigation obligations, a growing and ageing population, biodiversity deterioration, and depleting natural resources are placing a premium on the island's ability to respond in a timely and sustainable manner.

Ireland is committed to achieving the 2030 Agenda for Sustainable Development. The 17 UN Sustainable Development Goals (SDGs) are a set of interconnected global development targets that address environmental, economic and social challenges. The short timeframe from now to 2030 will be vital in the transition to a climate-neutral and resource-efficient economy and society that is sustainable and within current planetary boundaries.

The island of Ireland is unique - it is on the western edge of Europe, surrounded by water, and agriculture accounts for nearly three-quarters of land cover in Ireland and Northern Ireland (compared to the EU average of 39%). Climate change and wider sustainability challenges are shared both North and South of the island, and their interconnectedness is becoming ever more evident. There are many cultural, economic, social, geographic and political interlinkages between the North and South of the island. These offer a unique opportunity for the island to position itself as a research and innovation (R&I) leader on the international stage to enable positive and sustainable change in the transition to climate-neutrality by 2050.

### 2. Sustainability Research

There has been a seismic policy shift in recent years from prioritising national economic viability and growth to ensuring sustainability, resilience and recovery within the context of a range of global challenges and drivers. At a national and EU level, strategies and policies are being underpinned by economic, social and environmental sustainability, and these policies, strategies and targets are in turn informing and driving the strategic direction of R&I funding programmes. National and European research programmes are being thematically framed to support R&I activities that address global challenges and opportunities linked to policy objectives and sustainable sectoral growth targets. Research areas and expertise that were not traditionally associated with a sector are now vital to address sustainability challenges. Academics, research groups and institutions across the island are pivoting their research activities to develop solutions to address climate change and to target new funding opportunities in sustainability research.

Research-active institutions across the island share long-standing and deep collaborative links in R&I in the physical, natural, life and social sciences, engineering, and humanities. The R&I ecosystem on the island is a critical enabler in supporting the achievement of national and global sustainability goals, and must maximise its impact on the sectoral (e.g. energy, housing, food, transport, agriculture) agendas of government departments, agencies and stakeholders. The island has a unique opportunity to develop and implement interdisciplinary and collaborative solution-based approaches to address sustainability challenges (e.g. carbon sinks in bogs, restoring multiple benefits from biodiversity in mixed land uses, turning waste into higher value products).

During this time of great global change, it is the responsibility of research-active institutions like UCD to inform choices through evidenced-based science that will create a sustainable economy and society for future generations. A strong R&I ecosystem on the island that performs at a top internationally competitive level is necessary to generate the scientific and technological breakthroughs needed to tackle the urgent sustainability challenges facing society.

Experts in all academic fields - from humanities to engineering - across Ireland's seven Universities and five Technology Universities, Northern Ireland's three Universities, and State-funded agencies (such as Teagasc, the Marine Institute, and the Agri-Food and Biosciences Institute) are actively working in these global challenge areas, bringing excellence and interdisciplinary creativity to solve problems and expand our horizons. Innovative and transformative solutions are being developed that will contribute to the delivery of the ambitious sustainability targets that government, society and industry have committed to. Individual researchers, research groups and institutions cannot address and solve the island's climate and sustainability crisis without the integration of disciplines, as well as collaboration with the public sector, industry and other sectors of society.

An analysis of research publications between 2017 and 2021[2] was conducted to assess the breadth, scale and quality of scholarly outputs in five key sustainability challenge areas. This landscape analysis provides a clear dataset to assess the research expertise and leadership of research-active institutions on the island, including UCD.

## 3. Challenge 1 - Sustainable Food Systems


The agri-food sector is the largest indigenous industry in Ireland[3] and is more important in Northern Ireland in terms of employment and economic contribution than any other country in the United Kingdom[4]. The sector is a key feature of the island of Ireland's economy, culture and society, exporting food and drink products around the world and contributing to the island's global reputation in producing high quality and safe food. The sector is a major future driver for economic development - its geographical spread across the whole island means that it is particularly important for supporting sustainable socioeconomic development in rural areas.

The sustainability of the whole food system - from primary producer to consumer - is the biggest challenge facing the sector. There is a growing negative perception towards current agricultural practices and systems, which is shifting consumer preferences towards healthier, environmentally friendly and ethical diets. A backdrop of political and economic uncertainty and changes are exacerbating many of these challenges for the food industry, not least in terms of trade of meat, dairy and other food commodities. Most recently, the war in the Ukraine has highlighted the vulnerability of global food systems and the need for resilience to shocks.

Food production systems are one of the key drivers of climate change, and the EU has set out a range of ambitious targets for the sector to reduce the use of pesticides and antimicrobials, reduce fertilisation, increase organic farming, improve animal health and welfare, and reverse biodiversity loss by 2030. Although the sector is one of the largest contributors to greenhouse gas (GHG) emissions and climate change[5], it is also one of the main sectors most impacted by environmental degradation and one of the few sectors that can work towards a carbon positive position.

[2] Elsevier SciVal is a benchmarking tool that uses Scopus data to identify research output and uses a range of metrics to present research from a variety of viewpoints. https://www.scival.com/landing

[3] Department of Agriculture, Food and the Marine, *Annual Review and Outlook for Agriculture, Food and the Marine 2021*. 2021, Department of Agriculture, Food and the Marine: Dublin, Ireland.

[4] Allen, M., *Northern Ireland's Agri-Food sector – background and possible 'Brexit' considerations*. 2016, Northern Ireland Assembly.

[5] Environmental Protection Agency, *Ireland's Provisional Greenhouse Gas Emissions 1990-2020*. 2021, Environmental Protection Agency: Dublin, Ireland.

Sustainable agriculture and food systems will require diversification, a building of resilience and a whole food system approach. A strong R&I ecosystem is key to supporting agri-food primary producers, processors, SMEs, multinationals and research institutions to drive future waves of economic development to assist the sector to radically transform to produce high-quality products that are internationally competitive using environmentally neutral production systems.

The R&I scope of the sector is vast - covering topics ranging from animal health and welfare, animal production, nutrition, food processing, food safety, food authenticity, smart agriculture, plant protein, rural development to the environment. Ireland is a world-leader in Agricultural Sciences - the Clarivate list of Highly Cited Researchers for 2021[6] included seven Agricultural Science researchers from Ireland (3 in Teagasc, 2 in UCC, 1 in UCD and 1 in UL). Four institutions on the island are ranked in the QS World University Rankings 2022[7] Agriculture and Forestry subject area - UCC is ranked 59th in the world, UCD is 61st, QUB is ranked in the top 201-250, and NUI Galway is in the top 251-300. UCD has the only School of Veterinary Medicine on the island and is the only institution to be ranked for Veterinary Sciences (33rd in the world).

During the five-year period from 2017 to 2021, UCD published the most scholarly outputs in the Agricultural and Biological Sciences subject area (n=1,964). These research outputs have a field-weighted citation impact (FWCI) of 66% above world averages (i.e. 1.66). Following UCD in terms of the number of scholarly outputs for Agricultural and Biological Sciences is Teagasc (1,804; 1.47), QUB (1,512; 1.60), and UCC (1,450; 1.70).

'The All-Island of Ireland Agri-Food Research Ecosystem Mapping Exercise'[8], the first report of its kind ever to be completed for the island of Ireland, estimates that a total of €681M of public investment between 2015 and 2020 was awarded to academic research projects and Centres on the island in the area of agri-food. Year-on-year public investment in Principal Investigator (PI)-led individual research projects (n=1,805) declined annually, falling from €137M in 2015 to €96M in 2019.

The mapping exercise report found that over two-thirds of public funding for projects in the area of food (i.e. food chain integrity and safety; food processing technology and engineering; food product development and formulation; food quality and sensory science; functional food, nutrition, health and diet-related disease) were awarded to researchers in Irish institutions, demonstrating research excellence and strength in this area. Centres of excellence leading in the area of food research include the UCD Institute of Food and Health, Food for Health Ireland Technology Centre, Teagasc Food Research Centre, Meat Technology Centre, VistaMilk SFI Research Centre, and UCC Food Institute. UCD has one of the highest FWCI for Food Science on the island (1.75) for the period 2017-2021. TU Dublin has a FWCI 99% above the world average (1.99), followed by IT Sligo (now Atlantic TU) at 1.90 and UL at 1.84. In the North, UU's Nutrition Innovation Centre for Food and Health (NICHE) and QUB's Institute for Global Food Security (IGFS) are undertaking world-leading research in Food Science (1.60 and 1.50 respectively) and are collaborating on Food Science scholarly outputs with UCD, Teagasc, UL, UCC and AFBI.

Between 2015-2020 over 40% (€69.3M) of all funding in the area of animal science (i.e. animal health and welfare; animal production and livestock systems; fisheries and aquatic ecosystems) were awarded to research-active institutions in Northern Ireland (in particular QUB and AFBI), demonstrating leadership and excellence in this field. For the period 2017-2021, 24% of AFBI's scholarly output (626; 1.42) was in Animal Science and Zoology, with a further 7% in Aquatic Science (1.71). QUB has the highest FWCI on the island for the period 2017-2021 for this topic area at 1.67, followed by TU Dublin (1.57), UL (1.54), TCD (1.53) and UCD (1.52). Nearly 22% of

[6] https://recognition.webofscience.com/awards/highly-cited/2021/

[7] https://www.topuniversities.com/university-rankings/world-university-rankings/2022

[8] University College Dublin, *The All-Island of Ireland Agri-Food Research Ecosystem Mapping Exercise*. 2022, University College Dublin: Dublin, Ireland.

Teagasc publications were in Animal Science and Zoology (1.47). UCD, which is unique amongst third-level institutions on the island by having its own teaching and research farm (UCD Lyons Farm, Co. Kildare), is collaborating with other academics in Teagasc, QUB, UL and AFBI on Animal Science and Zoology scholarly outputs.

Researchers on the island are exploring crop diversification to identify new sources of nutrients and to diversify national outputs to feed a growing global population and to support the shift towards more sustainable diets. The mapping exercise found that the majority of public funding in plant research (totaling €68M) was in the areas of crops and agronomy (54%) and grassland science (26%). Nearly €8M was awarded to six projects in the area of plant protein – this is an expanding research area given growing shifts in consumer diets to plant-based foods and the need to diversify the agri-food sector to new innovative products. UCD is one of the top producers of Agronomy and Crop Science and Plant Science scholarly outputs. UCD has a strong FWCI of 1.53 in Agronomy and Crop Science, compared to 1.44 for QUB, 1.32 for Teagasc and 1.24 for AFBI. QUB has an exceptional FWCI in Plant Science (2.08), well ahead of UCC (1.76), AFBI (1.54), Teagasc (1.49), UCD (1.41) and NUI Galway (1.33).

Only by consolidating food systems expertise on the island - bringing together academics, industry, government, producers and consumers - will we be able to deliver a step-change in the sustainability, security, harmony and integrity of the food system with a view to ensuring healthy, safe, nutritious food. The All-Island Food Integrity Initiative (FOOD-I), co-led by UCD and QUB, brings together for the first time the leading agri-food research-active institutions on the island[9] with the shared vision to support the transition to a sustainable food system on the island.

## 4. Challenge 2 - Creating a Sustainable Circular Economy and Bioeconomy


The environmental impact of the linear model of production and consumption ('take-make-waste') is not sustainable. Allowing resources and goods to go to waste is a significant loss of value and increases dependency on complex global supply chains. Ireland's material consumption rate is above the EU average, and has a circularly rate of just 1.6% (well behind the EU average of 11.9%). There is significant scope to reduce GHG emissions through maximising the efficiency of material usage and natural and biobased resources. Fossil-based resources are being used to make energy and materials which result in GHG emissions, water and air pollution, soil erosion, biodiversity loss and the degradation of ecosystems.

The circular economy offers a sustainable alternative to the linear model, in which we keep resources in use for as long as possible, extract the maximum value from them while in use, and recover and regenerate products and materials at end of life. The bioeconomy is the sustainable use of renewable biological resources and industry technologies to produce bio-based products and services for societal, environmental and economic gain[10]. The bioeconomy is particularly

[9] FOOD-I members include UCD, UCC, Teagasc, NUI Galway, Atlantic TU, UU, QUB and AFBI.

[10] BiOrbic, *Collaborating on Climate: Bioeconomy and Sustainable Agriculture Research and Innovation across the UK and Ireland*. 2022, British Embassy Ireland: Dublin, Ireland.

important for operational systems such as agriculture, forestry and the marine. The transition towards a sustainable circular economy and bioeconomy on the island will support the delivery of ambitious climate policy targets – i.e. a 51% reduction in GHG emissions by 2030 and net-zero emissions by 2050.

There are significant economic, social and environmental benefits to adopting a sustainable circular economy and bioeconomy approach for a range of sectors (e.g. agri-food, marine, manufacturing, construction, energy, transport, waste management and treatment, retail etc.). NESC recommends that a cohesive all-island approach would bring maximum benefit from resources, infrastructure and materials, as well as reuse and waste management[11]. The circular economy has the potential to reduce GHG emissions by 39% if the current extent of efficient resource consumption is doubled by 2032[12]. Northern Ireland could gain £474M of annual economic opportunities from moving to a circular economy, and more than 13,000 jobs could be created[13]. The island of Ireland has a unique opportunity in the bioeconomy due to the size and global reputation of its agri-food sector and the vast marine area surrounding the island. The global market for biorefinery products is predicted to grow from $587B in 2020 to $868B by 2025.

There is significant scope for the sharing of resources and expertise on the island to adopt a systemically circular economy and bioeconomy. Delivering on this challenge will require the collaboration of expertise from a wide range of disciplines, including manufacturing, engineering, chemistry, agriculture, statistics, behavioural science and policy. The 'All-Island of Ireland Agri-Food Research Ecosystem Mapping Exercise' estimates that €50M of public funding between 20150 and 2020 was awarded to PI-led individual research projects on natural resources and raw materials efficiency (i.e. the bioeconomy; circular economy; renewable energy; sustainable management of natural resources; understanding, managing and conserving water resources; food waste and loss; valorisation; and biorefinery etc.).

This does not include the additional €15M awarded to the BiOrbic SFI Bioeconomy Research Centre in 2017, as well as Enterprise Ireland funding for the Circular Bioeconomy Cluster South-West launched in 2021. BiOrbic is an SFI Research Centre hosted at UCD in partnership with Teagasc, TCD, NUI Galway, UL and Munster TU, and brings together over 100 academics focused on addressing challenges and delivering solutions for the development of a sustainable circular bioeconomy. The Circular Bioeconomy Cluster South-West, established by Munster TU, the CircBio Research Group and Enterprise Ireland, is the first regional circular bioeconomy cluster in Ireland that brings together industry, government and research centres to deliver unique and co-created initiatives to benefit member companies.

In Ireland, UCD, Teagasc, TCD, NUI Galway, UL, Munster TU and UCC are leading on research in natural resources and raw materials efficiency. QUB is demonstrating leadership in the North, particular in the areas of waste and wastewater. PI-led individual projects in natural resources and raw materials efficiency accounted for the second highest public funding drawdown in Ireland (the highest drawdown was projects in animal production and livestock systems at €61M). UCD published 50 scholarly outputs on topics related to the circular economy between 2017 and 2021, followed by NUI Galway (19), UL (18) and TCD (15).

## 5. Challenge 3 - Climate Mitigation and Adaptation

[11] National Economic and Social Council, *Collaboration on Climate and Biodiversity: Shared Island as a Catalyst for Renewed Ambition and Action*. 2021, National Economic and Social Council: Dublin, Ireland. http://files.nesc.ie/nesc_reports/en/156_shared_island_cbd.pdf

[12] CGRi, The Circularity Gap Reporting Initiative, 2021. https://www.circularitygap.world/2021

[13] ReNew, *Job Creation in the Circular Economy - Increasing Resource Efficiency in Northern Ireland*. 2015, WRAP.


Climate change and biodiversity loss are the greatest challenges facing the world. We are witnessing rising sea levels, extreme weather events, greater pressure on water resources and food production systems, increased river and coastal flooding, poorer water quality, and new pests and diseases. The planet's future cannot be sustained without preserving and restoring ecosystems, biodiversity, natural resources and land.

Agriculture is the primary land use and land cover (LULC) type in Ireland (67.6%), followed by wetlands (14.9%) and forestry (9.5%). Soil is a fragile natural resource due to the negative impact of settlement patterns, the generation of slurry and sludge, nutrient loss to water, ammonia emissions to the atmosphere, and soil organic carbon losses. Approximately 33% of global soils are degraded, and erosion is affecting 25% of agricultural land in the EU. Agriculture was the single largest contributor to GHG emissions in Ireland in 2020 at 37.1%[14]. There is a growing need for the agriculture and land use, land use change and forestry (LULUCF) sectors to become a long-term sustainable net sink, positively contributing to addressing climate change and supporting a transition to a carbon-neutral economy and society by 2050. Climate policy commitments include reducing agriculture and LULUCF emissions by 22-30% and 37-58% respectively, and increasing forest cover to 17% by 2030 (equivalent to one million hectares of forest)[15]. Land use is a key climate mitigation measure for the island, but there are significant challenges that must be overcome to maximise the potential contribution from land use.

There are other key sectors on the island also significantly negatively contributing to climate change. Transport and energy industries (primarily power generation) were the second and third largest contributors of GHG emissions (17.9% and 15.0% respectively) in Ireland in 2020, and residential and manufacturing combustion emissions accounted for 12.3% and 7.8% respectively. Together these five sectors accounted for 90.1% of total emissions[16]. The transport sector is the fastest growing source of GHG emissions, with a 88% increase between 1990 and 2020 (from 9.5% to 17.9%). Emissions from sectors such as agriculture, transport, buildings and light industry will need to reduce by 30% by 2030, relative to 2005 levels[17]. Projections by the EPA estimate that total GHG emissions in Ireland could decrease by at least 19% by 2030 due to the impact of adopted and planned policies. The projections assume significant reductions in sectors such as agriculture, power generation, residential, transport, and commercial and public services.

There has been a recent significant shift towards a greater focus on environmental and climate research, likely driven by national and EU targets relating to climate change which are shaping funders' portfolios. R&I must underpin the island of Ireland's response to climate change and wider environment and sustainability challenges, and must develop cutting edge scientific and technological innovations to meet these ambitious climate targets by 2030. A fresh transitional approach must be adopted where all resources and research expertise across the island are pooled together to increase sustainability, reduce emissions, and protect biodiversity and ecosystem services. The island has developed a strong climate R&I ecosystem - expertise includes climate science, biodiversity science, geoscience, carbon sequestration, natural capital and ecosystem services, behavioural science, agroforestry, and smart agriculture.

[14] Environmental Protection Agency, op. cit.
[15] Ibid.
[16] Ibid.
[17] Department of the Environment, Climate and Communications, *Climate Action Plan 2021: Securing Our Future*. 2021, Government of Ireland: Dublin, Ireland.

UCD is leading a substantial and diverse portfolio of R&I initiatives in the areas of climate change and biodiversity loss, and is a founding member of the All-Island Climate and Biodiversity Research Network (AICBRN). The AICBRN, which was established in 2019 and brings together researchers from a wide range of disciplines across the island who are undertaking research in climate and biodiversity topics, has gained strong political support. The ambition of AICBRN is to develop a large-scale research and innovation initiative to support policy and management decisions, underpin business and enterprise strategies, and strengthen societal capacity to address the climate and biodiversity emergencies.

National and EU policies highlight soil quality and health, alternative land uses (including forestry), and agricultural diversification as essential to achieving a climate-neutral agriculture and food system by 2050. Given these policy priorities and strong research expertise on the island (particularly in Teagasc, UCD, AFBI and QUB) in soil science, forestry and land use, it is interesting to note that the 'All-Island of Ireland Agri-Food Research Ecosystem Mapping Exercise' found that only €32.6M (or 5.4%) of agri-food public research investment between 2015-2020 was awarded to PI-led individual research projects on soils, land use, mixed farming and diversification[18]. Across the whole island, this research area experienced a negative Compound Annual Growth Rate (CAGR) of -18.5% between 2015 and 2019, with a particularly significant decline in Ireland (-25.2% CAGR). UCD published the most scholarly outputs in soil science between 2017-2021 (n=127), followed by Teagasc (81) and QUB (60), although the FWCI for these Teagasc and QUB outputs are 1.85 and 1.84 respectively, compared to 1.51 for UCD. By comparison, UCC only published 12 scholarly outputs in this field with an exceptional FWCI of 4.02. Teagasc established the National Agricultural Soil Carbon Observatory in 2020, and UCD has the most co-authored publications in soil science with Teagasc (n=21). UCD, which has a Forestry Group, also produced the most scholarly outputs in forestry on the island for the five-year period 2017-2021 (n=69) with a strong FWCI of 1.58. The South East TU only produced four outputs in this discipline but with the highest FWCI on the island at 2.63, followed by AFBI (11; 2.08), NUI Galway (39; 1.85) and Teagasc (49; 1.70). UCD is also the most active research institution on the island in the area of carbon sequestration (169; 1.62), followed by Teagasc (130; 1.31).

The mapping exercise report found that €32.2M of public investment between 2015-2020 was awarded to PI-led individual research projects on the island in the area of fisheries and aquatic ecosystems[19]. Over two-thirds (€22.2M) of this funding was allocated to research institutions in Northern Ireland, clearly demonstrating strength and expertise in this research topic. QUB published 240 scholarly outputs in aquatic science between 2017-2021, with a FWCI of 1.60. Galway-Mayo IT (now Atlantic TU) published 106 outputs during this same period with a strong FWCI of 2.18. This compares to UCD's FWCI of 1.32 in aquatic science (n=91), the second lowest on the island. TCD and UCD are the only two institutions on the island in the QS World University Rankings 2022[20] for Earth and Marine Sciences, both ranked in the top 151-200 in the world.

Academic institutions in the North secured €12.8M during 2015-2020 for PI-led individual research projects in ecosystems[21], with a further €19.9M awarded to Irish research institutions. TCD has the highest FWCI in ecology on the island for the period 2017-2021 at 2.24 (n=155), with many leading academics in this field in TCD's Nature+ initiative particularly in the area of nature-based solutions. TCD is followed by IT Sligo (now Atlantic TU) at 2.19 and AFBI at 2.01, with UCD also having a

[18] Research topics include: soil health; soil quality; soil carbon sequestration; forest utilisation; agroforestry; land use; land management; land diversification; bogs; land nutrient management; land use emissions and sequestration.

[19] Research topics include: freshwater catchment management; freshwater ecosystem management; marine ecosystems management; sustainable mariculture; marine nutrient management; fishing gear/equipment; fish tagging; fishing capacity; seaweed; aquaculture

[20] https://www.topuniversities.com/university-rankings/world-university-rankings/2022

[21] Research topics include: ecosystem services and sustainability; biodiversity; natural capital; protection and expansion of forest resource; resilient ecosystems; marine ecosystems

strong FWCI of 1.86 (n=191). QUB is the leader on the island in ecological modelling (34; 3.26). UCD also publishes in this area (n=31) but with a FWCI 6% below world averages (0.94).

UCD is ranked in the top 151-200 in the QS World University Rankings 2022 for Environmental Sciences, the highest of the five institutions on the island ranked for this subject area. Maynooth University has an excellent FWCI of 3.28 in environmental science (n=36) with leading academics in ICARUS (Irish Climate Analysis and Research UnitS), followed by IT Sligo (now Atlantic TU) at 2.93 and QUB at 2.21. UCD produced the most scholarly outputs in this field (n=190) during 2017-2021, with a FWCI of 1.76, as well as in the area of environmental management, monitoring, policy and law (269; 1.48). Of the total €36.5M awarded to PI-led individual research projects in the area of climate, air and water during 2015-2020, 81.1% (€29.6M) was allocated to research institutions in Ireland. QUB published 265 scholarly outputs during 2017-2021 in the area of pollution (FWCI of 1.37), closely followed by UCD (259; 1.19). Technology Universities are clearly leading in the research area of pollution with FWCIs of 3.61, 3.56 and 2.68 respectively for IT Sligo, Galway-Mayo IT (both now Atlantic TU) and TU Shannon Midland Midwest. Maynooth University is strong in atmospheric science with a FWCI of 2.48 (n=52). UCD published a similar number of scholarly outputs during the same period (n=51) with a FWCI of 2.19. Maynooth University is the most active institution on the island in the research area of climate modelling (92; 2.78), followed by UCD (59; 1.63). Despite this significant quantity of scholarly output, TCD has the highest FWCI on the island during 2017-2021 at 3.46 (n=29). In comparison, CNRS (French National Center for Scientific Research) has the highest FWCI in the world in climate modelling at 6.25.

## 6. Challenge 4 - Decarbonisation of the Energy System


The island of Ireland is currently facing an energy crisis due to a range of international factors, including the COVID-19 pandemic, geopolitical developments, inflationary pressures and energy supply shortages. These drivers highlight the growing need to decarbonise the energy system and for energy efficiency, renewable energy, resource recovery and biofuels.

The energy system is a major contributor to GHG emissions and climate change. In 2018, Ireland's share of GHG emissions from electricity as a percentage of overall emissions (17.9%) was less than the EU27 average (23.4%)[22]. It is encouraging to see that emissions from the energy industry sector in Ireland fell by 7.9% in a one-year period from 2019 to 2020, largely due to a 50.8% decrease in the consumption of peat. There were increases in coal, natural gas, oil and biomass (23.7%, 1.8%, 36.6% and 27.8% respectively) for electricity generated. In 2020, electricity generated from wind and hydro increased by 15.3% and 5.2% respectively, resulting in an 8.1% decrease in the emissions intensity of power generation. Renewables accounted for 42.1% in 2020 (compared to 37.6% in 2019), and natural gas accounted for 50.7% of electricity generated[23].

In the residential sector, emissions increased by 9.0% from 2019 to 2020. Natural gas use was the only fuel that declined in 2020 by 0.3% (compared to an increase in coal, peat and kerosene by 6.0%, 3.2% and 19.3% respectively). Although weather is a key variable in residential emissions per year, the flattening of the historic downward trend in per household $CO_2$ emissions since the early 2010s indicates the need for further energy efficiency retrofit activity in order to meet future emission targets.

[22] Department of the Environment, Climate and Communications, op. cit.
[23] Environmental Protection Agency, op. cit.

Electricity demand is forecast to grow by 19%-50% in Ireland over the next ten years, primarily due to new large energy users such as data centres, while at the same time electricity emissions need to decline by 60-80%[24]. Climate policy targets for this sector include increasing the proportion of renewable electricity to 80%, more renewable generation capacity (i.e. wind and solar power generation technologies), increased storage, and the deployment of zero-emissions gas by 2030.

The path to decarbonisation of the energy sector will be challenging given the increase in demand for energy, as well as the need to ensure the security of supply. There is an urgent need to develop innovation solutions to enable all sectors, including the energy sector, to respond to climate change. The government recognises that achieving decarbonisation of the electricity sector cannot be achieved without the 'social licence' of local communities and society as a whole.

Of the eight institutions on the island ranked in the QS World University Rankings 2022 for Electrical and Electronic Engineering, TCD is ranked the highest at 150th in the world followed by UCD and QUB, both ranked in the top 151-200. The Clarivate list of Highly Cited Researchers for 2021 included one Engineering researcher from NUI Galway. UCD published the highest number of scholarly outputs in energy during 2017-2021 (n=648), followed by QUB (572) and UCC (469). UCC hosts the MaREI SFI Research Centre for Energy, Climate and Marine, which brings together over 220 researchers from across 13 research institutions including UCD. The UCD Energy Institute and NexSys SFI Strategic Partnership (previously ESIPP) bring together the leading energy researchers from across UCD in both STEM and the social sciences. Maynooth University has the highest FWCI in energy on the island at 1.96, followed closely by QUB and IT Sligo (now Atlantic TU) both at 1.90. UCD has the fifth highest FWCI on the island at 1.68.

Looking specifically at the subject area of renewable energy, sustainability and the environment, QUB and UCD produced the most publications during the five-year 2017-2021 (353 and 333 respectively). In terms of FWCI, four institutions on the island are more than 100% above world averages - IT Sligo (now Atlantic TU) has the highest FWCI at 2.46, and UCD is ranked eight at 1.60. UCD published the most scholarly outputs in the area of energy engineering and power technology (n=382; 1.63).

## 7. Challenge 5 - Adapting Society and Infrastructure


Climate change is the direct result of human activity, and its impacts are not felt equally by all in society. The transition to a climate-neutral and sustainable island of Ireland will require radical changes in how we work and live. This transition will require a collaborative effort between government, industry, local communities and citizens to deliver on the ambitious national and EU policy targets and in order to develop new technological innovations. Changes in individual behaviours - such as how we work, warm our homes, travel, consume goods and services, and manage our waste – are urgently required. This transition across society must be fair, just and empowering for all. In the 2021 Climate Action Plan, the government recognises the need for a just transition which is made up of four key principles:

1. An integrated, structured and evidence-based approach to identify and plan our response to just transition requirements.
2. People are equipped with the right skills to be able to participate in and benefit from the future net zero economy.
3. The costs are shared so that the impact is equitable and existing inequalities are not exacerbated.

[24] Department of the Environment, Climate and Communications, op. cit.

4. Social dialogue to ensure impacted citizens and communities are empowered and are core to the transition process[25].

A range of climate policy targets for infrastructure, including transport, buildings and construction materials, have been set by the government for 2030:

- Accelerate the electrification of road transport (e.g. increasing the number of electric vehicles to one million), the use of biofuels, and a shift to transport modes with lower energy consumption.
- Retrofit 500,000 homes to a B2 equivalent BER standard, rollout of district heating in cities, and accelerating zero-emissions heating in commercial buildings.
- Decrease embodied carbon in construction materials[26].

Research areas and expertise that were not previously associated with an economic sector, such as behavioural science, public policy and law, are now becoming vital to address the many environmental and sustainability challenges facing the world. UCD has been a national leader in this interdisciplinary space – for example, UCD was instrumental in the introduction of the first citizens' assembly in Ireland, and there are now a number of assemblies including the Citizens' Assembly on Biodiversity and the Youth Climate Assembly. A UCD academic has also been appointed to the new European Bauhaus. This initiative is an interdisciplinary and creative space where architects, artists, students, scientists, engineers and designers collaborate to implement the European Green Deal.

UCD and TCD are both ranked in the top 51-100 in the world in the QS World University Rankings 2022 for Politics. UCC, TCD and UCD are all ranked in the top 100 in the world for Law and Legal Studies (75$^{th}$ and joint 78$^{th}$ respectively). UCD published the second highest number of scholarly outputs during 2017-2021 in the Social Science subject area of transportation (n=59), with a strong FWCI of 2.01. NUI Galway has the highest FWCI in this topic area at 2.63.

UCD publishes extensively in the subject area of geography, planning and development (380; 1.34), and TU Shannon Midland Midwest has the highest FWCI of 2.23. UCD is ranked in the top 101-150 in the world for Architecture and Built Environment. DCU has an impressive FWCI of 3.98 for the period 2017-2021 in building and construction, with QUB and UCD producing the most scholarly outputs during the same period (213 and 186 respectively). UCD, with a FWCI of 1.70 for the building and construction subject area, was recently successful in securing funding from Enterprise Ireland for a new €5M Construction Technology Centre, led by NUI Galway in partnership with TCD, UCC and the Irish Green Building Council.

## 8. UCD Leadership

Radical transitions and transformation are essential at this critical time. Systemic fundamental and translational research that maximise the potential and expertise on the whole island of Ireland is needed to develop innovative solutions that overcome global sustainability challenges. Academics, institutes and research groups across the island are now pivoting their research activities to develop these solutions and technologies.

UCD is one of Europe's leading research-intensive universities and is ranked within the top 1% of higher education institutions worldwide. The university demonstrates excellence in its diversity of disciplines and its contribution to the prosperity of the island through education, research and innovation. As Ireland's largest and most globally engaged university, UCD is playing a key role in the national response to environmental and sustainability challenges. UCD is delivering excellent and impactful R&I in a number of sustainability challenge areas where the university, and the island as a whole, can lead globally working with a range of strategic partners including government,

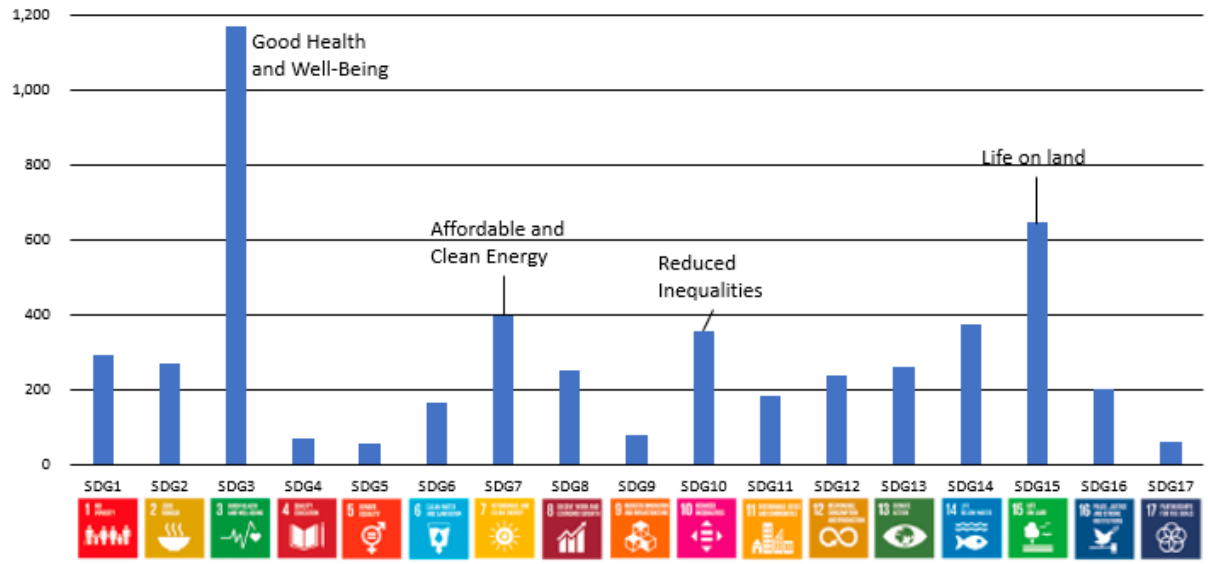
[25] Ibid.
[26] Ibid.

industry, communities and citizens. Figure 1 below illustrates the many large-scale strategic research programmes, initiatives and partnerships that UCD is leading in the area of sustainability.

**Figure 1: Examples of Large-Scale UCD Strategic Research Initiatives in Sustainability**


It is important that we understand how UCD's research activities contribute to the knowledge base that informs delivery of the SDGs, and that we work with stakeholders to ensure our knowledge has a positive impact on societies and economies. During 2020-2021, one-third of UCD's total publication output (n=3,185 publications) contributed to the SDGs. Notably, over 65% of UCD's total faculty and research staff publishing during this period contributed to advancing knowledge related to the SDGs. It is clear that UCD is leading in a number of SDG areas.

**Figure 2: Volume of research outputs between 2020-2021 aligned with SDG areas**



Many of the solutions to the challenges set out by the SDGs can only be resolved through understanding interdependencies and assessing the optimum systems solutions across many diverse parameters. UCD's Research Institutes, Centres, Schools and academics are working on a range of interdisciplinary sustainability challenges, and the outputs of this research are technical solutions and evidence-based policy recommendations around the challenges of energy and food security, natural resources, biodiversity loss etc.

It is clear that UCD has world-leading strength, scale and expertise in a number of sustainability research areas of national and global importance, as well as emerging areas of strength where the university can deliver excellence and impact. UCD is publishing extensively in a range of academic fields, demonstrating the scale and breadth of the university's research activity. The university is also ranked highly in the QS World University Rankings 2022 for a number of subject areas. FWCI can also be a useful metric in determining the quality and impact of research activities and scholarly outputs. The R&I landscape on the island is becoming increasingly competitive, most recently with the establishment of five new Technology Universities in Ireland. UCD must continue to meet international best practice and enhance its research performance in order to positively contribute to a sustainable transition to climate-neutrality by 2050.

## Appendix 3 – initial listing of UCD degree programmes and modules with relevance to sustainability

This listing was prepared by Una Watkins (UCD Global). It is intended as a starting point for the development of a comprehensive inventory through consultation with Schools and Programmes (Recommendation 4.2).

Table A3.1 Degree programmes

| COURSE TITLE | AWARD | TYPE | DURATION |
|---|---|---|---|
| Agricultural Science - Omnibus (Omnibus) | BAgriSci | Taught | 4 Years |
| Agricultural Systems Technology (Single Major) | BAgriSci | Taught | 4 Years |
| Agriculture & Food Science | MAgrSc | Research | 2 Years / 4 Years |
| Agri-Environmental Sciences (Single Major) | BAgriSci | Taught | 4 Years |
| Animal & Crop Production (Single Major) | BAgriSci | Taught | 4 Years |
| Animal Science - Equine (Single Major) | BAgriSci | Taught | 4 Years |
| Animal Science (Single Major) | BAgriSci | Taught | 4 Years |
| Architecture, Urbanism & Climate Action | MSc | Taught | 1 Years |
| Biological & Environmental Science | MSc | Research | 1 Years / 2 Years |
| Biosystems & Food Engineering | ME | Taught | 2 Years |
| BSc Sustainability (Single Major) | BSc | Taught | 4 Years |
| BSc Sustainability with Environmental Sciences (Single Major) | BSc | Taught | 4 Years |
| BSc Sustainability with Social Sciences, Policy and Law (Single Major) | BSc | Taught | 4 Years |
| Business Sustainability | | Taught | 18 Months |
| Civil Engineering | ME | Taught | 2 Years |
| Civil, Structural & Environmental Engineering | ME | Taught | 2 Years |
| Crop Science (Single Major) | BAgriSci | Taught | 4 Years |
| Dairy Business (Single Major) | BAgriSci | Taught | 4 Years |
| Design Thinking for Sustainability | GradDip | Taught | 9 Months |
| Development Practice | MPA | Taught | 2 Years |
| Digital Agriculture | MSc | Taught | 1 Years / 2 Years |

| | | | |
|---|---|---|---|
| Earth & Natural Sciences | PhD | Research | 3 Years / 6 Years |
| Earth Sciences | MSc | Research | 2 Years |
| Energy Systems | ME | Taught | 2 Years |
| Environmental Biology (Single Major) | BSc | Taught | 4 Years |
| Environmental Policy | MSc | Taught | 1 Years |
| Environmental Resource Management | MSc(Agr) | Taught | 1 Years |
| Environmental Science | MSc | Taught | 1 Years / 2 Years |
| Environmental Sustainability | GradCert | Taught | 2 Years / 4 Years |
| Environmental Technology | MSc | Taught | 1 Years |
| Food & Agribusiness Management (Single Major) | BAgriSci | Taught | 4 Years |
| Forestry (Single Major) | BAgriSci | Taught | 4 Years |
| Geography | MA | Taught | 1 Years / 2 Years |
| Global Change: Ecosystem Science & Policy | MSc | Taught | 16 Months |
| Horticulture (Single Major) | BAgriSci | Taught | 4 Years |
| Horticulture, Landscape & Sportsturf Management (Single Major) | BAgriSci | Taught | 4 Years |
| International Development | GradDip | Taught | 1 Years / 2 Years |
| International Political Economy | MA | Taught | 1 Years / 2 Years |
| Planning, Development & Urban Design | MSc | Taught | 1 Years / 2 Years |
| Plant Biology (Single Major) | BSc | Taught | 4 Years |
| Politics | MA | Taught | 1 Years / 2 Years |
| Power System Analysis | ProfDip | Taught | 1 Years |
| Public Policy | GradDip | Taught | 1 Years / 2 Years |
| Regional & Urban Planning | MRUP | Taught | 1 Years / 2 Years |
| Renewable Energy & Environmental Finance | MSc | Taught | 1 Years / 2 Years |
| Risk, Resilience & Sustainability | MSc | Taught | 1 Years / 2 Years |
| Spatial Demography | MSc | Taught | 1 Years / 2 Years |
| Sustainable Development | MSc | Taught | 1 Years / 2 Years |
| Sustainable Energy & Green Technologies | MSc | Taught | 1 Years |

| | | | |
|---|---|---|---|
| Urban & Building Conservation | MUBC | Research | 16 Months |
| Urban Design | MSc | Research | 16 Months / 25 Months |
| Water, Waste & Environmental Engineering | MEngSc | Taught | 1 Years / 2 Years |
| Wildlife Conservation & Management | MSc | Taught | 1 Years |
| World Heritage Conservation | MSc | Taught | 3 Years |
| World Heritage Management | GradDip | Taught | 1 Years |
| World Heritage Management & Conservation | MSc | Taught | 1 Years / 2 Years |

Table A3.2. Modules

| | |
|---|---|
| ACM10090 - Climate Change:Causes & Consequences | FDSC40030 - Food Process Technology I |
| AERD20020 - Business Law | FDSC40040 - Food Process Technology II |
| AERD20030 - Business Management | FDSC40060 - Fresh&Processed Meat Products |
| AERD30010 - Spreadsheet Modelling and Business Applications | FDSC40080 - Milk and Dairy Products |
| AERD30020 - Enterprise Development | FDSC40120 - Project |
| AERD30030 - Agri-Environmental Economics and Policy | FDSC40270 - Introduction to the European Union and Food Regulatory Affairs (UU) |
| AERD30050 - Financial Planning and Control | FDSC40280 - Farm to Fork Regulation of the Food Chain (UU) |
| AERD30180 - Professional Work Experience | FDSC40290 - Risk Analysis (UU) |
| AERD30190 - Farm Business Management | FDSC40300 - International Food Regulatory Affairs (UU) |
| AERD30200 - Statistics and Econometrics | FDSC40310 - Research Design & Statistics (UU) |
| AERD30210 - Food and Agricultural Policy | FDSC40320 - Food & Health (UU) |
| AERD30220 - Agri-Taxation | FDSC40330 - Current Issues Food Regulatory Affairs (UU/UCC) |
| AERD40020 - International Food Marketing | FDSC40340 - Research Project (FRA)(UU/UCC) |
| AERD40040 - Food and Agribusiness Strategy | FDSC40500 - Chemistry of Nutrients |
| AERD40100 - Economics of Food Markets and Business Behaviour | FDSC40510 - Food Chemistry |
| AERD40110 - Group Project | FDSC40520 - Food Microbiology & Safety |
| AERD40130 - Food Policy and Industry Responses | FDSC40530 - Physiology & Metabolism |
| AERD40140 - Analysis of Prices and Markets in Global Agri-Business | FDSC40540 - Food Process Technology |
| AERD40150 - Innovation for Food Business | FDSC40550 - Meat and Meat Products O/L |

| | |
|---|---|
| AESC10010 - Land Use and the Environment<br>AESC20050 - Applied Zoology<br>AESC20060 - Soil Science Basics<br>AESC20070 - Soil Resources<br>AESC2009K - Microbiology in Action: Food, Health, Environment<br>AESC30010 - Scientific Writing and Review<br>AESC30080 - Agri-Environmental Issues and Policy<br>AESC30100 - Pests, Parasites and Beneficials<br>AESC30110 - Diversity in the Rural Landscape<br>AESC30150 - Forest Protection<br>AESC30160 - Agrichemicals and the Environment<br>AESC30170 - Professional Work Experience<br>AESC30210 - Plant Protection - Pests<br>AESC30220 - Soil Science Applications<br>AESC30230 - Climate, Carbon and Soil<br>AESC30240 - Pesticide Use, Integrated Pest Management (IPM) and the Environment<br>AESC30250 - Environmental Data and Modelling<br>AESC3026K - Soil Science and Plant Nutrition<br>AESC3027K - The Circular Bioeconomy<br>AESC40140 - Agri-Environmental Nutrient Management<br>AESC40150 - Wildlife Conservation<br>AESC40160 - Research Project (AESC)<br>AESC40180 - Data Analysis for Biologists<br>AESC40190 - Habitat Evaluation<br>AESC40200 - Conservation Genetics<br>AESC40250 - Soil Resources<br>AESC40340 - Environmental Management<br>AESC40360 - One Health<br>AESC40370 - Research Project (AESC) 2 | FDSC40560 - Nutrition and Health Claims (UU)<br>FDSC40570 - Food Marketing (O/L)<br>FDSC40580 - Project Module (O/L)<br>FDSC40590 - Milk and Dairy Products (O/L)<br>FDSC40600 - Principles of Sensory Science<br>FDSC40620 - Design Thinking for Food Packaging<br>FDSC40630 - Food Sector Entrepreneurship and Enterprise Development<br>FDSC40680 - Risk Assessment, Management & Communication<br>FDSC40690 - Food Safety Management<br>FDSC40700 - Regulatory Content & Drivers<br>FDSC40710 - Bioinformatics in Food Safety<br>FDSC40720 - Food Risk Analysis<br>FDSC4072K - Food Safety & Security<br>FDSC40730 - Science & Stds of Food Safety<br>FDSC4073K - Food Security: Food Access<br>FDSC40740 - Food Regulation Exec<br>FDSC4074K - Global Food Regulation&Policy<br>FDSC4075K - Food Process Technology IISCAU<br>FDSC4076K - Local Food Production<br>FDSC50010 - Effect. Leadership&Mngt Skills<br>FDSC50020 - Media Skills Agriculture &Food<br>FDSC50040 - Statistical Analysis Research<br>FDSC50050 - Science Writg &Present. Skills<br>FDSC50060 - Advanced Statistics<br>FIN2001H - Economic Policy and the Global Environment<br>FIN30220 - Green Ventures<br>FIN41910 - Green Data Science<br>FOR10020 - Trees and Forests in Ireland<br>FOR20020 - Elective Forestry Project I<br>FOR20040 - Tree Structure and Function |

| | |
|---|---|
| AESC40390 - Human Impact on the Environment | FOR20050 - Principles of Forestry |
| AESC40400 - Seminar Presentation | FOR20100 - Applied Biostatistics |
| AESC40410 - Soil, Plant & Water Resources | FOR20110 - Forests, Climate and Carbon |
| AESC40420 - Geographic Information Systems | FOR20120 - Apiculture - bees, pollination and people |
| AESC40440 - Biodiversity and Ecosystem Services | FOR20130 - International Forestry |
| AESC40450 - Rural Habitat Management | FOR30050 - Elective Forestry Project II |
| AESC40460 - Literature Review (AESC) | FOR30070 - Forest Harvesting |
| AESC40470 - Practical Research Skills | FOR30180 - Professional Work Experience |
| AESC40660 - Plants, Roots and Productivity | FOR30320 - Wood Science |
| AESC40670 - Human Impact Environment | FOR30340 - Professional Forestry Practice |
| AESC4069K - Biodiversity and Ecosystem Ecology | FOR30400 - Silviculture |
| AESC4070K - Global Change Biology | FOR30410 - Forest Inventory and Sampling |
| AESC4071K - Wildlife Management and Conservation | FOR30420 - Forest Management and Economics |
| AESC4072K - One Health: Plants, Animals, Humans, Environment | FOR30430 - Geographic Information Systems |
| AESC4073K - Global Food Security | FOR40020 - Elective Forestry Project III |
| ANSC10010 - Introduction to Animal Science | FOR40060 - Forest Management Plan |
| ANSC20010 - Genetics and Biotechnology | FOR40130 - Research Project |
| ANSC20020 - Animal Nutrition I | FOR40150 - Experimental Design |
| ANSC20050 - Principles of Dairy Production | FOR40160 - Forest Inventory & Mgmt. Plan |
| ANSC30010 - Animal Reproduction | FOR40170 - Forest Planning & Optimisation |
| ANSC30020 - Animal Breeding I | GEOG10140 - Mapping a Sustainable World |
| ANSC30030 - Animal Genomics | GEOG10150 - Introduction to Sustainability |
| ANSC30040 - Animal Nutrition II | GEOG20060 - Weather, Climate and Climate Change |
| ANSC30050 - Experimental Design and Data Analysis | GEOG20150 - Quaternary Environmental Change |
| ANSC30070 - Professional Work Experience | GEOG20230 - Intro: GIS for Sustainability |
| ANSC30100 - Applied Biotechnology | GEOG20240 - Sustainability: Research Tools |
| ANSC30120 - Non-ruminant Animal Production (Swine & Poultry) | GEOG30780 - Quaternary Environmental Change in Ireland |
| ANSC30130 - Principles of Animal Health, Behaviour and Welfare | GEOG30840 - The Urban Environment |
| ANSC30150 - Animal Physiology II | GEOG30860 - Environmental Assessment |
| ANSC30170 - Animal Physiology I | GEOG40770 - GIS for Environmental Assessment |

ANSC30210 - Equine Industries
ANSC30220 - Equine Health and Husbandry
ANSC30230 - Professional Work Experience
ANSC30250 - Equine Genetics
ANSC30280 - Herd Health & Milk Quality
ANSC30290 - Grassland Management and Applied Dairy Nutrition
ANSC30310 - Dairy Systems
ANSC30320 - Dairy Business Project
ANSC30330 - Applied Dairy Breeding and Fertility
ANSC30340 - Equine Reproduction and Breeding Management
ANSC30350 - Equine Nutrition
ANSC30370 - Professional Work Experience
ANSC30380 - Animal Science Industries
ANSC30390 - Sheep Production
ANSC30400 - Beef Production
ANSC30410 - Dairy Production
ANSC40010 - Applied Animal Reproduction
ANSC40040 - Advanced Dairy Production
ANSC40090 - Equine Science Project
ANSC40110 - Equine Anatomy,Physiology&Repr
ARCH40900 - Cultural Heritage Conservation
ARCH40920 - Natural Heritage Conservation
ARCH40950 - Conservation Strategies
ARCH40960 - Sustainable Strategies
ARCH40970 - Project (World Heritage Conservation)
ARCT10030 - Architecture & its Environment
ARCT10070 - History & Theory of the Designed Environment II - Survey Course 1
ARCT10090 - History & Theory of the Designed Environment I - Perspectives on Architecture

GEOG40850 - GIS for Environmental Investigations
GEOG40860 - Practical Environmental Assessment
GEOG41030 - Sustainability Internship SSL
GEOG41040 - Internship in Sustainability
GEOL10040 - Earth, Environment and Society
GEOL20110 - Global Environmental Change
GEOL20180 - Geoscience perspectives on the UN Sustainable Development Goals
GEOL30040 - Sedimentary Environments
GEOL40300 - Environmental Geology
GEOL40450 - Environmental Geoscience
HIS42490 - Landscape and Environment in Ireland, 1500-1800
HNUT10010 - Human Nutrition I - Understanding Nutrients
HNUT10020 - Human Nutrition I - Understanding Nutrition
HNUT10030 - Physiology for Nutrition
HNUT20010 - Human Nutrition II - Nutrients in Life Stages
HNUT20020 - Nutrition and Health
HNUT20060 - Human Nutrition II - Nutrients in Life Stages
HNUT20070 - Population Nutrition Research
HNUT20080 - Laboratory Nutrition Research
HNUT30010 - Food Diet and Health III
HNUT30020 - PWE
HNUT30170 - Professional Work Experience
HNUT40010 - Food Regulation - Food Science
HNUT40020 - Nutritional Metabolism
HNUT40060 - Introduction to Nutrition
HNUT40070 - Nutrients in the Life Cycle
HNUT40080 - Omic Strategies in Nutrition
HNUT40090 - Pathways to Health (O/L)
HNUT40100 - Food Regulatory Affairs (O/L)
HNUT40110 - Food Quality and Safety (O/L)

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| ARCT20020 - The Indoor Environment<br>ARCT20040 - History & Theory of the Designed Environment III - Survey Course 2<br>ARCT30030 - History & Theory of the Designed Environment IV - Architecture, Urban and Landscape<br>ARCT40020 - Research & Innovation in the Designed Environment<br>ARCT40080 - Research and Innovation in the Designed Environment II<br>ARCT40170 - Conservation History, Theory and Policy<br>ARCT40330 - Thesis - Urban and Building Conservation<br>ARCT40490 - Irish Designed Environment<br>ARCT41210 - Architecture in a Climate Emergency<br>ARCT41260 - Climate Carbon Cities Change<br>BIOL20050 - Climate Change and Agriculture<br>BIOL40160 - Biodiversity Informatics (JLU)<br>BIOL40230 - Resource Economics and Environmental Management (JLU)<br>BIOL40580 - Policy Consulting - Environmental Policy and Development Cooperation (JLU)<br>BIOL40740 - Sustainable agro-ecosystems<br>BIOL40770 - Man in Past Climates and Climate Change Impacts (JLU)<br>BMGT1001S - Business Environment<br>BMGT1008D - Business Environment<br>BMGT30280 - Ireland's International Business Environment<br>BMGT30330 - Governing International Trade, Finance, Climate and the Internet<br>BMGT44090 - Global Business Environments<br>BMGT44280 - Supply Chain Sustainability<br>BMOL40370 - Environment Sustainability<br>BSEN30020 - Buildings and Environment<br>BSEN30210 - Precision Agriculture<br>BSEN30310 - The Bioeconomy; A strategy for sustainable fuel, material and chemical production | HNUT40130 - Research Design and Statistics<br>HNUT40150 - Nutritional Assessment<br>HNUT40160 - Clinical Nutrition (Post Grad)<br>HNUT40170 - Professional Practice<br>HNUT40220 - Clinical Nutrition<br>HNUT40240 - Food Regulation<br>HNUT40250 - Clinical Nutrition O/L<br>HNUT40260 - Food & Health Research Skills<br>HORT10020 - Plants and People<br>HORT1003K - Plants and People<br>HORT20020 - Fundamentals of Horticulture<br>HORT20060 - Sportsturf Construction<br>HORT20070 - Agricultural Botany<br>HORT2008K - Fundamental of Horticulture<br>HORT30020 - Elements of Landscape Design<br>HORT30040 - Landscape Management<br>HORT30050 - Landscape Trees and Shrubs<br>HORT30070 - Professional Work Experience<br>HORT30190 - Food Production: Fruit and Post Harvest Physiology<br>HORT30260 - Sportsturf Management<br>HORT30270 - Horticulture Seminar<br>HORT30380 - Horticulture Field Studies<br>HORT3039K - Advanced Technologies in Temperate Protected Crops<br>HORT3040K - Advanced Technologies in Temperate Fruit Crops<br>HORT40080 - Research Project<br>HORT40090 - Nursery Production & Management<br>HORT40100 - Minor Thesis<br>HORT40110 - Food Production: Vegetable Crops<br>HORT40120 - Food Production: Protected Crops<br>HORT4013K - Landscape Management (Trees & Shrubs) |

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| BSEN40210 - Green Technologies Project<br>BSEN40480 - Sustainable Energy & Environment<br>BSEN40700 - Energy System & Sustainable Environments<br>BSEN40720 - Carbon & Sustainability<br>BSEN40790 - Carbon & Sustainability<br>CHEM20110 - Env & Sustainable Chemistry<br>CHEM40960 - Green and Sustainable Chem<br>CHEN40010 - Environmental Engineering<br>COMP47290 - Green, Sustainable, Data Centre Management<br>CPSC10010 - Introduction to Crop Science<br>CPSC20020 - Fundamentals of Arable Crop Production<br>CPSC20030 - Principles of Crop Science<br>CPSC20040 - Physiological Plant Ecology<br>CPSC30010 - Professional Work Experience<br>CPSC30030 - Root and Alternative Crop Production<br>CPSC30040 - Grass and Forage Production<br>CPSC30050 - Organic Agriculture | HORT4014K - Nursery Production and Management<br>HORT4015K - Sportsturf Construction and Management<br>HORT4016K - Advanced Technologies in Temperate Field Vegetable Crops<br>HORT4017K - Post Harvest Physiology: Fresh Produce Supply Chain Management<br>IA20100 - Innovation for Sustainability<br>IA20140 - Design a Sustainable Future<br>IA20210 - Innovation for Sustainability (OL)<br>IA40610 - Design for User-Centric, Sustainable Solutions<br>LARC40550 - Building Biodiversity: nature as Builder<br>LAW30440 - Environmental Law and Policy<br>LAW40120 - Environmental Law and Policy<br>LAW41090 - Climate Change Law and Policy<br>LAW41730 - Environmental Law&Policy SBES<br>MATH00030 - Access to Science, Engineering and Agriculture - Mathematics I<br>MATH00040 - Access to Science, Engineering and Agriculture - Mathematics II<br>MATH10230 - Mathematics for Agriculture I<br>MATH10240 - Mathematics for Agriculture II |
| CPSC30060 - Biology and Control of Weeds, Pests and Diseases of Crops<br>CPSC30070 - Integrated Pest Management (IPM) Principles and Practice<br>CPSC30080 - Use of Integrated Pest Management Practices in Crop Management Programmes<br>CPSC30100 - Emerging Crop Pathogens<br>CPSC40010 - Cereal Production<br>CPSC40040 - Developments in Grassland<br>CPSC40050 - Devs in Crop Production & Util<br>CRWT30150 - Writing the Environment<br>CVEN20030 - Environmental Engineering Fundamentals<br>CVEN2003W - Environmental Eng Fundamentals<br>CVEN40570 - Water Waste and Environmental Modelling | MEEN40090 - Energy Systems and Climate Change<br>MEEN40900 - Energy, Climate and Sustainability (online)<br>MICR20050 - Microbiology in Medicine, Biotechnology and the Environment<br>MICR40140 - Environmental Biotechnology<br>MKT50010 - Researching Social Theories, Resources, and Environment International Summer School<br>NMHS33160 - Nursing a Person in the Medical Environment<br>OVSE3050W - Biodiversity and Ecosystem Ecology (SCAU)<br>OVSE3052W - Environmental Sciences (SCAU)<br>OVSE3055W - Environmental Microbiology (SCAU)<br>PHYC40660 - The Space Environment<br>PLAN30010 - Transport, Environment & Sustainability<br>PLAN40050 - Transport, Environment & Sustainability |

CVEN40590 - Environmental Research Project
CVEN40800 - Environmental Research Proj
DEV20130 - Achieving the Sustainable Development Goals
DSCY10060 - Energy, Climate Change & Policy
ECON2001D - Economic Policy and the Global environment
ECON20160 - Economics of the Environment
ECON42680 - Competition & Industrial Policy for Sustainable Development
EDUC10220 - Education for a sustainable future
ENG32310 - Climate and Environment in Global Literature
ENVB20050 - Principles of Environmental Biology & Ecology
ENVB30020 - Wildlife Conservation and Fisheries Management
ENVB30100 - Ecological and Environmental Microbiology
ENVB30120 - Genetics for Environmental Scientists (On-line)
ENVB30140 - Analysis of Environmental Materials
ENVB40040 - Environmental Impact Assessment
ENVB40310 - Peatlands and Environmental Change
ENVB40320 - Wildlife Management/Conservation (On-line)
ENVB40410 - Management of Sustainable Fisheries (On-line)
ENVB40510 - Analyses for Environmental Investigations
ENVB40620 - Environmental Impact Assessment Procedures On-line (1 of 2)
ENVB40630 - Environmental Impact Assessment Procedures On-line (2 of 2)
ENVB40650 - Environmental-based internship
ENVB40700 - Environmental experience
ENVP10010 - Environment Change & Policy
ENVP10030 - Environmental Economics
ENVP2001W - Environmental Economics
ENVP20020 - Case Studies Environmental Pol
ENVP2002W - Environmental Economics
PLAN40390 - Sustainable Cities
RDEV10020 - Information Skills
RDEV10030 - Introduction to Agricultural Economics and Business
RDEV10040 - Introduction to Food and Agribusiness Management
RDEV20030 - Applied Economic Analysis
RDEV20140 - Health, Welfare & Safety in Agriculture
RDEV20220 - Agri-Food and the Sustainable Development Goals
RDEV30040 - Information Technology and E-Business
RDEV30060 - Professional Communications
RDEV30160 - Food Poverty and Policy
RDEV30380 - Knowledge Tfr for Farm Innovat
RDEV40050 - Economics and Sociology in Rural Development
RDEV40150 - Policies & Strategies for Sustainable Agriculture & Rural Development
RDEV40220 - Minor Thesis
RDEV40230 - Minor Thesis
RDEV40300 - Theory & Practice of Rural Enterprises
RDEV40390 - Orientation Period - Aix
RDEV40410 - Orientation Period - Deusto
RDEV40420 - Orientation Period - Groningen
RDEV40430 - Orientation Period - Bochum
RDEV40440 - Orientation Period - Uppsala
RDEV40450 - Research Methods Part I
RDEV40460 - Research Methods Part II
RDEV40470 - Planning for Development
RDEV40480 - Strategic Communications
RDEV40490 - Sustainable Agriculture
RDEV40540 - Social Farming:Policy & Practice
RDEV40560 - Agricultural Extension & Innov
RDEV40600 - Ag Extension&Innovation Online
RDEV40610 - The Reflective Agri Advisor

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| ENVP30010 - Environmental Management | RDEV40620 - Minor Thesis (Ext&Innovation) |
| ENVP30030 - Climate Policy and Politics | RDEV40630 - Client relationships in AgExt |
| ENVP4000W - Environmental Management | RDEV40640 - Agricultural Education |
| ENVP40020 - European Environmental Policy | RDEV40650 - Group Approaches in Ag Extensi |
| ENVP40030 - Environmental Policy Thesis | RDEV40660 - Orientation Period-Warsaw |
| ENVP40070 - Research for Environmental Policy | RDEV40670 - Food & Agribusiness Research Project |
| ENVP40100 - Environmental Economics & Climate Policy | RDEV40680 - Contextualisation |
| ENVP40170 - Research for Environmental Pol | RDEV40710 - Orientation Period- Malta |
| ENVP40180 - European Environmental Policy | RDEV40720 - Project Mngt in Ag Extension |
| ENVP40200 - Environmental Risk & Behaviour | RDEV40730 - Understanding the Family Farm Business |
| ENVP40220 - Environment and Behaviour | RDEV40740 - Green Care Policy and Practice |
| ENVP40230 - Environmental Economics | RDGY41190 - Child Welfare and Protection in the Clinical Environment |
| FDSC10010 - Food Diet and Health | SBUS41510 - Sustainable Agri-business Supply Chains |
| FDSC20010 - Food Macronutrients | SBUS41610 - Branding Sustainability |
| FDSC20020 - Nutritional Energy Metabolism | SBUS41630 - Org.Change for Sustainability |
| FDSC20030 - Basic Food Analysis | SBUS41650 - Environmental Policy |
| FDSC20040 - Sensory Analysis | SBUS41660 - Sustainable Food Business |
| FDSC20100 - Agricultural Biochemistry | SBUS41770 - Strategy in a Turbulent Environment - The New Normal |
| FDSC20110 - Food Diet and Health II - Making Healthy Food Choices | SBUS45500 - Business Sustainability |
| FDSC20230 - Introduction to Human Eating Behaviour | SBUS45660 - Business Sustainability Grads |
| FDSC2024K - Food Chemistry A | SCI10060 - Sustainability Challenges |
| FDSC2025K - Human Nutrition | SCI20040 - Careers and innovation in sustainability |
| FDSC2026K - Plant Products | SCI30110 - Sustainability Project |
| FDSC2027K - Microbiology | SCI40210 - Internship in Sustainability |
| FDSC30020 - Food Analysis I | SMGT40440 - Sport Event M & Sustainability |
| FDSC30030 - Food Analysis II | SPOL28160 - Soc Pol Sustainable Wellbeing |
| FDSC30040 - Food Chemistry I | SPOL30220 - Social Policy, Social Justice and the Environment |
| FDSC30050 - Food Chemistry II | ZOOL40490 - Wildlife Habitat Modelling for Ecology and Conservation |
| FDSC30070 - Product Development | ZOOL40510 - Conservation of Biodiversity: Theory and Practice |
| FDSC30150 - Principles of Meat Science | |

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| FDSC30160 - Professional Work Experience<br>FDSC30210 - PWE SCAU<br>FDSC3022K - Sustainability in Diet:<br>FDSC3023K - Animal Products<br>FDSC3024K - Food Process Technology I SCAU<br>FDSC3025K - Adv. Food Safety&Security Pt 1<br>FDSC3026K - Adv. Food Safety&Security Pt 2<br>FDSC40010 - Fermented Foods<br>FDSC40020 - Food Ingredients | |