



# The contribution of UCC Research to the United Nations Sustainable Development Goals

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# President's Message



The climate emergency is the defining challenge of our age and universities are key to enabling global action to make the world a more sustainable place for all. As Ireland's Green University, at UCC our students and staff work together to put sustainability at the centre of our research, learning and operations.

UCC was the first Green Flag campus in the world and is globally recognised as a leader in sustainability in higher education, now ranked the 8th most sustainable university in the world in the UI GreenMetric World University Rankings. Sustainability is at the heart of all that we do in UCC. Climate change action and solutions are the focus of much of the world-class work of our research community, a core element of our Connected Curriculum, and guide the management of our campus.

The United Nations Sustainable Development Goals (SDGs) call on all of us to work together to ensure that the most pressing social, economic and environmental issues are addressed by 2030. In 2022, UCC was ranked 62nd out of 1,406 universities worldwide in the Times Higher Education (THE) Impact Rankings.

These rankings examine the performance of universities through the lens of the SDGs across four different areas – research, teaching, stewardship and outreach. UCC is ranked in the top 40 in the world across five SDGs, demonstrating our leadership in these strategic areas of importance.



As the Government launches its new National Implementation Plan for the Sustainable Development Goals 2022-2024, we have mapped the diverse range of research undertaken across all disciplines at UCC that contributes to the achievement of the SDGs, at a local, national, and international level. This work is a wonderful resource for the UCC community and our partners, and provides a strong foundation for us to build on in the coming years. As a research-intensive university, the SDGs feature prominently in UCC's Strategic Plan 2023-2028, maintaining our steadfast commitment to the SDGs throughout this United Nations Decade of Action.





# Vice President for Research and Innovation's Message



UCC is a future-focused, research-led university, and our researchers play a key role, not only in the development of Ireland's knowledge-based economy, but also in the global drive to achieve the United Nations Sustainable Development Goals (SDGs) by 2030. At UCC, our researchers mine the frontiers of curiosity and inquiry at the intersection of disciplines to deliver impactful research.

University research ensures we have the innovations and solutions to successfully address the most concerning sustainable development issues facing the world today, including tackling poverty and hunger, ensuring health and wellbeing, protecting the environment on land and in the sea, and promoting universal social, economic and political inclusion. Our researchers are expanding new knowledge in all of these critical areas and driving solutions to the SDGs.

There has been exceptional engagement from the research community on this project, with hundreds of researchers engaging with the SDGs workshops, completing the mapping of their own research to the SDGs and submitting detailed case studies

describing the tangible impacts of their research in achieving the SDGs.

***"This demonstrates the huge commitment to the SDGs amongst researchers across all 27 Schools in the University and key Research Centres."***

To secure our future through excellence in research, we recently launched our UCC Futures initiative, an ambitious programme of research prioritisation, coupled with an innovative academic recruitment programme across ten areas of strategic importance, and aligned with the SDGs. Key to UCC Futures is the integration of researchers from different disciplines to share their knowledge and expertise to provide holistic solutions that address global societal challenges. The SDGs are recognised as one of the central principles of UCC's Research Charter which is in development and are also central to the research focus in the UCC's new Strategic Plan 2023-2028. This project is thus an important starting point and provides a compass in our journey to ensure that we are prioritising research that contributes to making the world a more sustainable place for all.





**32**

SDGs workshops

**27**

No. of  
participating Schools

**8**

No. of participating  
Research Centres

**477**

No. of researchers that  
attended SDGs workshops

## UCC Research and the SDGs



**119**

SDGs impact  
case studies

**497**

No. of researchers that  
completed mapping

**5,128**

No. of SDGs-related  
publications

**2.68**

Average Field-Weighted  
Citation Impact per  
SDGs topic



# **SECTION 1: BACKGROUND**

# The 17 Sustainable Development Goals

## SUSTAINABLE DEVELOPMENT GOALS



The Sustainable Development Goals (SDGs) have been described by the United Nations as a "*blueprint to achieve a better and more sustainable future for all*" and provide a common language to describe the impact our research community has on a local, national, and international scale. The 17 goals, and 169 associated targets, were agreed by all 193 UN member states in September 2015. The framework addresses pressing global challenges, including eradicating hunger and poverty, acting on climate change, and tackling gender inequality – all necessary actions to ensure no-one is left behind.



# Why Map UCC Research onto the SDGs?

Sustainability is a key focus at UCC, considered in all aspects of our operations. We published our first Sustainability Strategy in 2016 and have been tracking our sustainability initiatives on an annual basis since the publication of our first Sustainability Report in 2018. In 2021, we launched an SDG toolkit to help teaching staff to embed the SDGs into their teaching practices, efforts that are further aided by the recently launched Digital Badge on Learning and Teaching with the SDGs.

The mapping of our research onto the SDGs was identified as a strategic priority in our strategic plan UCC 2022: Delivering a Connected University. Section 2.1. contains actions related to Research Prioritisation - enabling the enhancement of key areas of strength, identifying emerging areas and supporting alignment of research with the SDGs. These actions also strengthen research engagement across the institution.

The mapping of our research onto the SDGs is beneficial to UCC, both at an institutional level and for individual researchers. It provides focus and lays the foundation for the development of further innovative solutions that address the challenges highlighted by the SDGs.

## For UCC

- Helps the University to understand the important impact that UCC Research is having on the SDGs and provides a strong foundation to build on in the future.

- Helps the University to identify potential for interdisciplinarity in the development of holistic solutions to existing and emerging challenges across the SDGs.
- Contributes to the University's ambitions for global rankings position, enhancing our global reputation and our ability to attract talent.
- Shows how UCC Research is contributing to Ireland's overall efforts to achieve the SDGs by 2030.
- Enhances the impact of UCC Research by linking to global challenges.

## For researchers

- Helps to raise awareness about the benefits of the SDGs as a framework for demonstrating real-world research impact.
- Ensures that our mapping looks beyond publications, giving researchers the opportunity to map other research outputs and their impacts to the SDGs.
- Prepares researchers for potential inclusion of the SDGs in their institutional research information system profile.
- Supports researchers in enhancing their competitiveness when preparing impact statements in future funding applications.

The crucial role that university research plays in achieving the SDGs by 2030 is recognised at a national and international level. As an internationally competitive, research-led university, our researchers continually contribute to the growth of Ireland's knowledge-based economy, developing the

innovations and holistic solutions to address urgent sustainable development challenges. This reach goes beyond Ireland, with our wide-ranging institutional research having demonstrable impact globally.

As the government publishes its second National Implementation Plan for implementing the Sustainable Development Goals 2022-2024, we demonstrate how our research community is helping Ireland to achieve the goals and targets by 2030.





# Planning and Consultation Process

An Action Group was established in May 2021, including staff representatives from the four Colleges, key Research Centres, Office of the Vice President for Research and Innovation, Office of External Relations and the Office of Sustainability and Climate Action. Additionally, a Research Support Officer (Julie O'Donoghue) was employed to undertake the mapping of our research and to develop a new website and report showcasing the results of this mapping process. All Action Group members had the opportunity to input and provide feedback on the direction of the project on a regular basis.

This project was supported by the President's Office and the University Leadership Team. It was coordinated by the Vice President for Research and Innovation, Professor John Cryan as Chair, and Director of Research Strategy and Projects, Dr. Siobhán Cusack as Vice-Chair, of the strategic pillar. This project was also supported by the Heads of Schools and Research Centres in nominating SDGs Champions to help with the rollout of a workshop in their area.

## Members of the Action Group

- Dr. Paul Bolger (Environmental Research Institute) – Chair
- Dr. John Barimo (Office of the Vice President for Research and Innovation)
- Dr. Ashleigh Byrne (College of Medicine and Health)
- Dr. Niall Dunphy (School of Engineering and Architecture, Cleaner Production Promotion Unit)
- Dr. Claire Edwards (School of Applied Social Studies, Institute for Social Science in the 21st Century)
- Dr. Christie Godsmark (School of Public Health)
- Mr. David Hogan (Office of External Relations)
- Dr. Maria Kirrane (Office of Sustainability and Climate Action)
- Ms. Saba Loftus (College of Science, Engineering and Food Science)
- Dr. Sean Lucey (College of Business and Law)
- Ms. Julie O'Donoghue (Office of the Vice President for Research and Innovation)
- Professor Paul O'Toole (School of Microbiology)
- Dr. James Rohan (Tyndall National Institute)
- Professor Áine Ryall (School of Law)
- Dr. Allen White (College of Arts, Celtic Studies and Social Sciences)

# SECTION 2: METHODOLOGY

# Roadmap





In tandem with extensive internal consultations, a literature review and benchmarking exercise were undertaken to assess national and international best practice. It was agreed that adoption of a mixed quantitative and qualitative methodology would ensure the most comprehensive mapping of our research to the SDGs. This three-step methodology involved:

- the mapping of our publications to obtain quantitative data
- the collation of qualitative impact case studies
- inviting our researchers to map their own research to the SDGs at our SDGs workshops.

Where possible UCC research activity has been mapped at both the SDG goal level and the deeper underpinning SDG targets level. The targets shown in this report are the abbreviated targets from the [Global Goals website](#). The full-text targets are available to view on the [United Nations website](#).

## 2.1: Publications

To map our research output in the form of publications, the [SciVal analytics tool](#), which evaluates publications on the [Scopus database](#), was used. Scopus indexes content from more than 25,000 active titles and 7,000 publishers. The SDGs function on SciVal uses keyword strings, loaded onto the system as pre-defined research areas, to identify the SDGs that publications map to. This is a tried and tested method that is used annually in the [Times Higher Education Impact Rankings](#) to evaluate the performance

by several peer institutions, both nationally and internationally, and it can be used to track our publications output annually. A further incentive for using the SciVal method was the publication in 2021 of improved SDGs keyword strings, which significantly increase the number of search terms used to define each SDG, resulting in greater accuracy of results. The updated methodology includes a machine learning component to supplement the keyword search terms. The 2022 keywords, which build on the improved keywords, were used in our mapping.

A five-year data period from 2017–2021 was chosen for the mapping exercise, to include the most recent full year of publications available in 2021. The data was analysed to report on the:

- number of publications per SDG
- the total number of citations received per SDG
- the average number of citations per publication
- UCC SDGs publications as a percentage of national SDGs publications
- Field-Weighted Citation Impact (FWCI) per SDG
- CiteScore - percentage of publications in top 10% of journals
- the percentage of international collaborations per SDG
- the ranking of the SDG in terms of the number of UCC publications

This data is highlighted under each of the goals in this report.

### 2.1.1: Limitations

We recognise that there are limitations to this process. The keywords search is not faultless, and some publications may therefore be missed if they do not contain specific keywords. We also recognise that SciVal may feature publications from some research areas more than others, however, many other databases are not currently compatible with the advanced, SDGs keyword search. Therefore, these results do not represent a complete assessment of the UCC research community's publications for this period and may particularly exclude some publications from the disciplines of arts, humanities, social sciences and law. Additionally, SciVal does not currently map publications to *SDG 17 – Partnerships for the Goals* as it has deemed it to be "difficult to quantify" and has therefore not found a satisfactory search query to define it.

### 2.2: Case Studies

Richer, more detailed examples of research impact on the SDGs are an essential part of this project. A case study template was developed to gather qualitative evidence of how UCC research contributes to the SDGs. All researchers in the University were invited to submit case studies.

Contributors were given the option to map their case study at goal level and/or target level. Contributors were asked to describe:

- the purpose of their research
- the impact of their research on the SDGs in terms of the planned

outputs, their outcomes and the actual or anticipated impact over time

- how their research is changing and informing the research landscape in Ireland and beyond.

A sustainable method of collecting case studies through the UCC Research Awards application process has also been implemented. The *President's Award for Research Impacting the Sustainable Development Goals* is a new award category that launched in 2021. A case study must be completed as part of the application process, ensuring that the contribution of different research projects to the SDGs will be showcased each year.

### 2.3: SDGs Workshops

In addition to the mixed-methods methodology detailed above, it was our objective to directly engage with the research community through SDGs workshops to embed the SDGs in all Schools and Research Centres. Having a general awareness about the SDGs framework is essential to the sustainability and long-term success of the project and to ensure that researchers continually engage with the SDGs in their research. These workshops are a unique way of mapping university research onto the SDGs. Other universities map their publications (University College Dublin, 2020; University of Leicester, 2020), or implement a mixed approach of mapping publications in addition to spotlighting SDGs case studies (University of Manchester, NUI Galway). These sessions were primarily



targeted at academics, with postdoctoral researchers and PhD students also welcome to participate.

The first half of the 90-minute workshop was informative, presenting to participants about the overall mapping project, the creation of the SDGs framework, how Ireland and the EU are progressing in achieving the SDGs, and how a knowledge of the connection between research and the SDGs is important for funding applications, communicating research impact and seeking potential research collaborations. In the second half of the workshop, researchers mapped their current or planned research to the SDGs - at goal and target level - using a mapping form created by the Research Support Officer.

The self-assessment results were collated after each workshop and analysed to form the mapping of UCC research onto the SDGs. The self-assessment process, and case studies, provided a means for researchers to map research outputs not in the form of publications to the SDGs. It was also important to empower researchers to map their own research to the SDGs, instead of the project team subjectively assessing the research in each area or having one point of contact from each area to do so.

The results from each workshop were shared with the Head of the School/Centre to use for communications and reporting purposes and are detailed [in this report](#).

### **2.3.1: Limitations**

The mapping from the workshops is not a complete representation of the research in each School and Centre. While there was successful engagement across the University, this was a voluntary process and not all researchers were in attendance. Additionally, the selection of goals and targets was subjective, with researchers reporting on the goals and targets that they think their research contributes to following an informative presentation about the SDGs framework.

### **2.4: SDGs Champions**

This project would not have been as far-reaching were it not for the help and support of a network of SDGs Champions in Schools and participating Research Centres across the University. The Heads of Schools and Research Centres were invited by the Vice President for Research and Innovation to nominate SDGs Champions in their areas. Champions acted as the point of contact, managing the logistics of the SDGs workshop, encouraging engagement from their colleagues, and moderating the workshops. An invitation template and participants' briefing note were shared with Champions for circulation. Post workshop, information was shared with each Champion for circulating amongst all invitees, including the mapping form and the case study template. This ensured that those who were unable to attend the workshop had the opportunity to share their data and contribute to the overall mapping of University research onto the SDGs.

# SECTION 3: RESULTS



# Publications Mapping Analysis

## Key findings

- 5,128 SDGs-related publications from 2017-2021, representing 43% of overall UCC publications
- Top three SDGs for publications:
  - SDG 3 - *Good Health and Well-being*
  - SDG 7 - *Affordable and Clean Energy*
  - SDG 9 - *Industry, Innovation and Infrastructure*
- SDG 5 - *Gender Equality* has the highest growth rate in publications from 2017 to 2021

## Comparison with Irish universities SDGs-related publications 2017-2021

- UCC has the third highest number of publications
- UCC has the highest average Field-Weighted Citation Impact
- UCC places second for the total number of citations received
- UCC has the second highest number of publications attributed to SDG 7 - *Affordable and Clean Energy* and SDG 14 - *Life Below Water*

## 3.1: Findings

A total of 5,128 publications are attributed to the SDGs from 2017-2021, representing 43% of overall UCC publications.

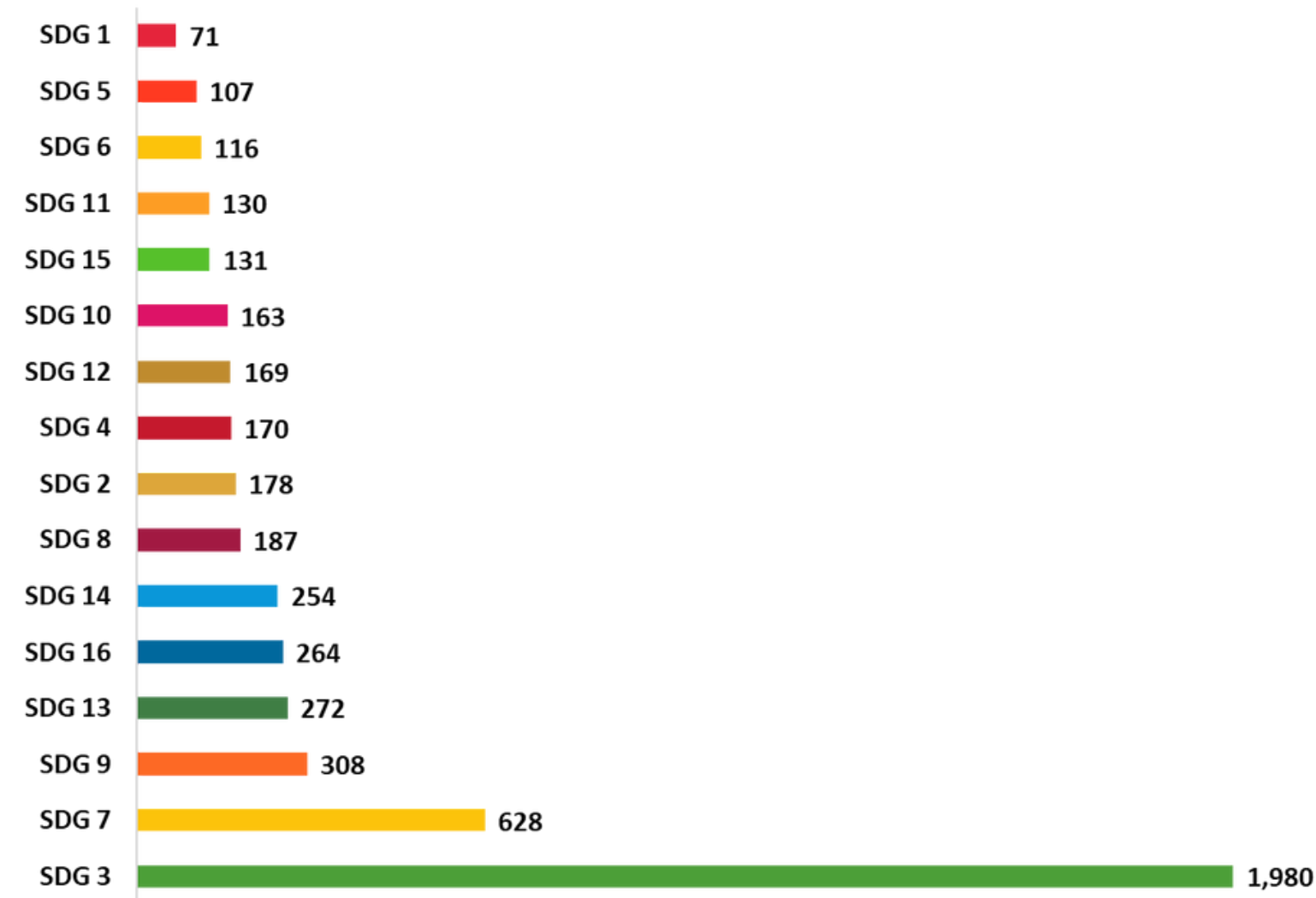
**5,128**

## SDGs-related publications

SDG 3 - *Good Health and Well-being* has the highest number of related publications, in line with the other six universities (Trinity College Dublin, University College Dublin, Dublin City University, University of Galway, University of Limerick and Maynooth University). SDG 7 - *Affordable and Clean Energy* has the second highest number of related publications at 628 during this time period, followed by SDG 9 - *Industry, Innovation and Infrastructure* at 308 publications. SDG 1 - *No Poverty* returned the least number of publications at 71, with 107 publications being attributed to SDG 5 - *Gender Equality*.

Although SDG 5 - *Gender Equality* is towards the end of the scale for the number of publications, it has the highest growth rate over the 5-year data period, assessed at 125%. This is followed in joint second position by SDG 15 - *Life on Land* and SDG 11 - *Sustainable Cities and Communities* at a 94% growth rate. The lowest growth rate in publications is in SDG 12 - *Responsible Consumption and Production* at 6%, with SDG 7 - *Affordable and Clean Energy* the second lowest at 8%.

Number of Publications 2017 - 2021



3.2: Comparison with Irish universities

UCC places third amongst universities in Ireland in terms of the number of publications affiliated to the SDGs from 2017 - 2021. UCC ranks significantly higher in terms of the total number of citations received, coming second by 4,675 citations despite having over 3,000 fewer publications. Therefore while we may not be publishing as frequently, our publications are achieving a higher rate of citation.

UCC has the second highest number of publications out of the seven Irish universities for SDG 7 - *Affordable and Clean Energy* (22% of all Irish universities publications) and SDG 14 - *Life Below Water* (30% of all Irish universities publications). In all other SDGs, UCC is third for the number of publications, except for SDG 4 - *Quality Education*, SDG 5 - *Gender Equality*, SDG 6 - *Clean Water and Sanitation*, SDG 11 - *Sustainable Cities and Communities*, and SDG 16 - *Peace, Justice and Strong Institutions* where UCC places fourth.

2.68  
Average Field-Weighted Citation  
Impact per SDGs topic

The average Field-Weighted Citation Impact (FWCI) per SDGs topic is 2.68, meaning that on average the publications in each SDGs topic are cited 2.68 more times than similar publications worldwide. Publications attributed to the SDGs shown in the table below scored far above the world average of 1 and have been cited more than would be expected based on the world average for similar publications. The top 5 SDGs for international collaborations are also shown below.

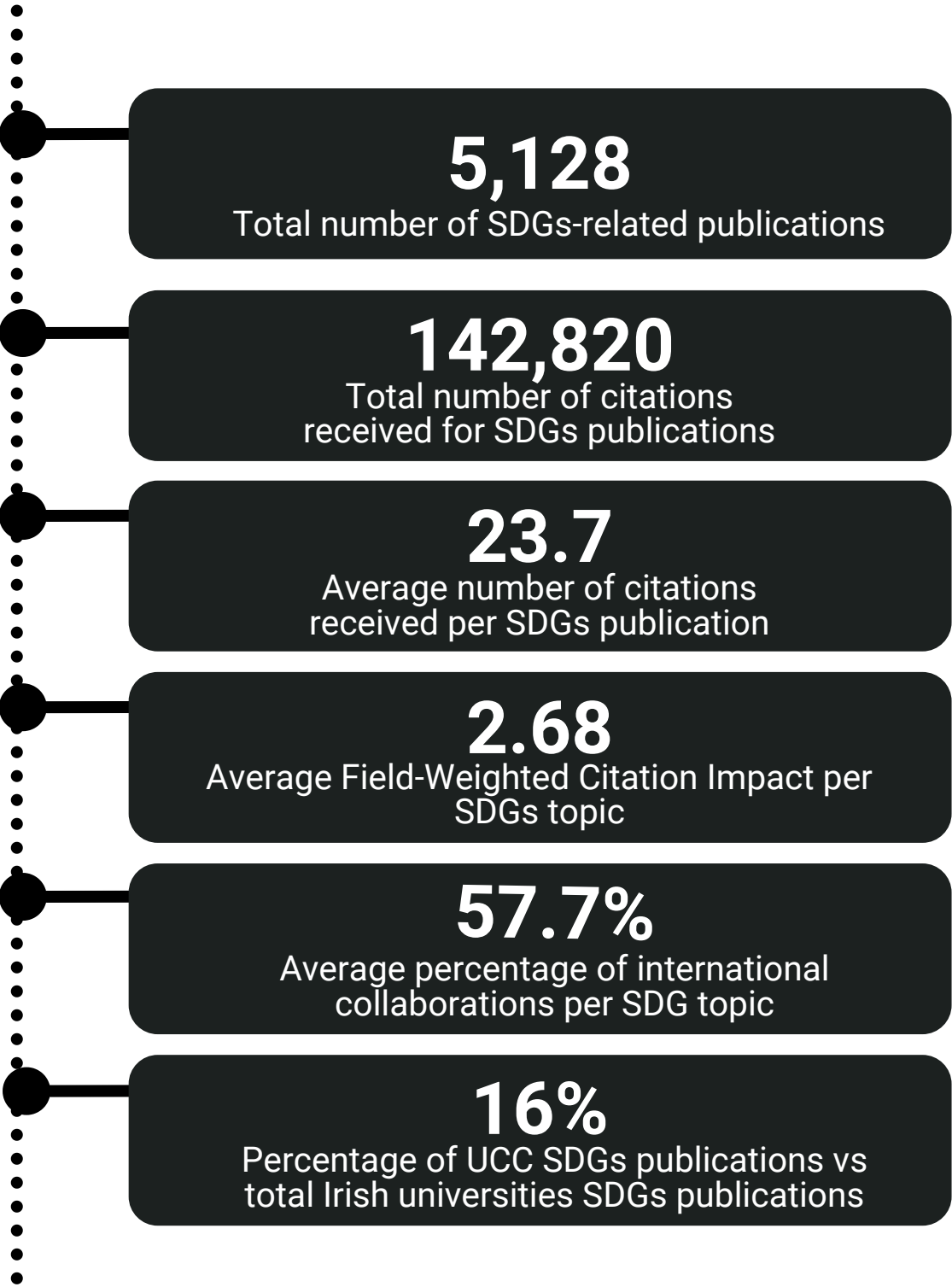


Top 5 SDGs for FWCI	
SDG 16 <i>Peace, Justice and Strong Institutions</i>	7.74
SDG 5 <i>Gender Equality</i>	5.99
SDG 3 <i>Good Health and Well-being</i>	3.85
SDG 6 <i>Clean Water and Sanitation</i>	2.95
SDG 10 <i>Reduced Inequalities</i>	2.79

Top 5 SDGs for international collaborations	
SDG 14 <i>Life Below Water</i>	74.4%
SDG 15 <i>Life on Land</i>	73.1%
SDG 13 <i>Climate Action</i>	69.8%
SDG 7 <i>Affordable and Clean Energy</i>	65.9%
SDG 11 <i>Sustainable Cities and Communities</i>	65.1%



UCC publications 2017 - 2021 analysis



University	No. of publications	Total citations count	Average international collaborations per SDGs topic	Average citations per SDGs publication	Average FWCI per SDGs topic	Percentage of national SDGs publications
UCC	5,128	142,820	57.7%	23.7	2.68	16%
UCD	8,679	147,495	60.3%	14.7	1.7	27%
TCD	7,177	128,680	61.7%	15.2	1.84	22%
DCU	2,194	25,574	52.4%	10.3	1.71	7%
Galway	4,788	91,753	59.5%	17.6	1.9	15%
Limerick	2,955	44,122	61%	13.1	1.6	9%
Maynooth	1,476	19,949	54.6%	13.6	1.84	4%

Publications 2017 - 2021 comparison with other Irish universities  
Correct as of 20th September 2022

# Case Studies Analysis

## Key findings

- 119 SDGs impact case studies submitted
- Top three SDGs for case studies:
  - SDG 3 - *Good Health and Well-being*
  - SDG 7 - *Affordable and Clean Energy* / SDG 8 - *Decent Work and Economic Growth*
  - SDG 9 - *Industry, Innovation and Infrastructure* / SDG 12 - *Responsible Consumption and Production*
- Over 80% of UCC's 27 Schools submitted examples

In total, 119 qualitative case studies were submitted by UCC researchers that describe the contribution their research is making to the SDGs. Similar to the publications mapping, SDG 3 – *Good Health and Well-being* is the most represented goal with 22 case studies submitted by researchers. This is followed by SDG 7 – *Affordable and Clean Energy* and SDG 8 – *Decent Work and Economic Growth* in second place with 10 case studies. SDG 9 - *Industry, Innovation and Infrastructure* and SDG 12 – *Responsible Consumption and Production* are in third, with 8 case studies apiece. It is important to note that due to the interconnected nature of the SDGs, case studies can contribute to more than one SDG - the SDG noted is the SDG that the case study is showcased under in this report and website.

# 119

## SDGs impact case studies

Research at UCC maps across all 17 of the SDGs and case studies were submitted from all four Colleges within the University, with over 80% of UCC's 27 Schools sharing examples. Key Research Centres are also represented, including Tyndall National Institute, the Environmental Research Institute, the Institute for Social Science in the 21st Century, INFANT, IPIC SFI Research Centre for Photonics, MaREI SFI Research Centre for Energy, Climate and Marine, Insight SFI Research Centre for Data Analytics, and APC Microbiome Ireland SFI Research Centre.



# **SECTION 4: RESEARCH MAPPING BY SCHOOLS/CENTRES**

# SDGs Champions

Thank you to our SDGs Champions Network whose invaluable support ensured the success of the SDGs workshops across the University.

- Professor Colm O'Dwyer (School of Chemistry)
- Dr. F. Jerry Reen (School of Microbiology)
- Dr. Spyridon Dendrinou (School of Mathematical Sciences)
- Dr. Laura Maye (School of Computer Science and Information Technology)
- Professor Hannah Daly (School of Engineering and Architecture)
- Dr. Susan Joyce (School of Biochemistry and Cell Biology)
- Dr. Emmanuele Zannini (School of Food and Nutritional Sciences)
- Dr. Timothy Sullivan (School of Biological, Earth and Environmental Sciences)
- Dr. Felicity Daly (Institute for Social Science in the 21st Century / School of Applied Social Studies)
- Dr. Therese Kenna (School of the Human Environment)
- Dr. Cara Levey (School of Languages, Literatures and Cultures)
- Dr. Marica Cassarino (School of Applied Psychology)
- Dr. Małgorzata Krasnodębska-D'Aughton (School of History)
- Dr. Maureen O'Connor (School of English and Digital Humanities)
- Dr. Aoife Granville (School of Irish Learning)
- Dr. Ger Mullaly, Dr. Lidia Guzy (School of Society, Politics and Ethics)
- Professor J. Griffith Rollefson (School of Film, Music and Theatre)
- Dr. Briony Supple (School of Education)
- Dr. Karen Neville (Cork University Business School)
- Professor Owen McIntyre (School of Law)
- Dr. Beth Brint, Dr. Gabriella Rizzo (School of Medicine)
- Dr. Martina Hayes (School of Dentistry)
- Dr. Angela Flynn (School of Nursing and Midwifery)
- Dr. Katie Ryan (School of Pharmacy)
- Dr. Alice Lee (School of Clinical Therapies)
- Dr. Christie Godsmark (School of Public Health)
- Dr. Sonia Monteiro (Environmental Research Institute / MaREI SFI Research Centre for Energy, Climate and Marine)
- Ms. Linda O'Sullivan (Insight SFI Centre for Data Analytics)
- Dr. Brendan Curran (APC Microbiome Ireland SFI Research Centre)
- Dr. Eoghan McKernan (INFANT)
- Dr. David McGovern, Dr. James Rohan (IPIC SFI Research Centre for Photonics / Tyndall National Institute)





**Image: Members of the Action 2.1.2. Group with SDGs Champions. (L-R) Professor Colm O'Dwyer; Professor Hannah Daly; Dr. Maria Kirrane; Dr. Sonia Monteiro; Dr. Paul Bolger; Vice President for Research and Innovation, Professor John. Cryan; Ms. Julie O'Donoghue; Dr. Susan Joyce; Dr. Christie Godsmark; Dr. Angela Flynn; Ms. Linda O'Sullivan; Dr. Felicity Daly; Dr. James Rohan; Dr. John Barimo; Dr. David McGovern; Dr. Katie Ryan**



# SDGs Workshops Analysis

## Key findings

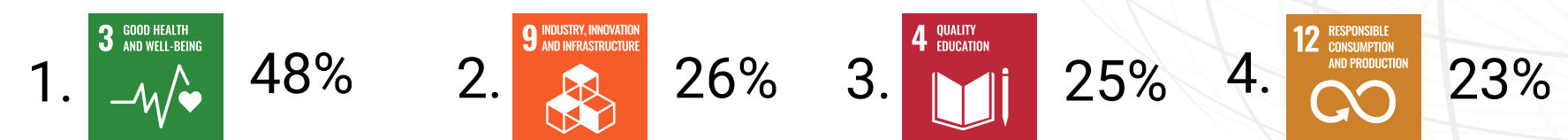
- 32 SDGs workshops rolled out across UCC
- All 27 Schools and 8 key Research Centres took part
- 477 researchers attended the SDGs workshops
- 497 researchers completed the mapping form to self-assess their own research against the SDGs
- 85% of researchers see the SDGs as being important in terms of their research
- 36% of researchers identified that their research is aligned with the SDGs
- 48% of researchers identified SDG 3 - *Good Health and Well-being* as a goal that their research contributes to, despite the fact that only 16% of participants were based in the College of Medicine and Health
- **Top three targets selected:**
  - 3.4 - *Reduce mortality from non-communicable diseases and promote mental health*
  - 9.5 - *Enhance research and upgrade industrial technologies*
  - 10.2 - *Promote universal social, economic and political inclusion*

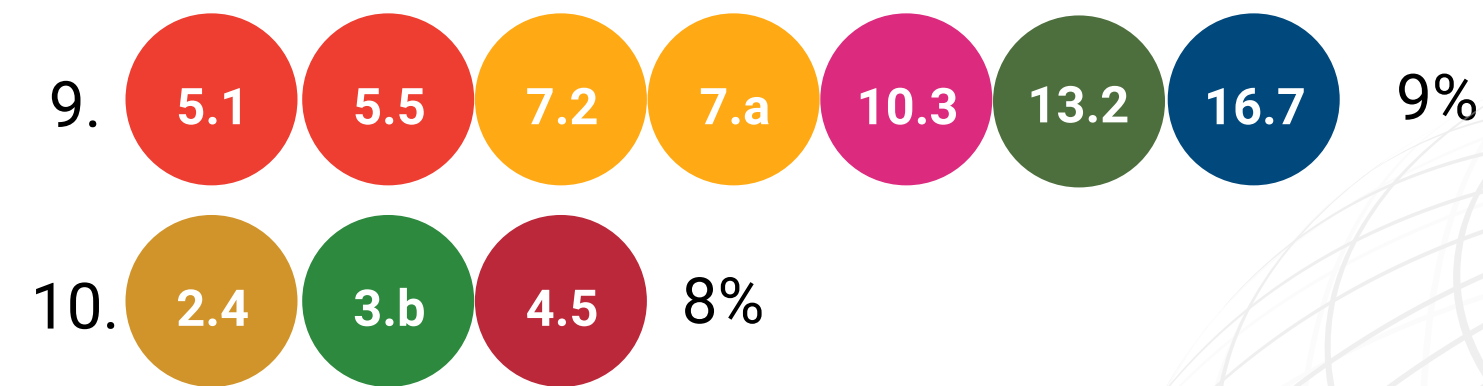
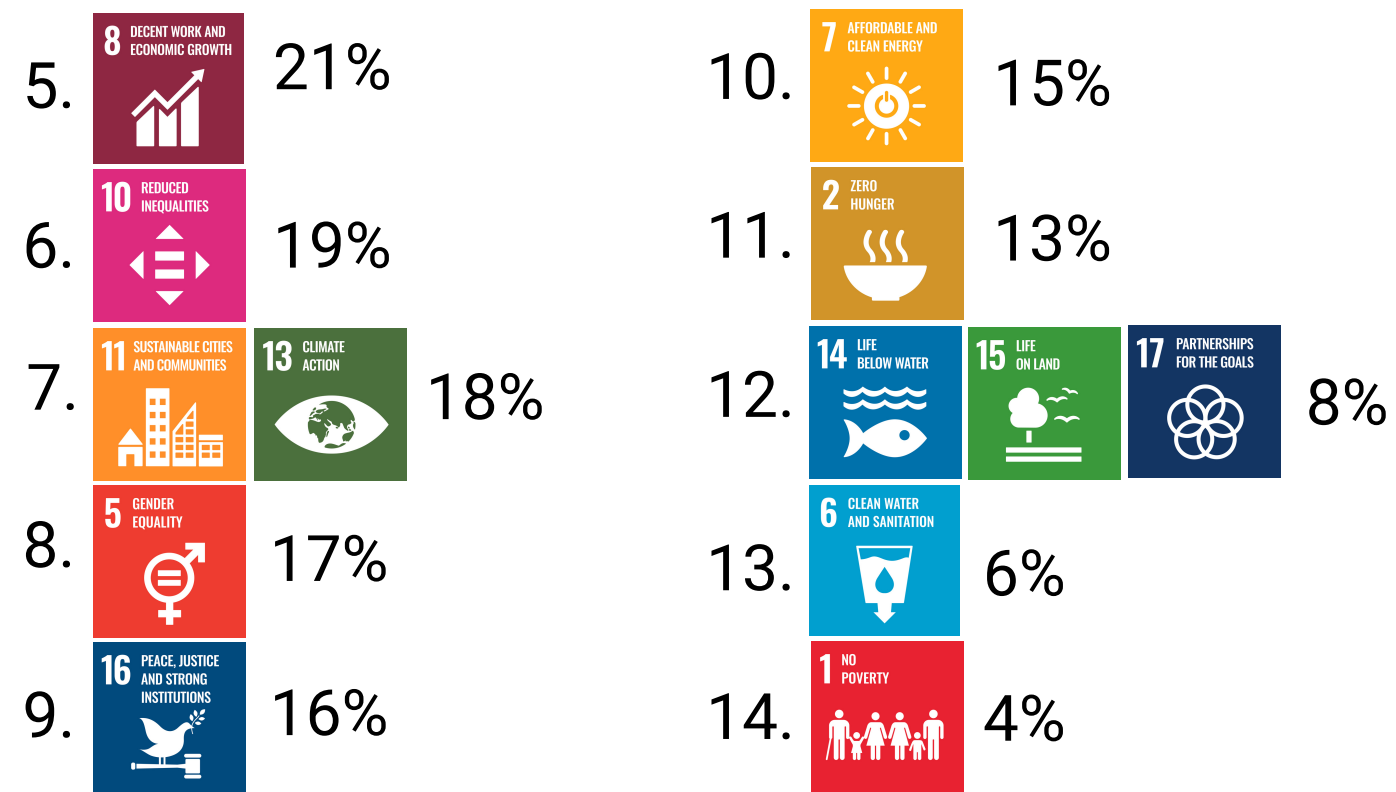
A total of 32 workshops were held across the university reaching all of UCC's 27 Schools and 8 key Research Centres. 477 researchers attended the workshops from June - September 2022. Those unable to attend were also invited to submit their mapping data, with a project landing page created to inform those completing the mapping form outside of the workshop setting. In total, 497 researchers completed the mapping form.

**32**  
**SDGs workshops**

**497**  
**No. of researchers that completed mapping**

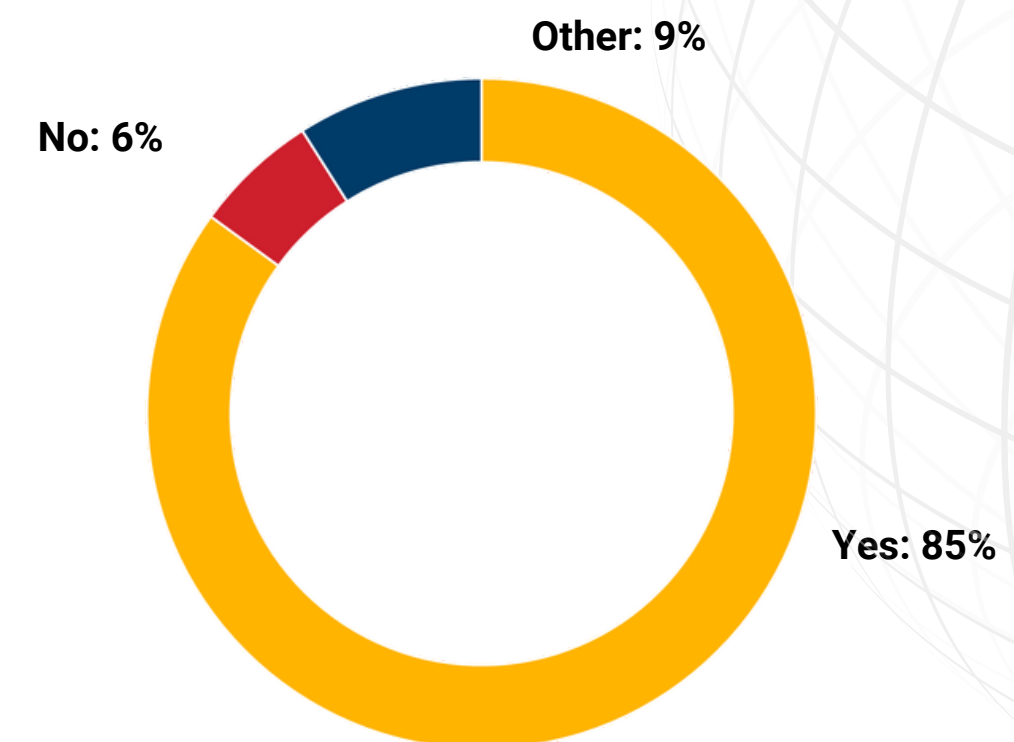
The majority of UCC researchers mapped their research to SDG 3 - *Good Health and Well-being*, with 48% of participants identifying that their current or planned research contributes to this goal. This was followed in second place by SDG 9 - *Industry, Innovation and Infrastructure* at 26% and SDG 4 - *Quality Education* at 25%. The least number of researchers chose SDG 1 - *No Poverty* at 4% and SDG 6 - *Clean Water and Sanitation* at 6%.



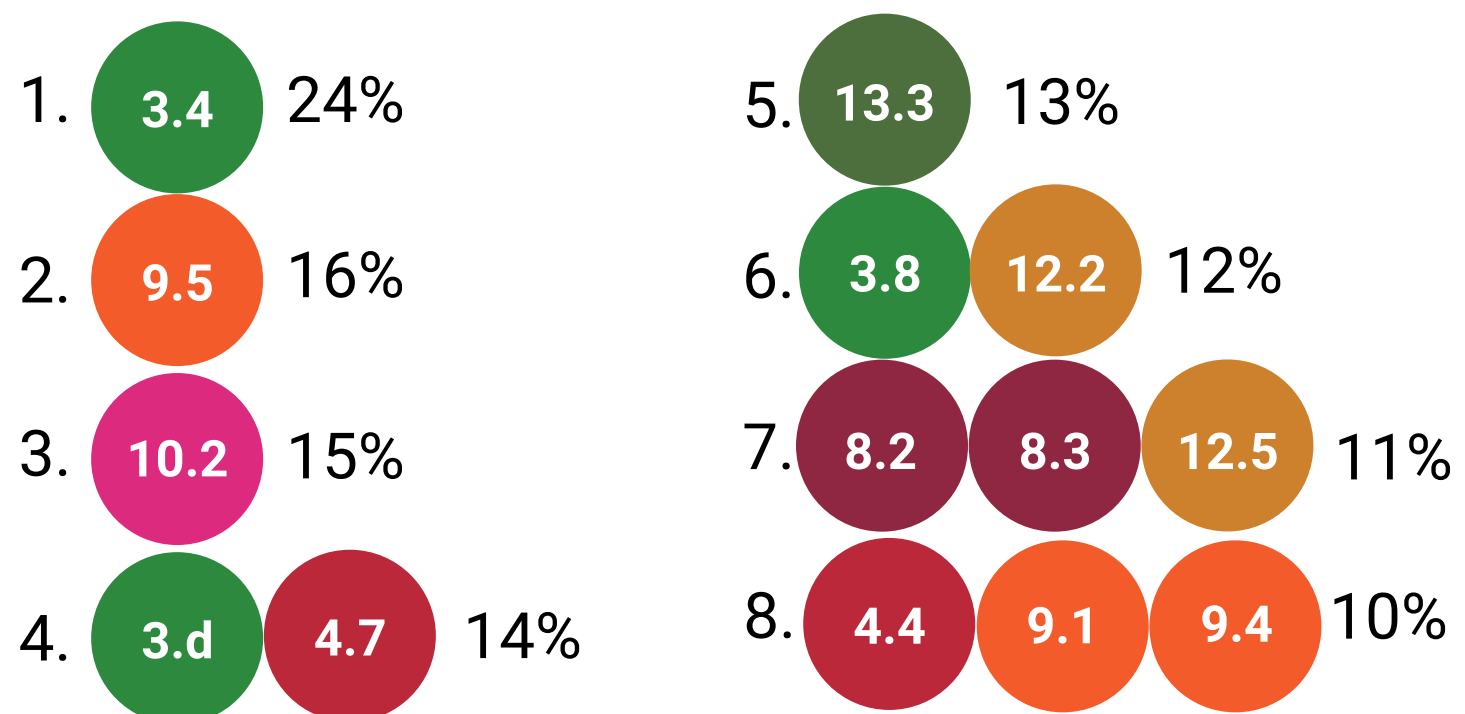


Those who completed the mapping exercise were asked two questions:

**Question 1:**  
Do you see the SDGs as being important in terms of your research?

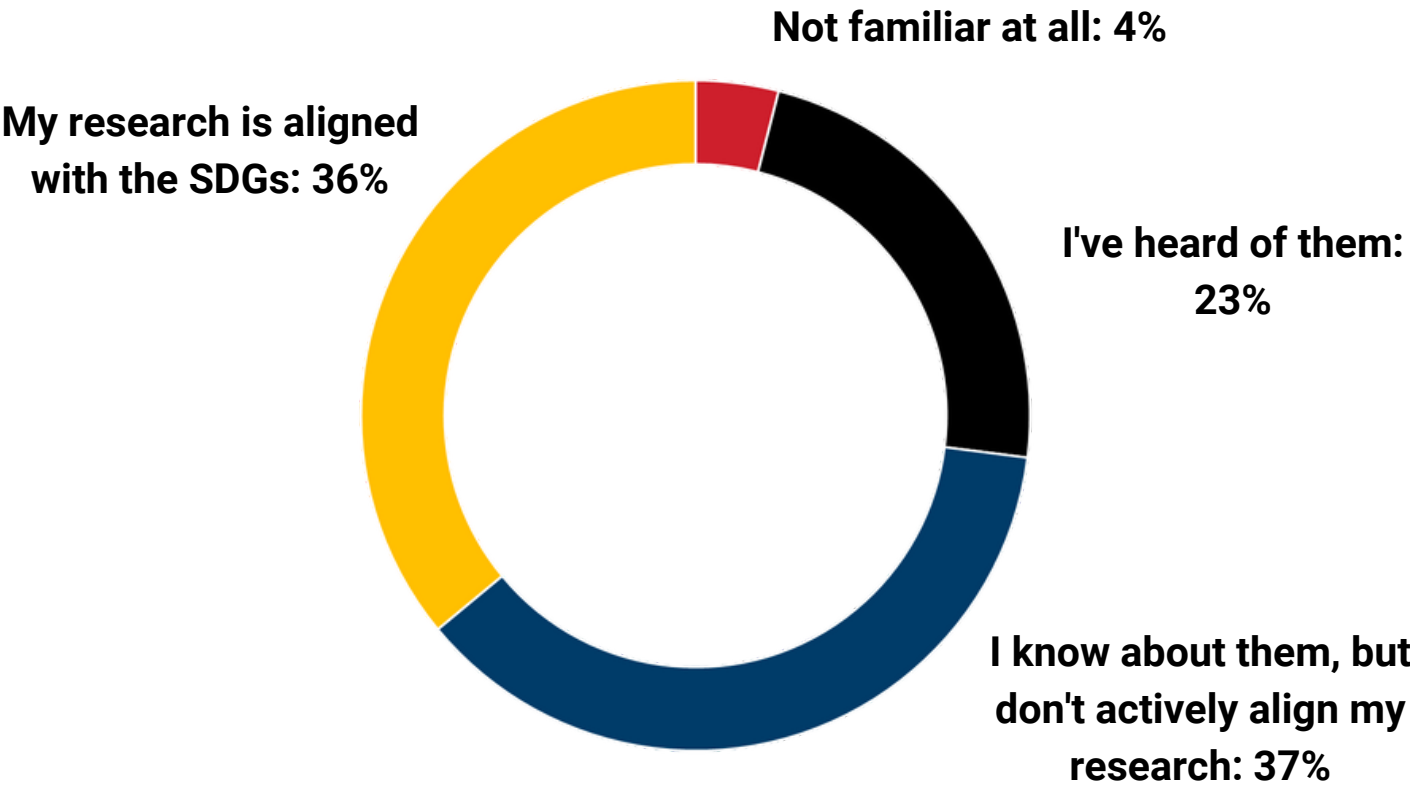


The top SDGs targets identified by researchers were (full description of targets in [Appendix](#)):



This shows that there is significant support amongst the UCC research community for integrating the SDGs into their research, and that researchers see the value of embedding the SDGs in UCC Research.

**Question 2:**  
**How familiar are you with the SDGs?**



This reveals that 64% of participants have some or no awareness of the SDGs framework or do not actively align their research with the SDGs, justifying the need to raise general awareness about the SDGs framework through the workshops. A sizeable number of researchers are already

aligning their research with the SDGs, demonstrating existing active engagement with the framework amongst the research community.

The graphs in the following pages show the main goals and targets identified by researchers in each School/Centre as being those that their current or planned research contributes to.

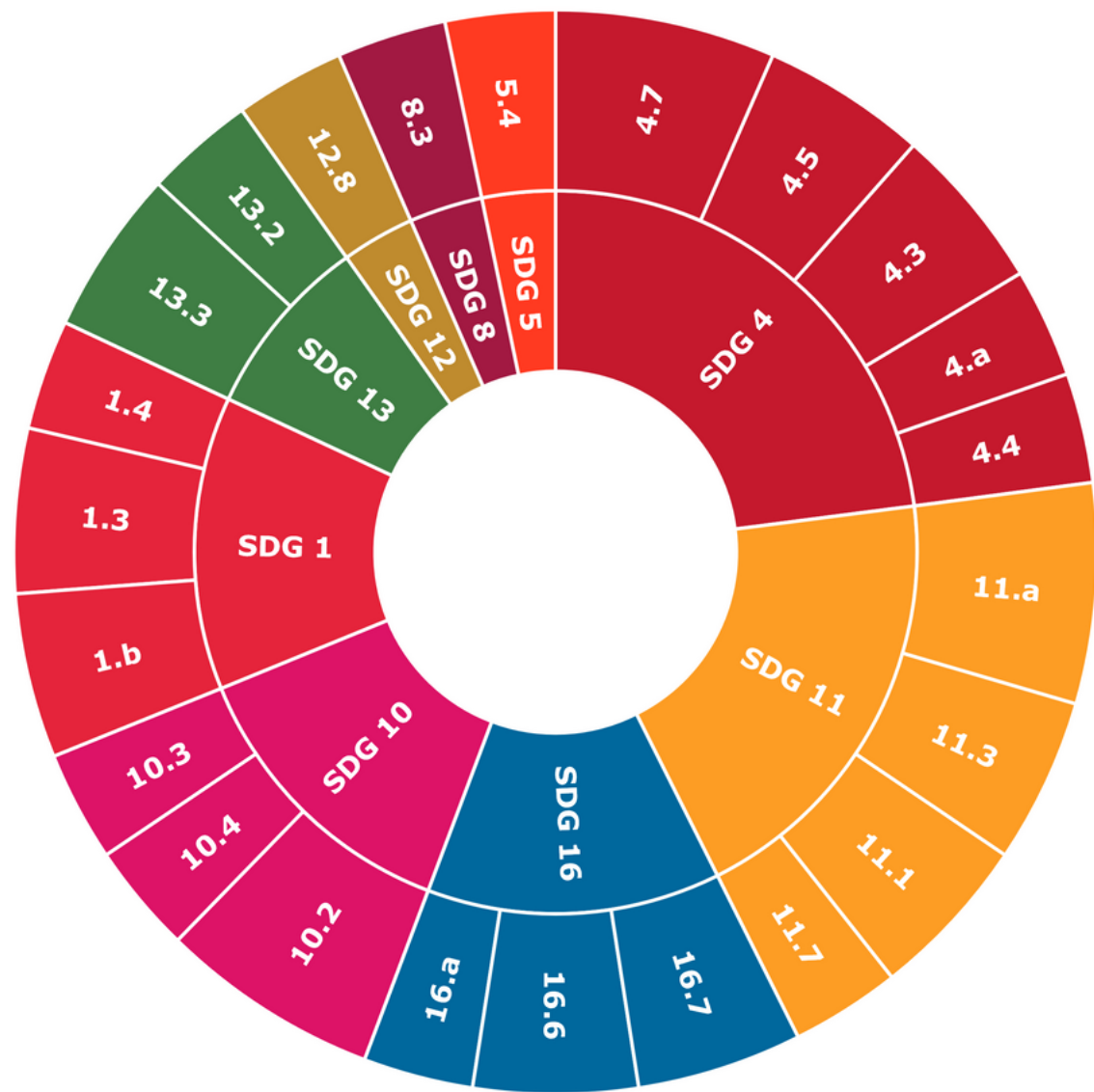




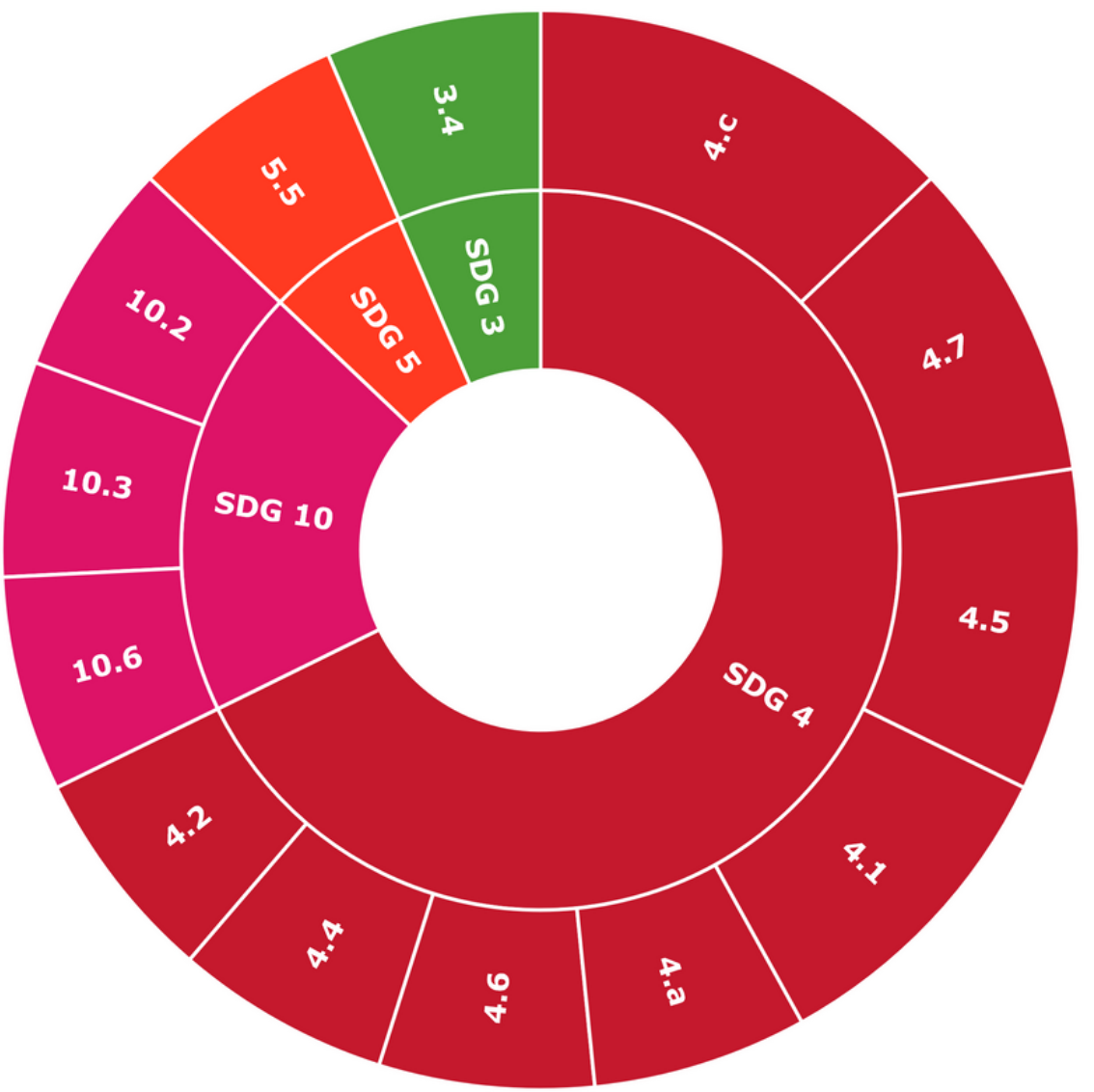
# College of Arts, Celtic Studies and Social Sciences



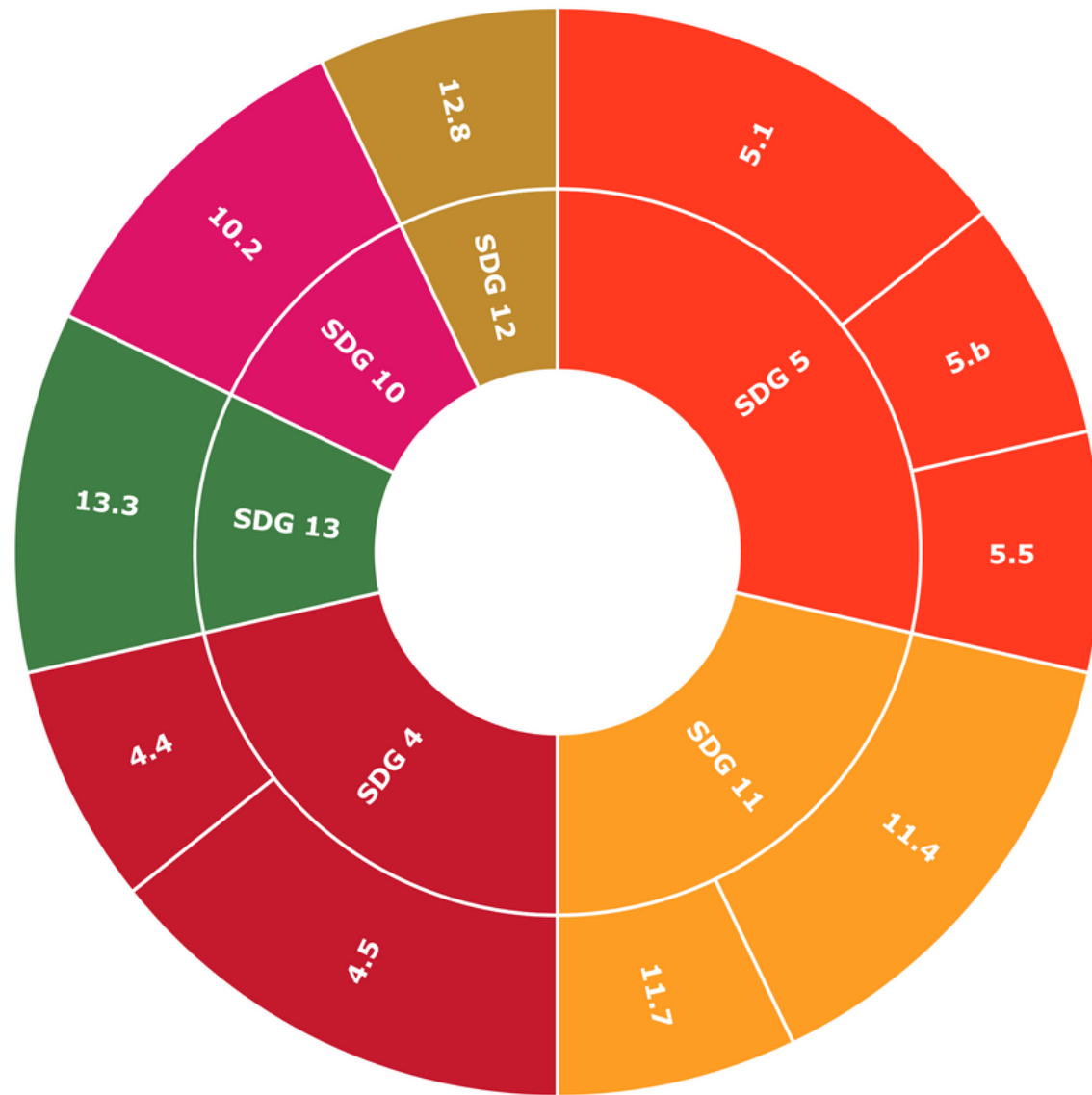
**School of Applied Psychology**



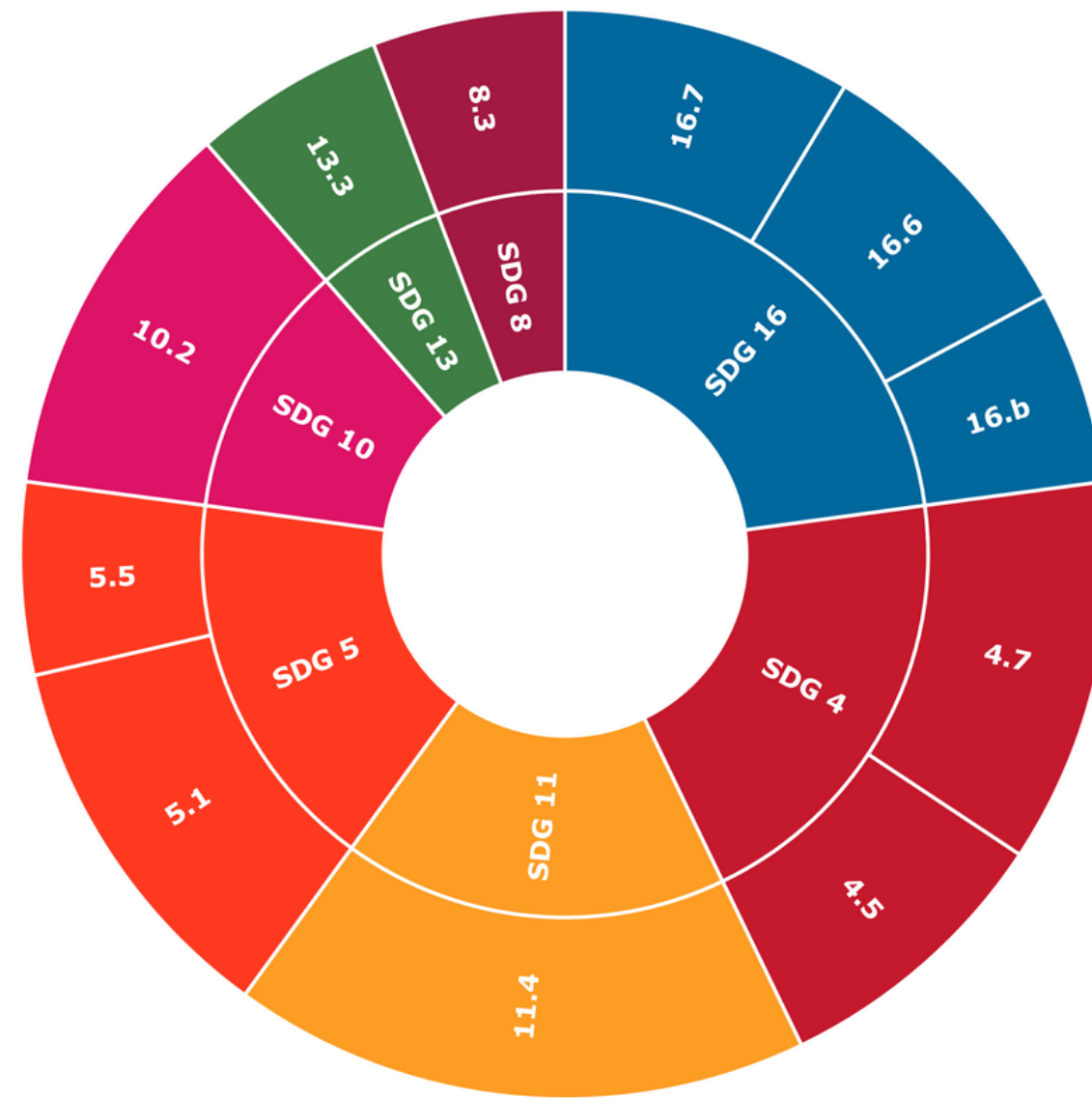
**School of Applied  
Social Studies**



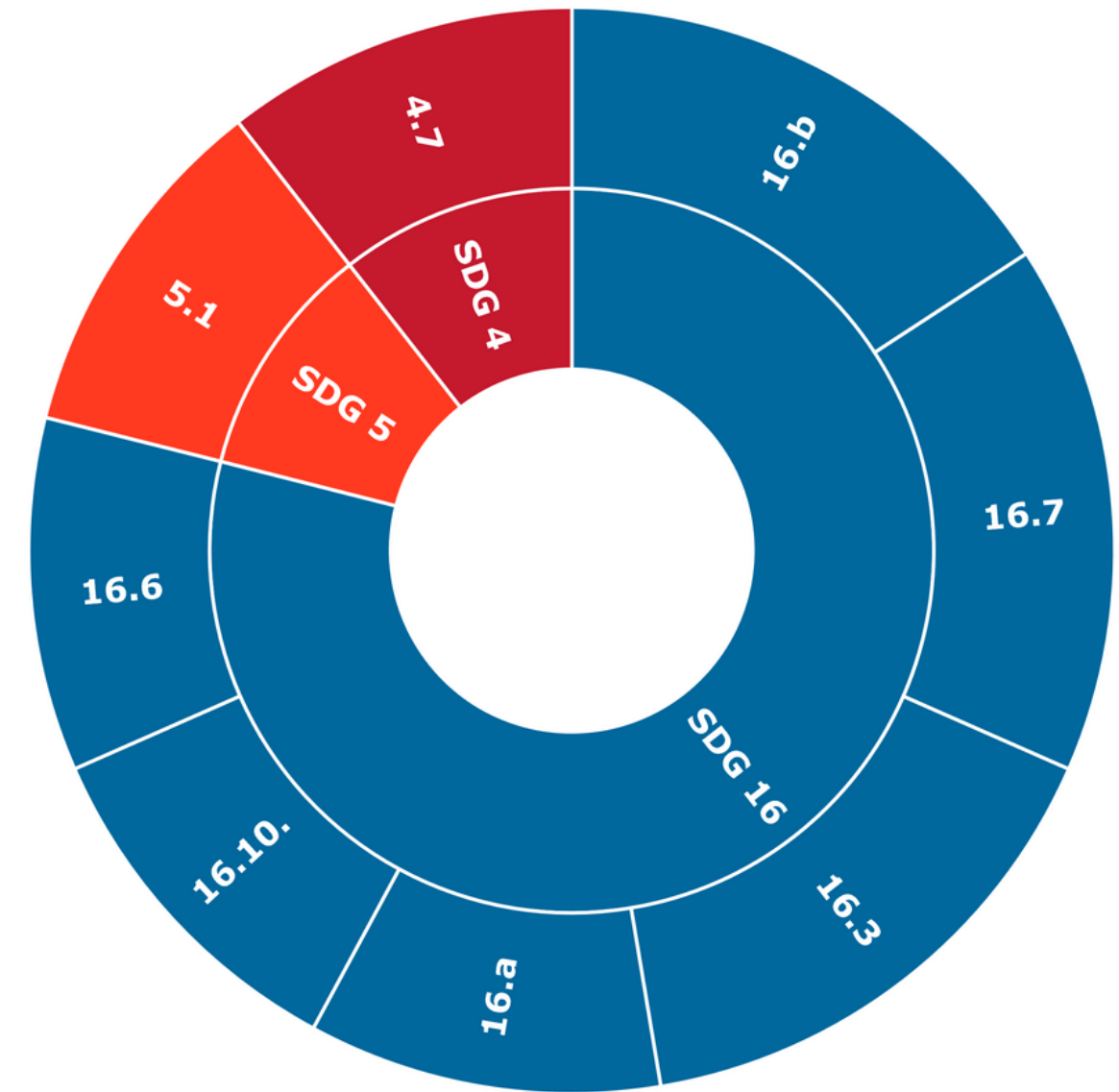
**School of Education**



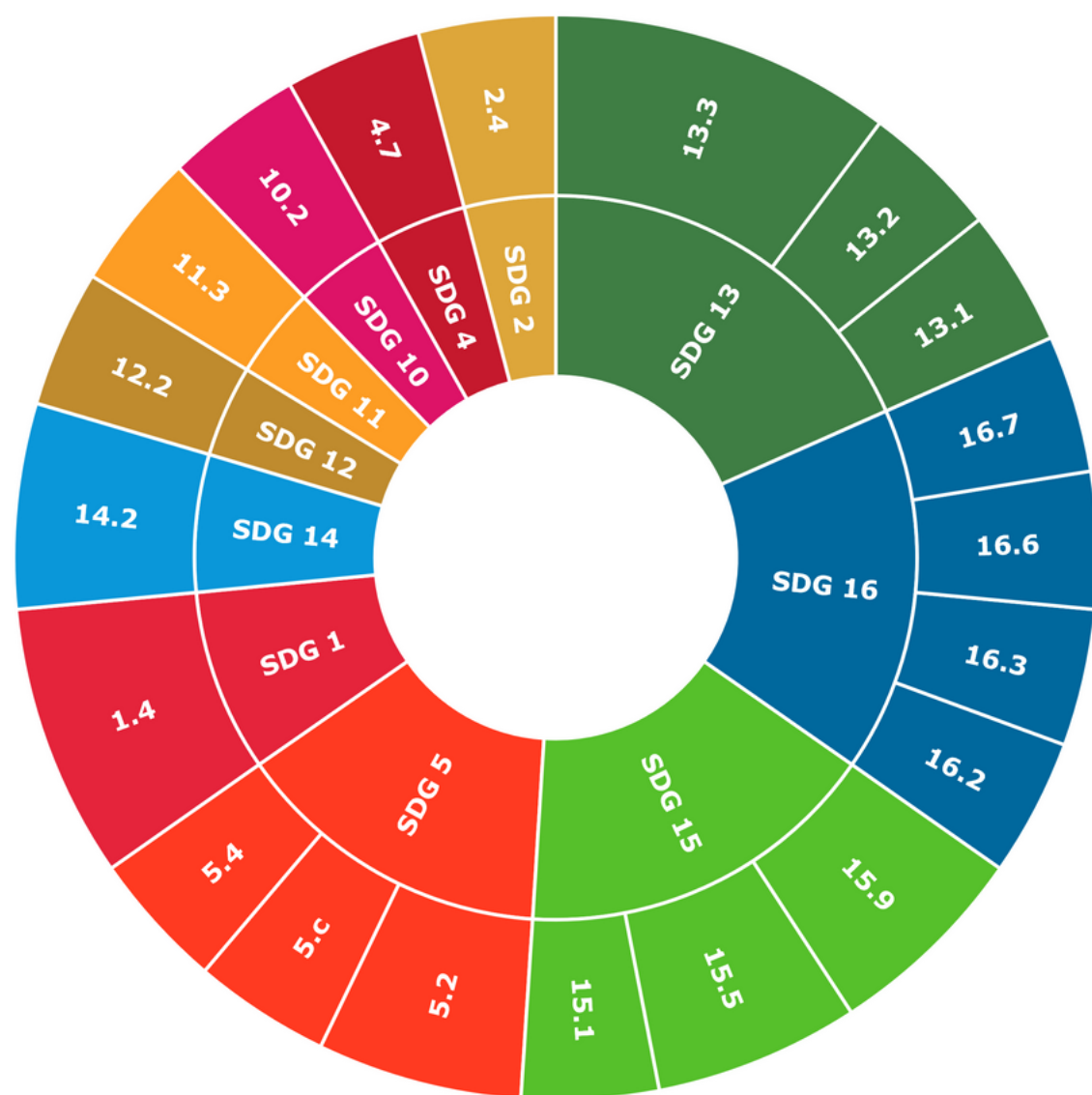
**School of English  
and Digital  
Humanities**



**School of Film,  
Music and Theatre**



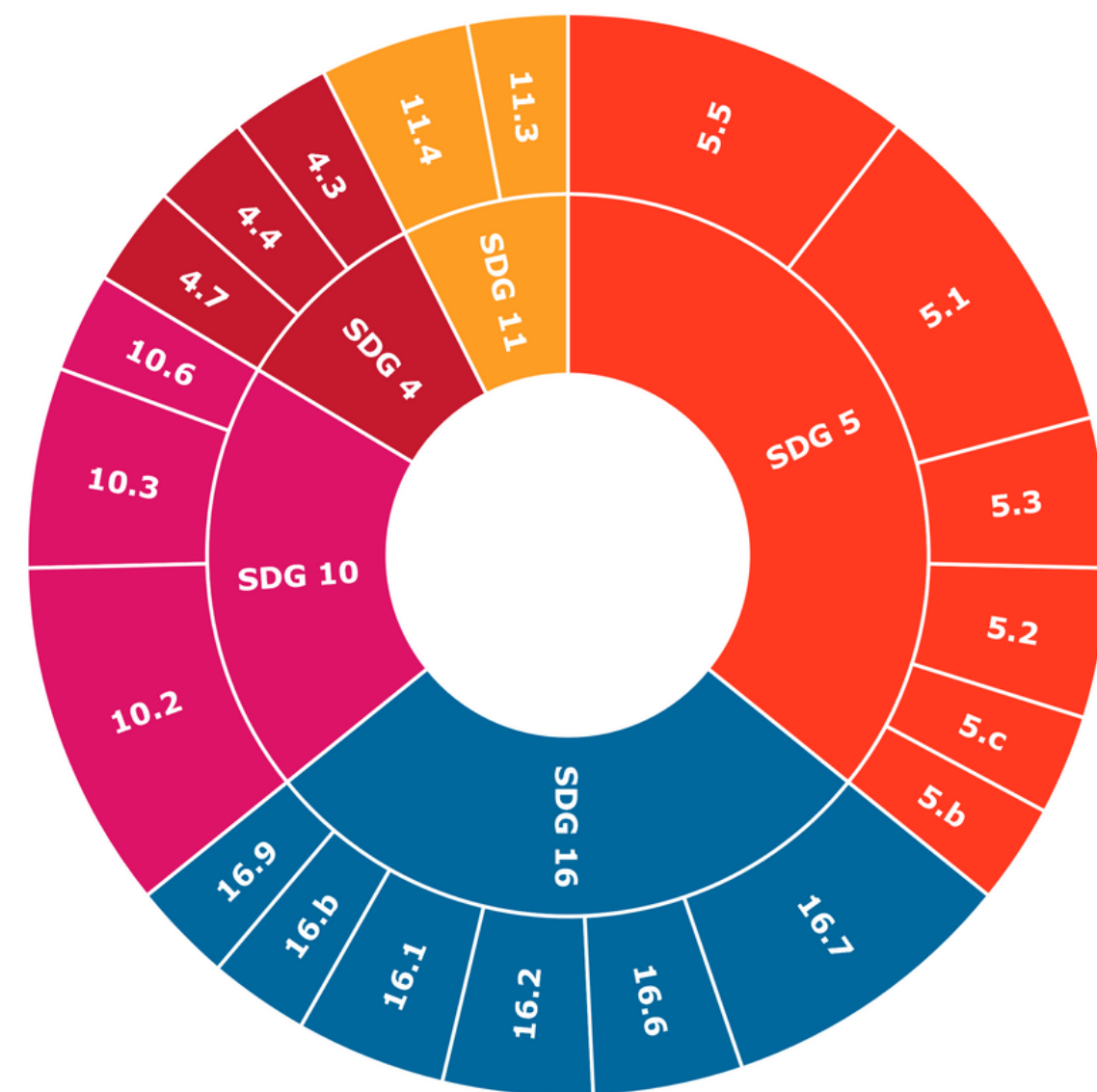
**School of History**



**School of the  
Human Environment**

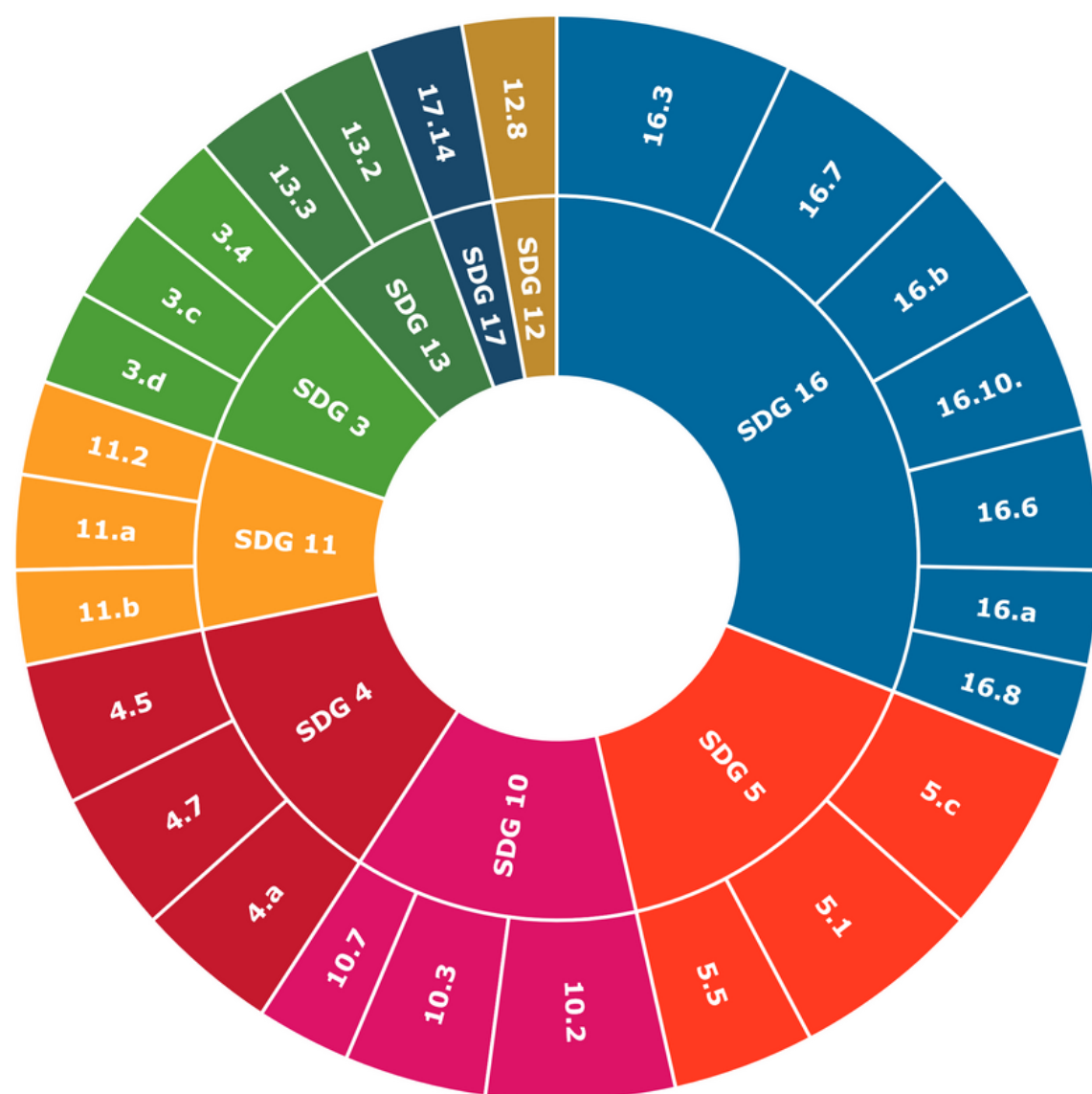


**School of Irish  
Learning**



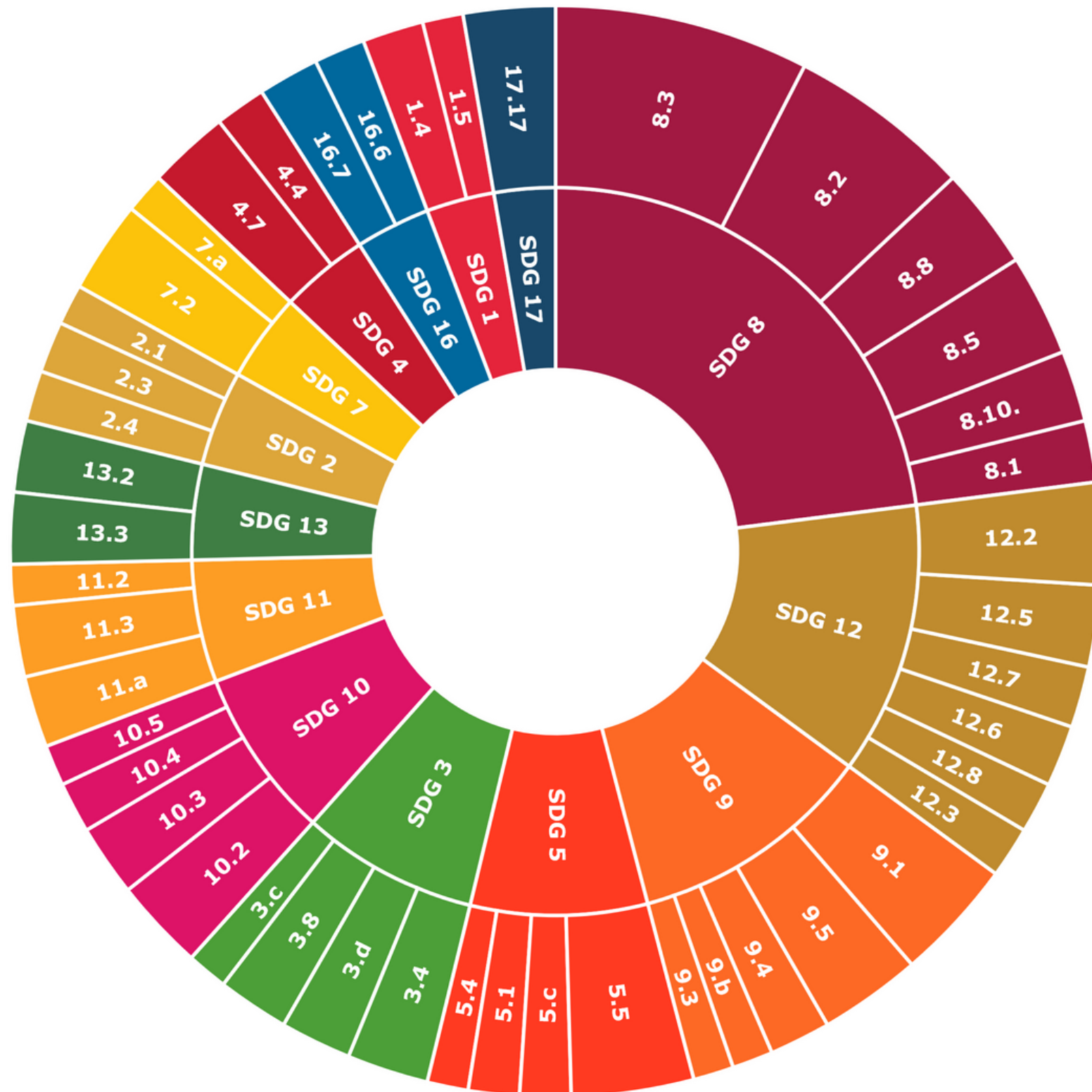
**School of Languages,  
Literatures and  
Cultures**



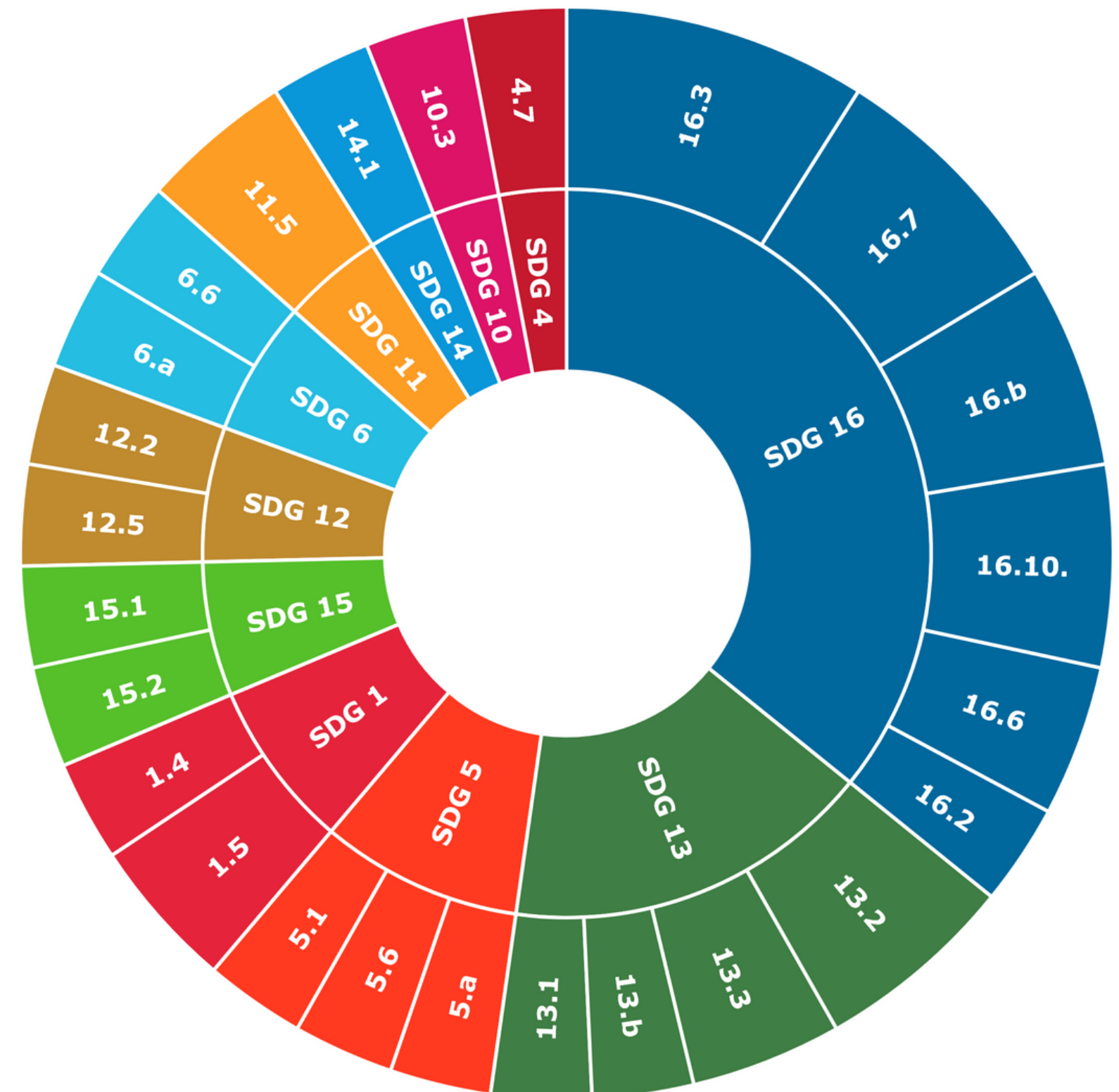


**School of Society,  
Politics and Ethics**

# College of Business and Law



# Cork University Business School

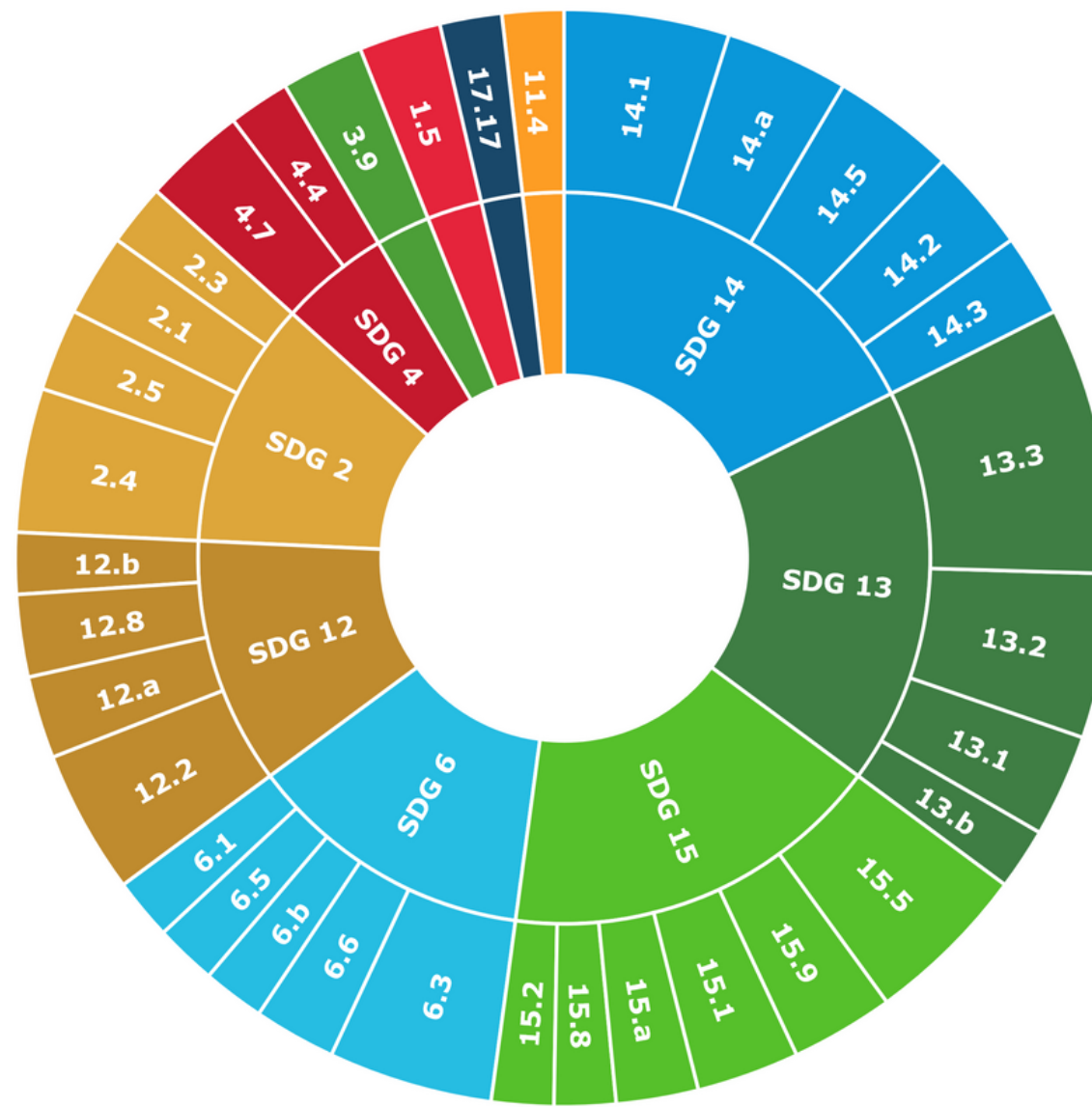


# School of Law

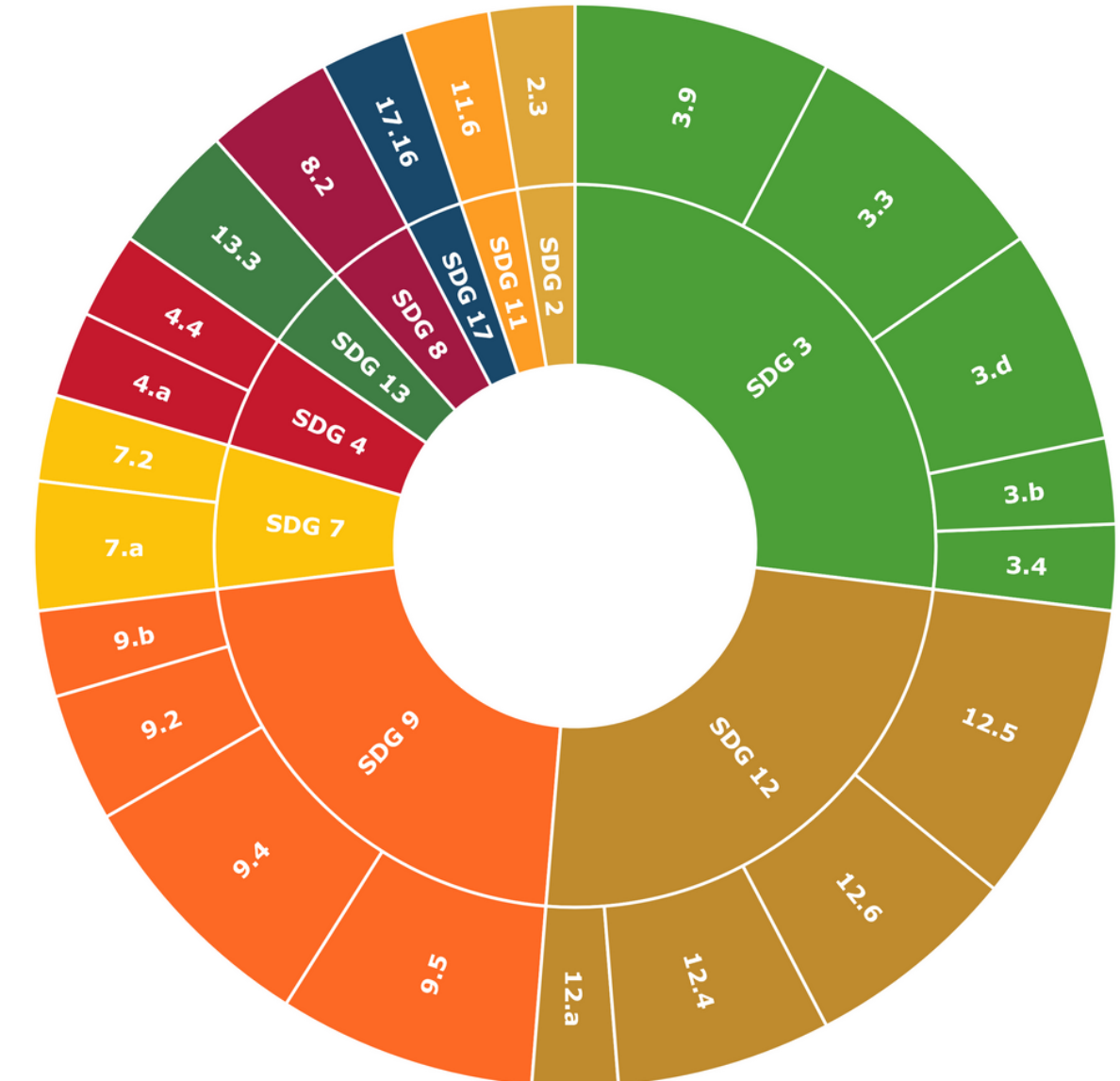
# College of Science, Engineering and Food Science



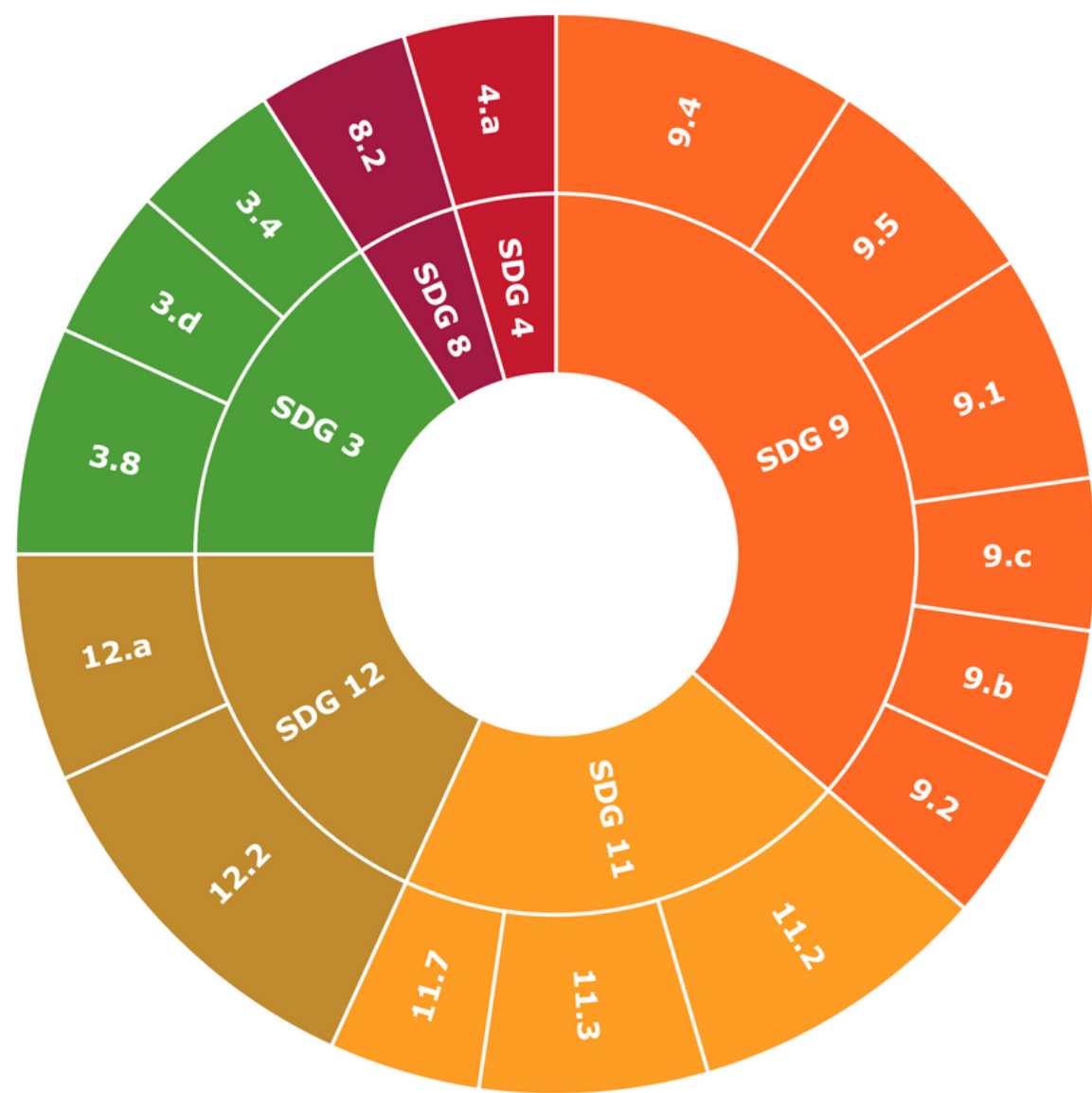
**School of Biochemistry and Cell Biology**



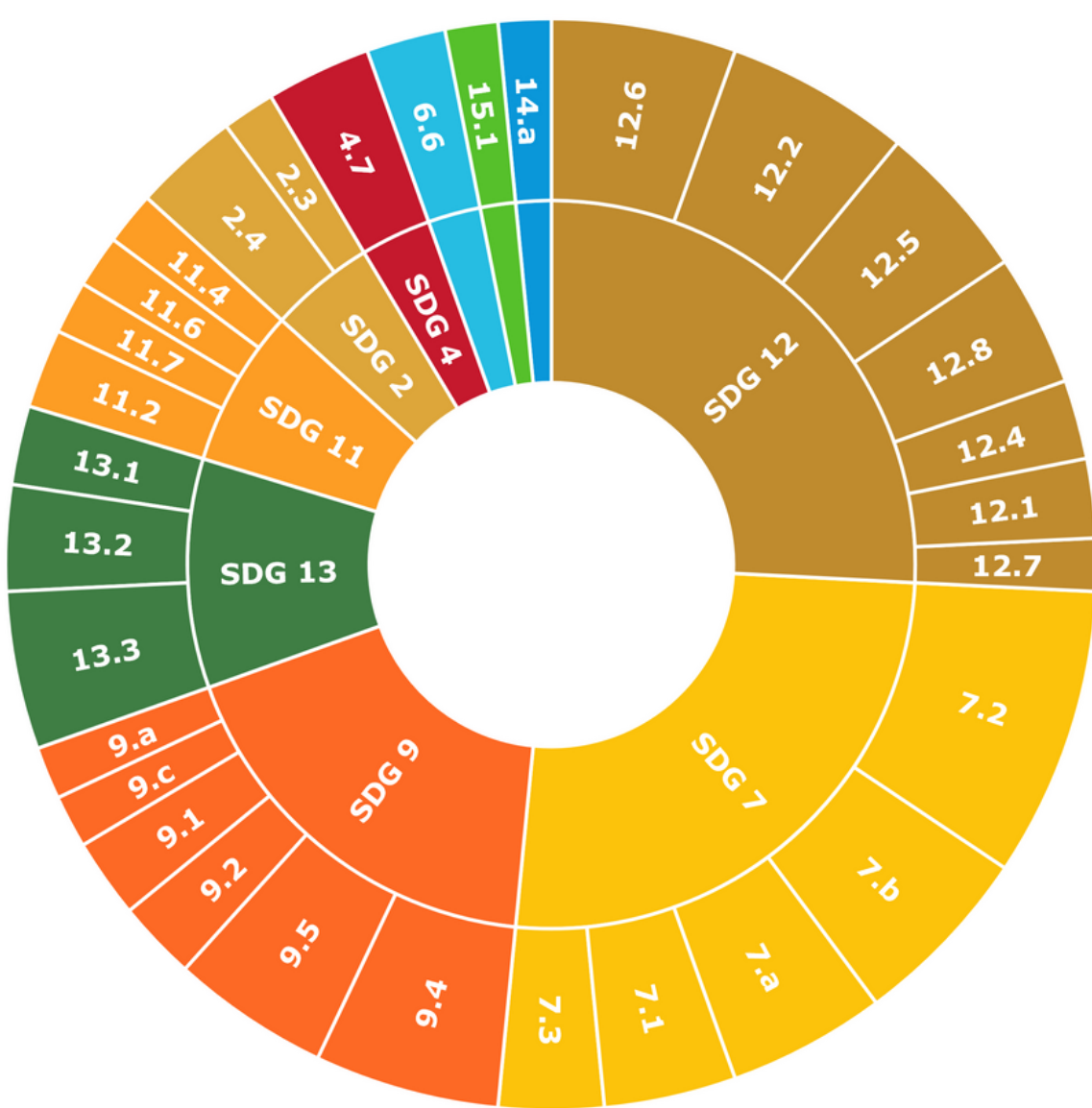
**School of Biological, Earth and Environmental Sciences**



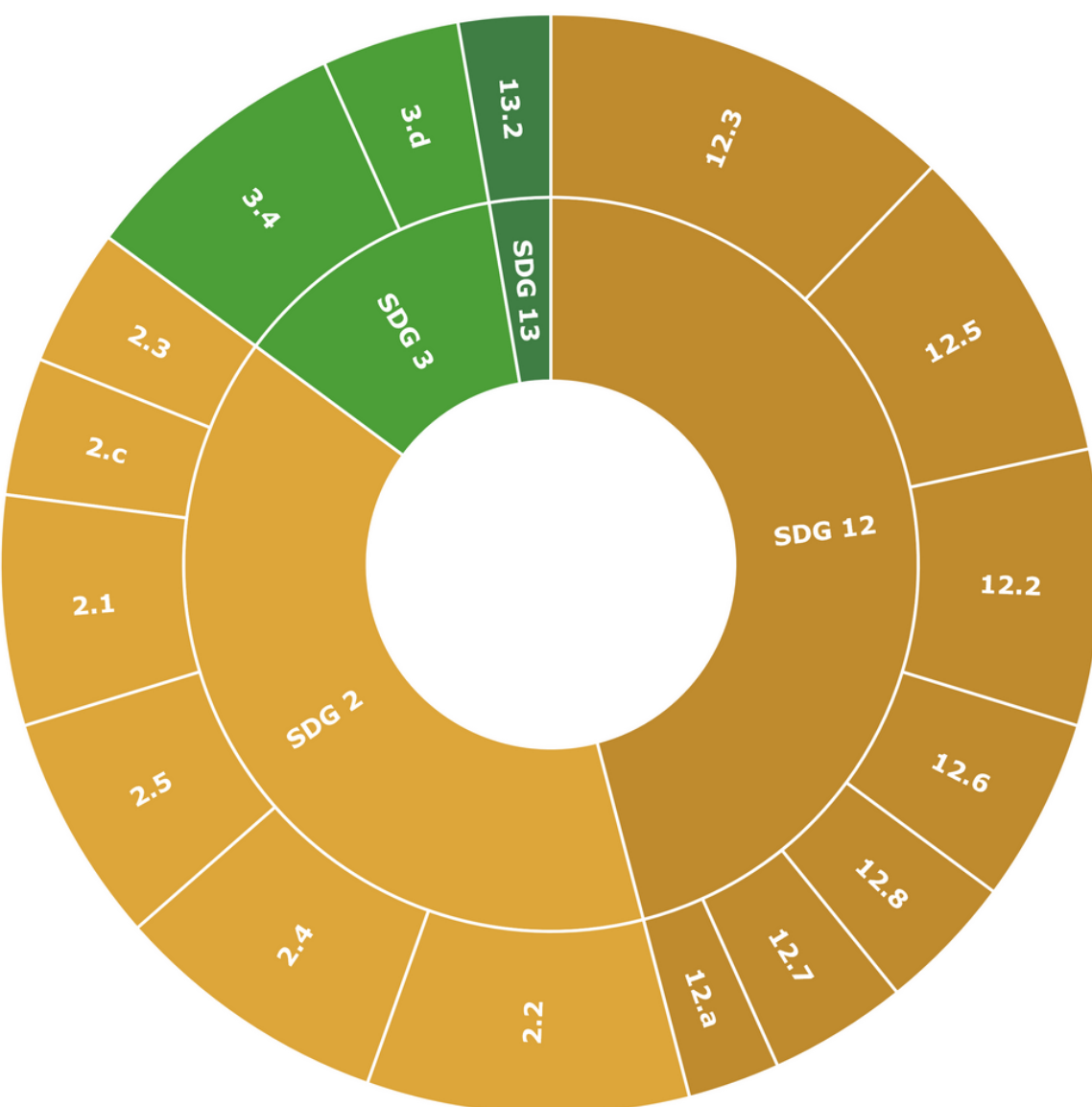




**School of Computer Science  
and Information Technology**



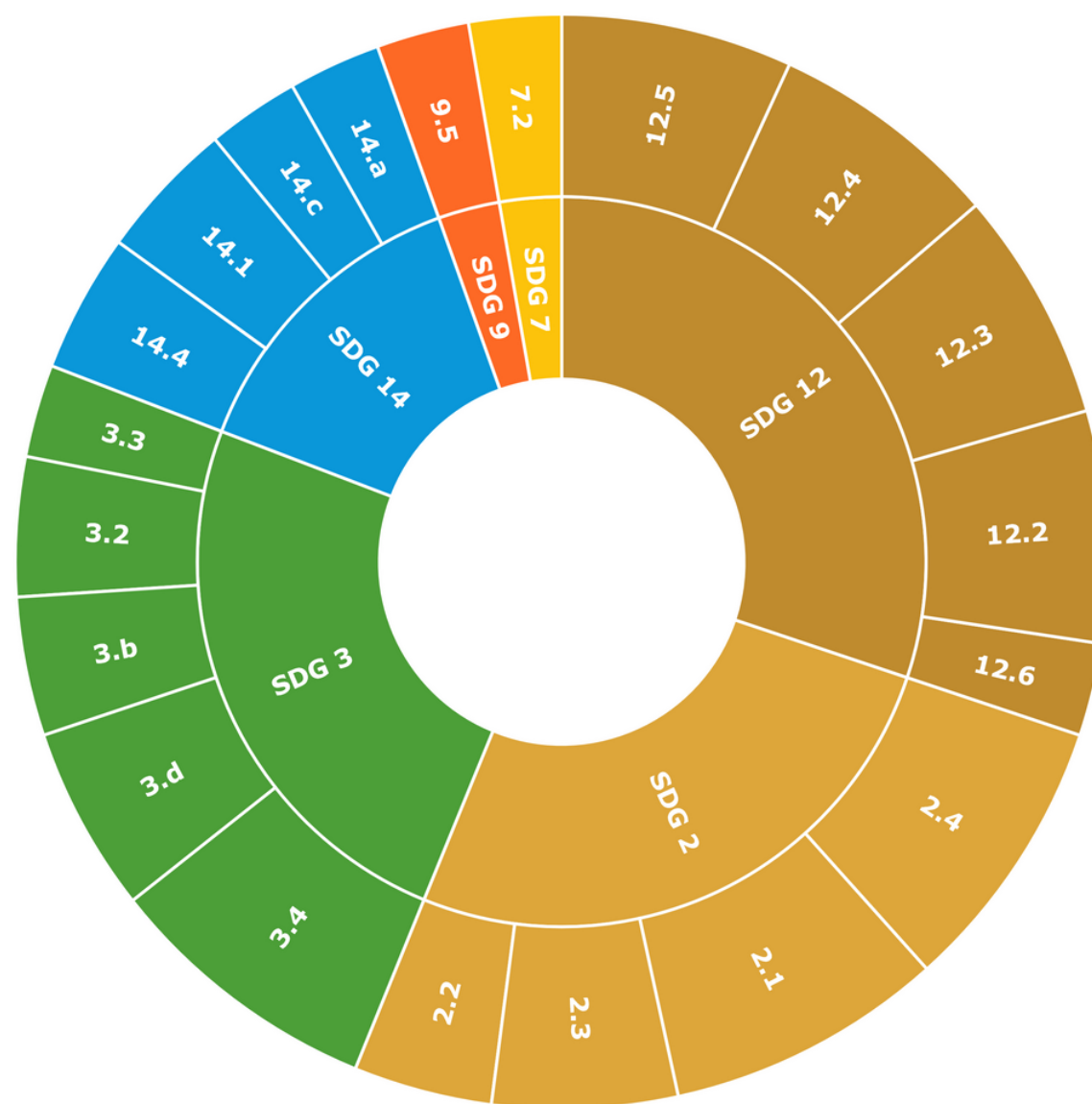
**School of Engineering and  
Architecture**



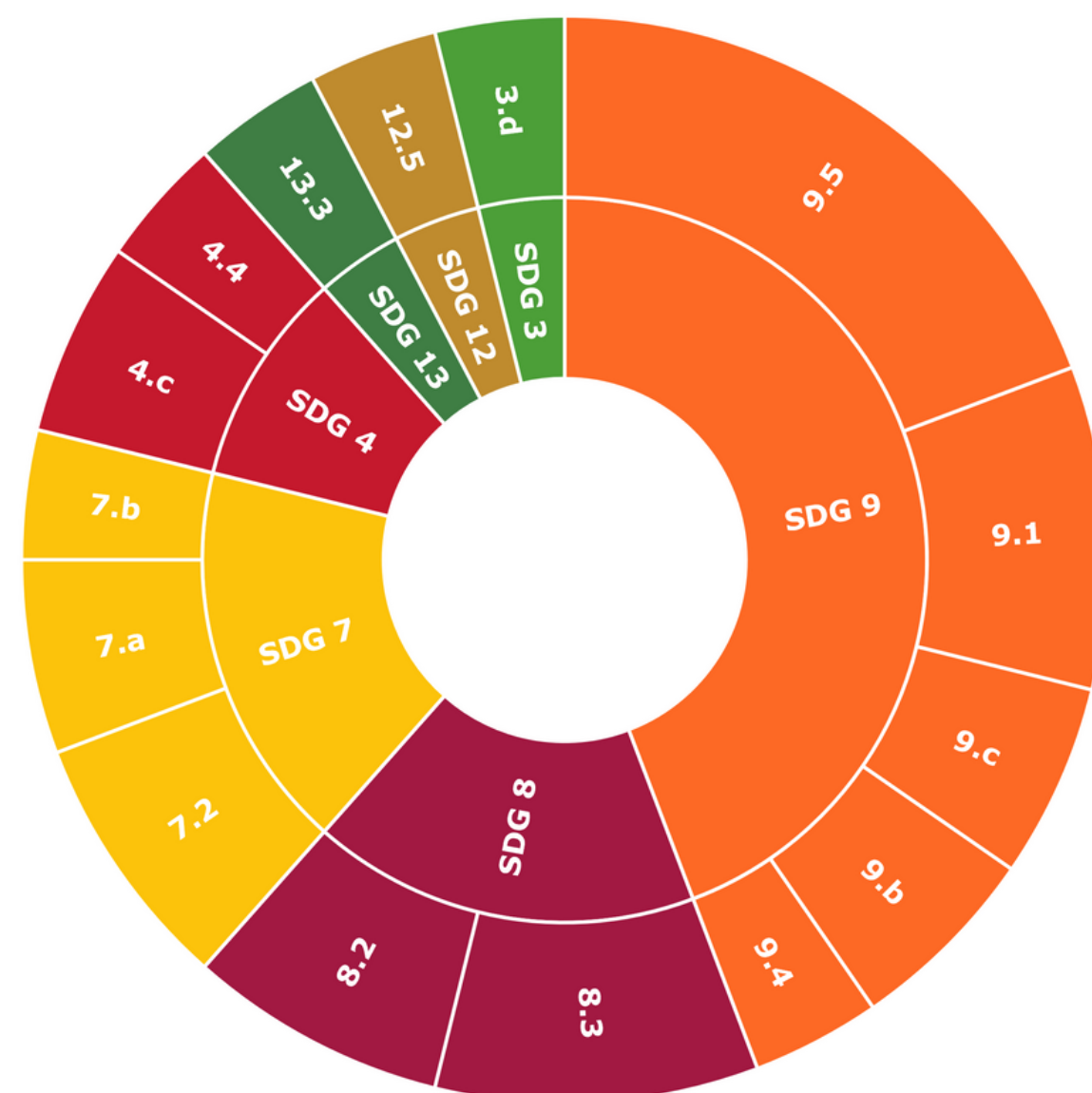
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Nutritional Sciences**



**School of Mathematical Sciences**

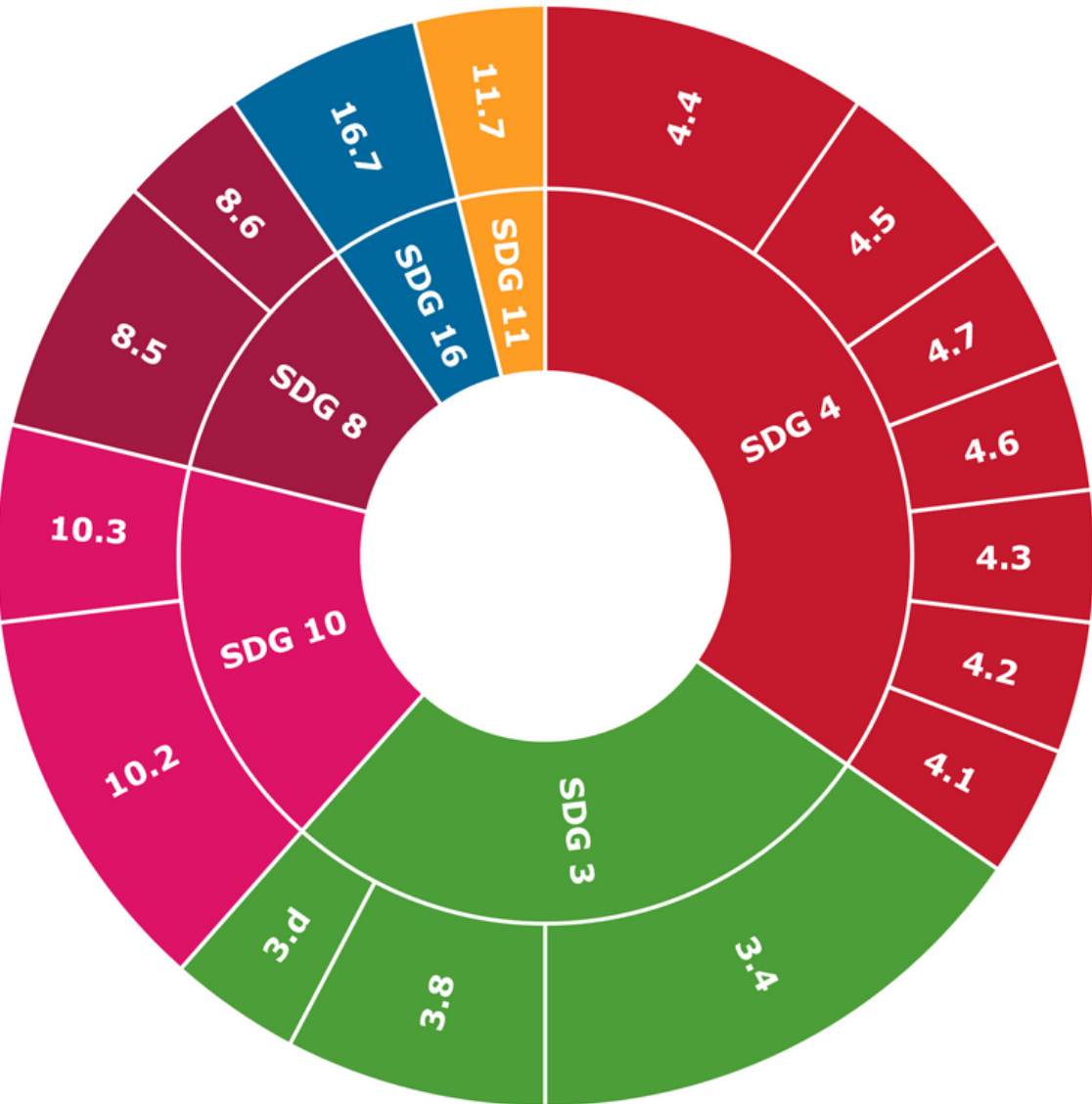


**School of Microbiology**

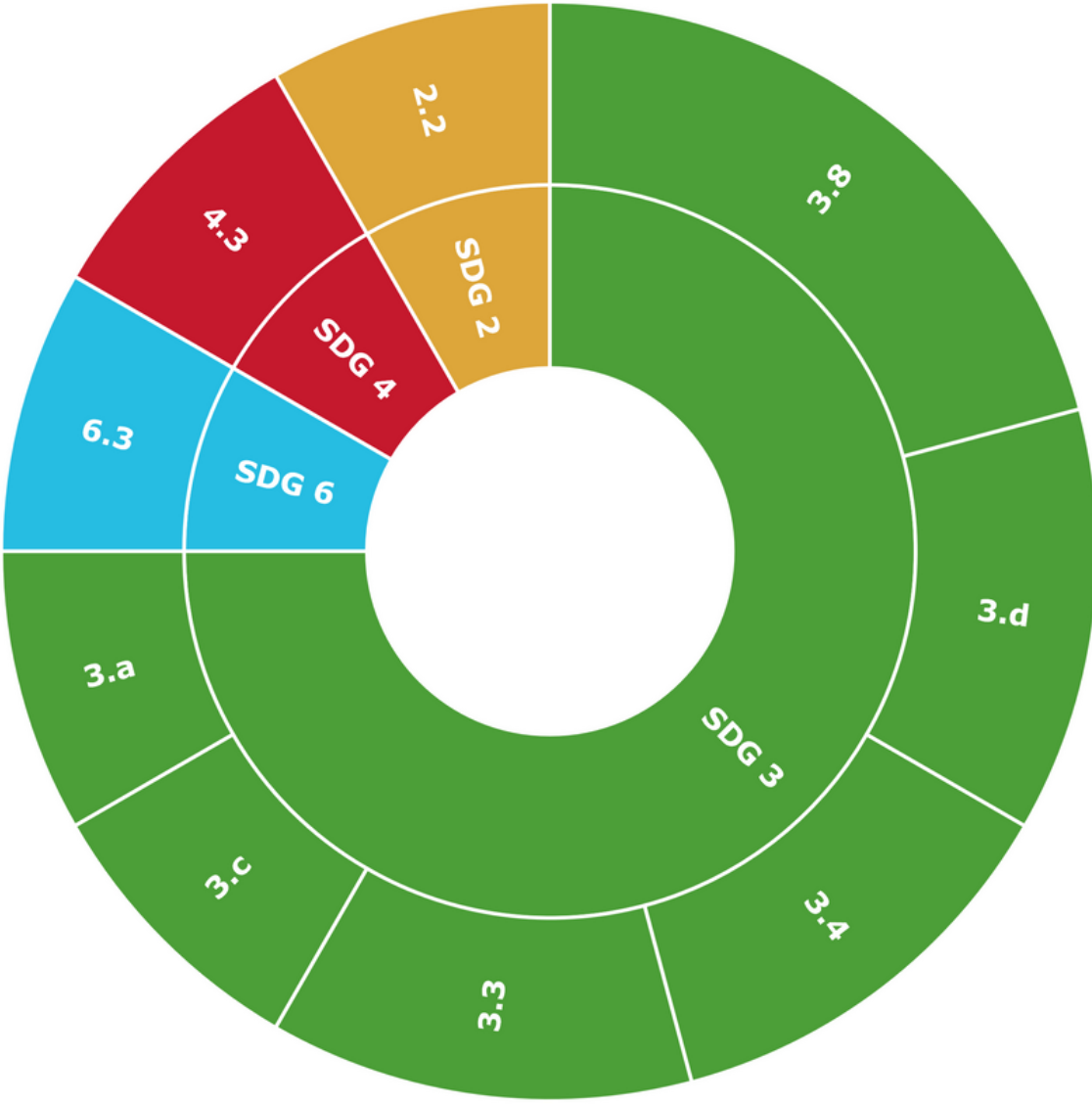


**School of Physics**

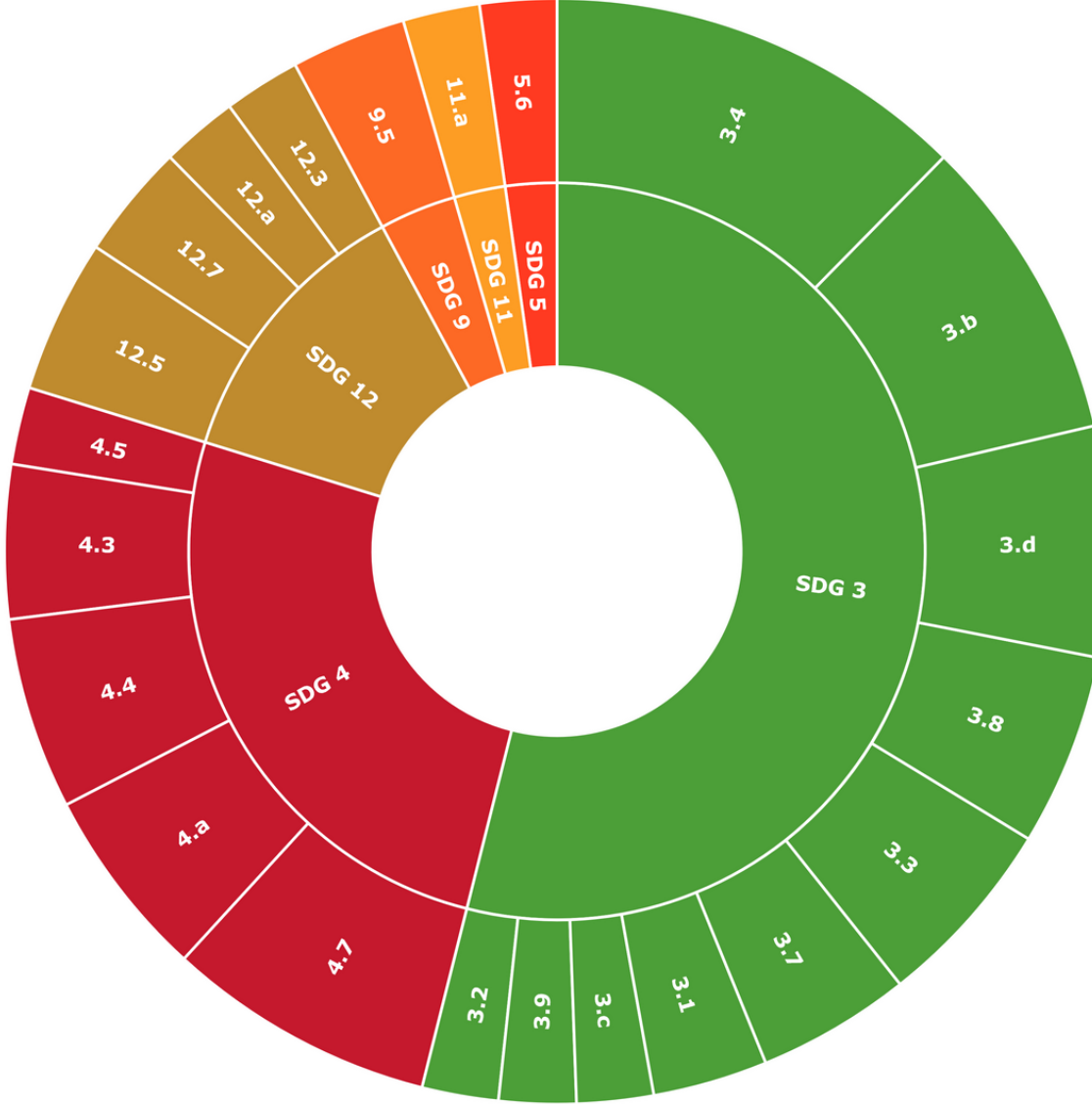
# College of Medicine and Health



School of Clinical Therapies

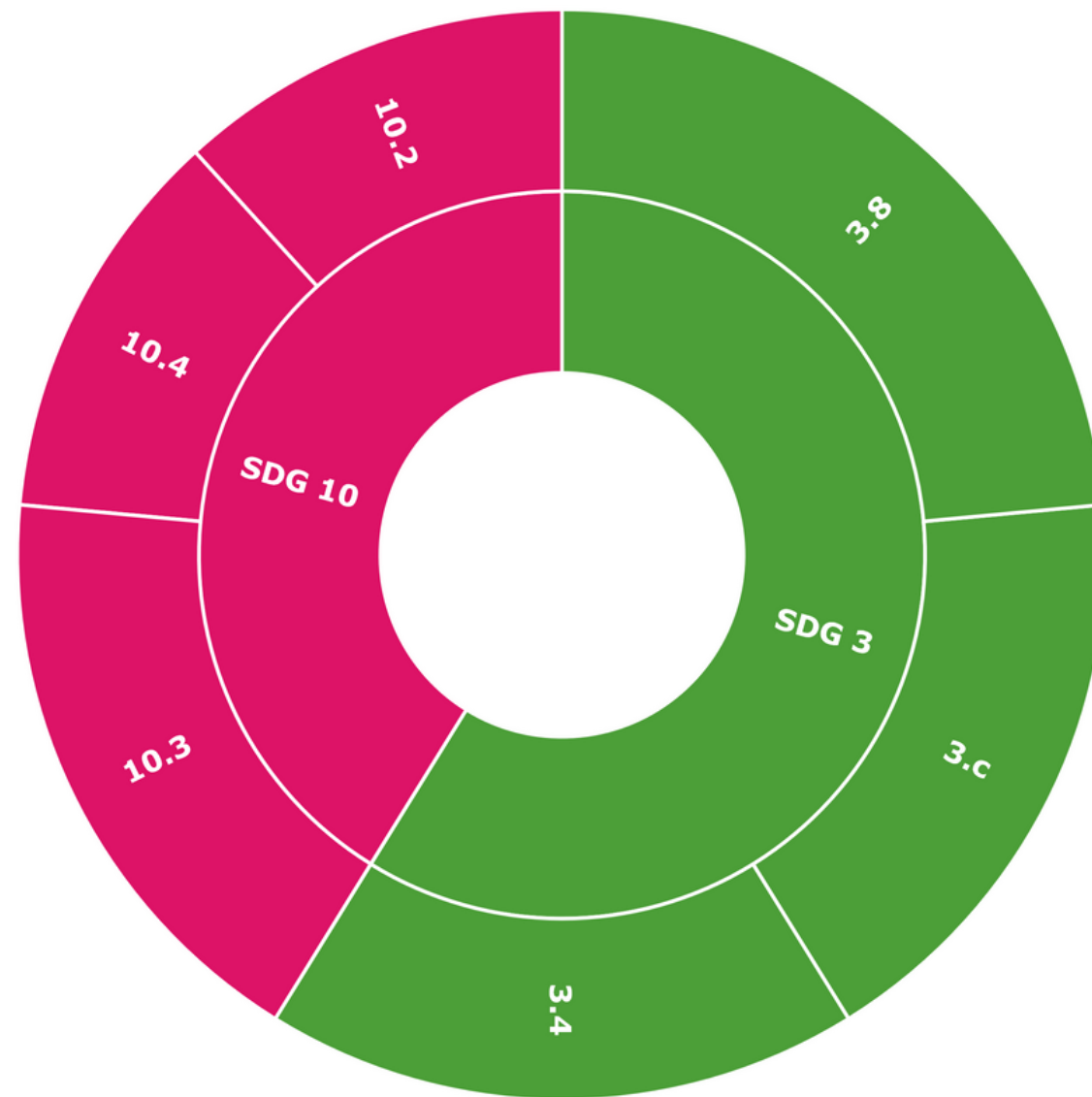


Dental School and Hospital

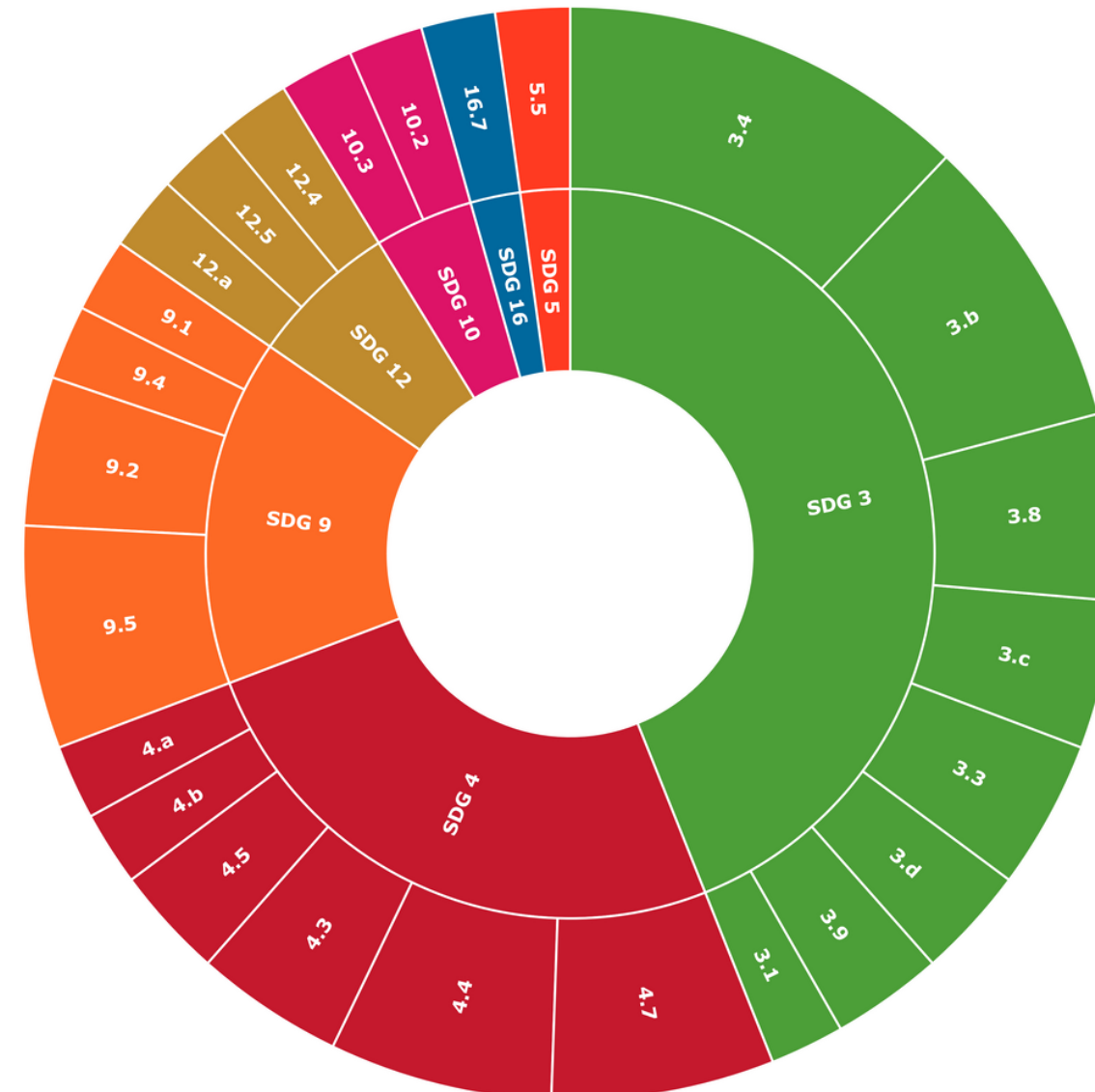


School of Medicine

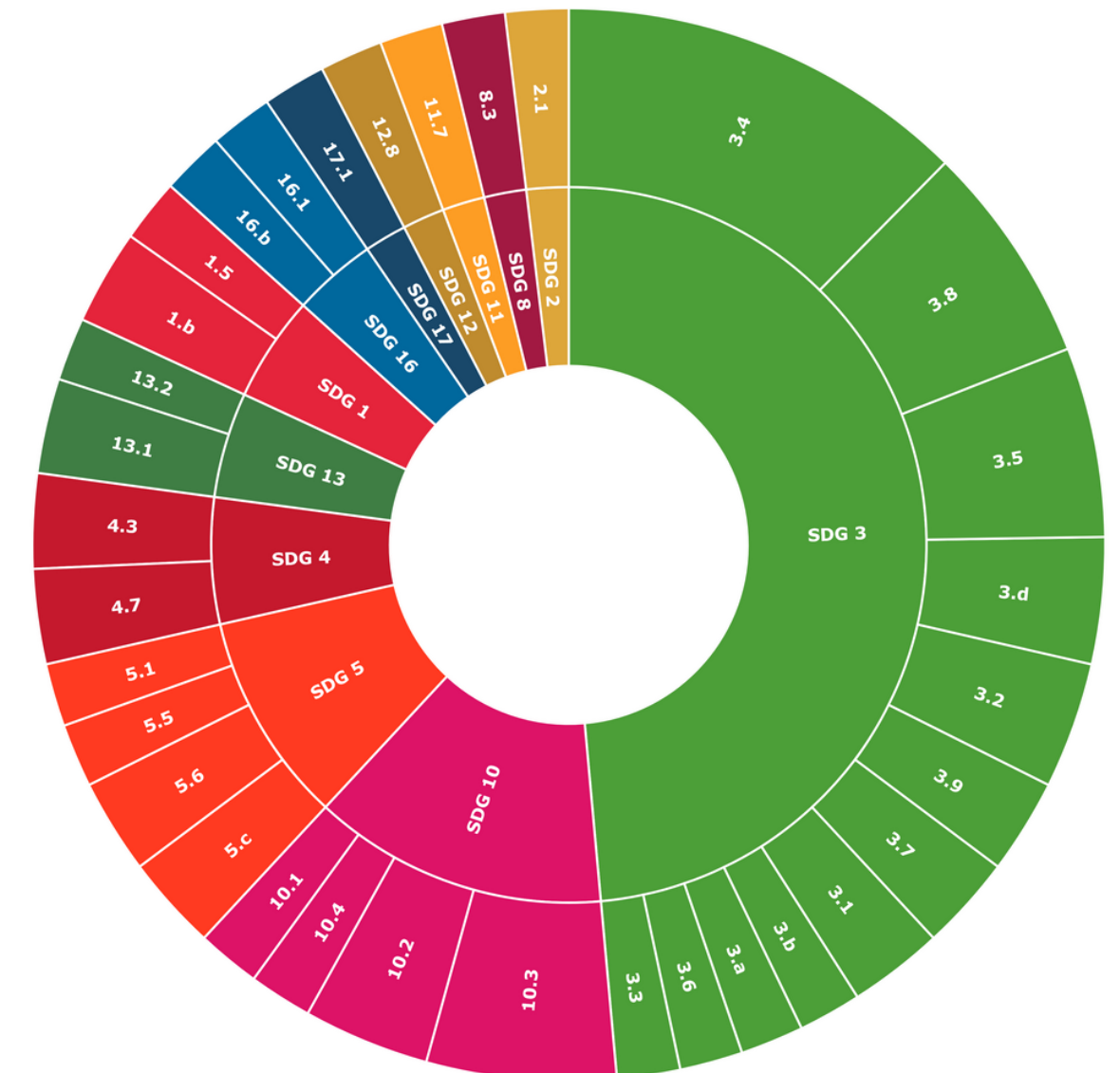




**School of Nursing and Midwifery**

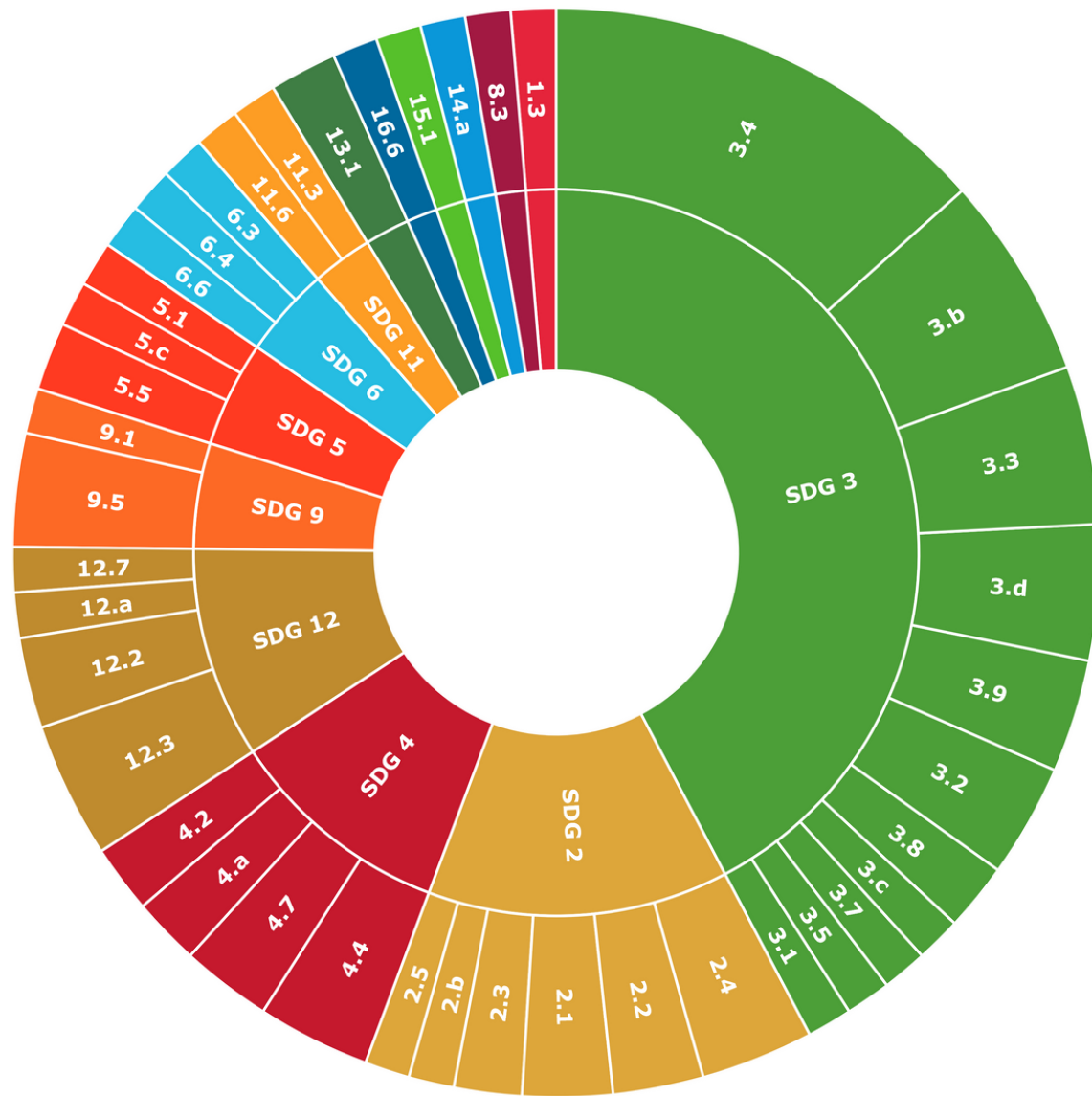


**School of Pharmacy**

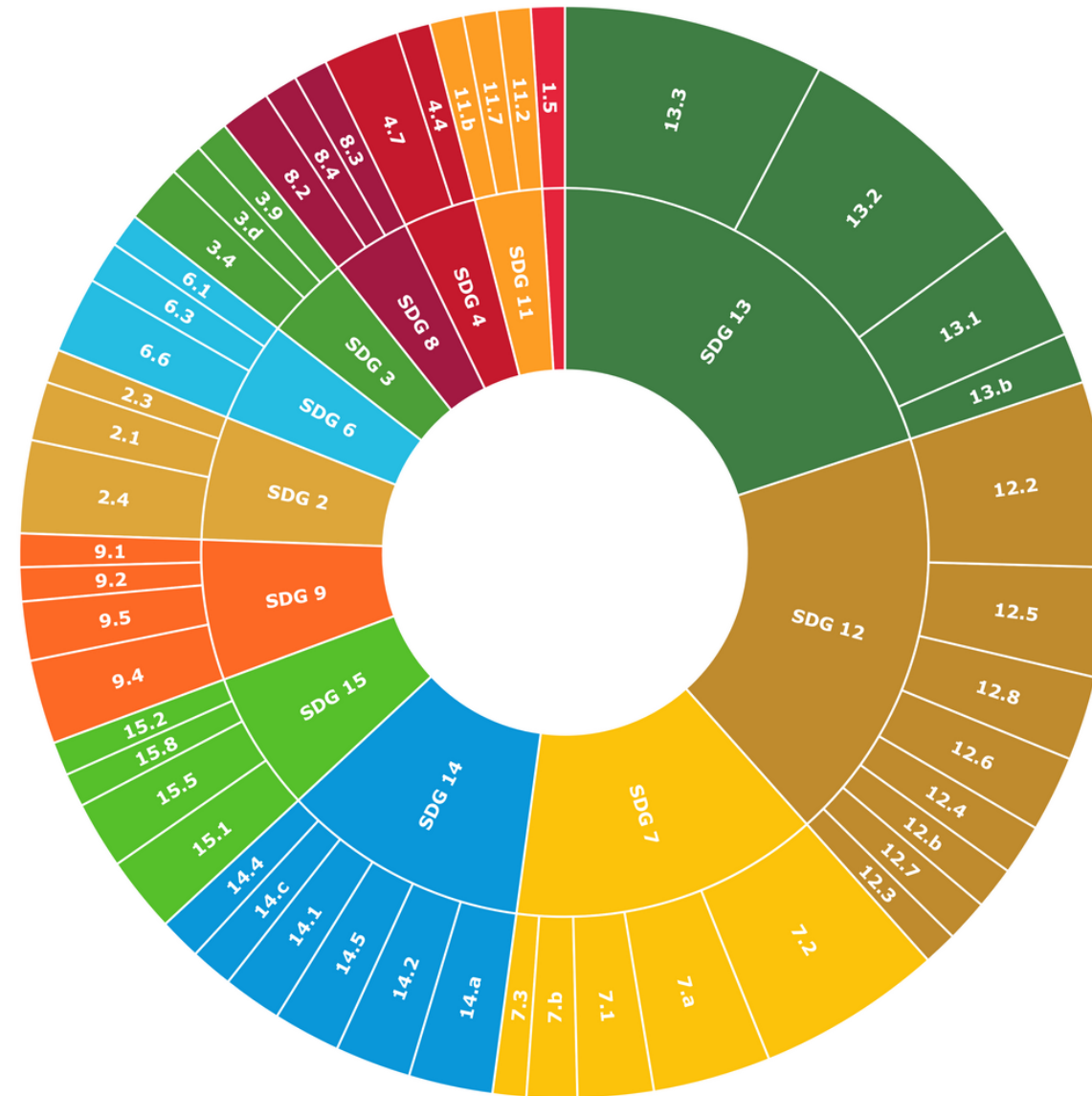


**School of Public Health**

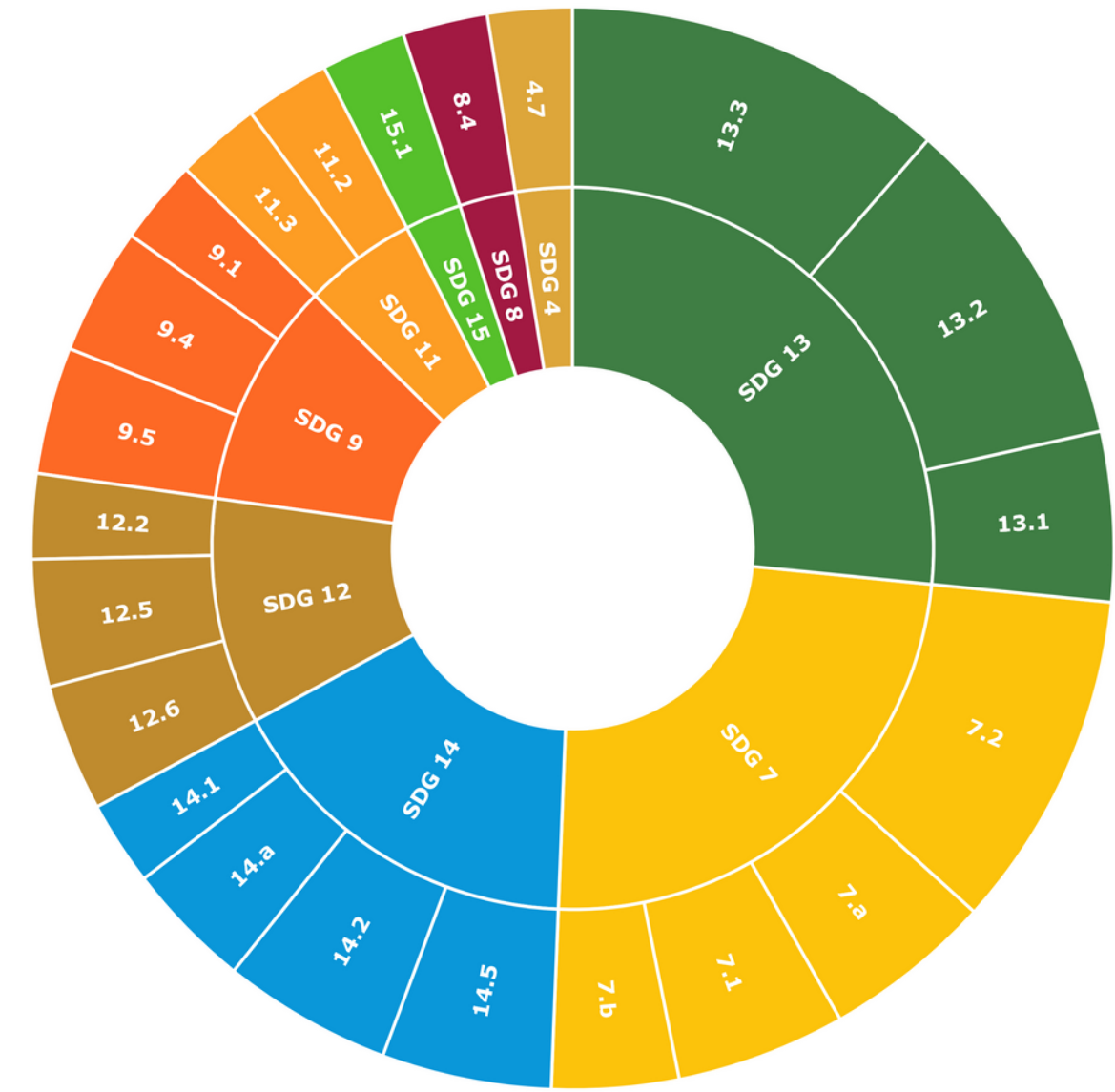
# Key Research Centres



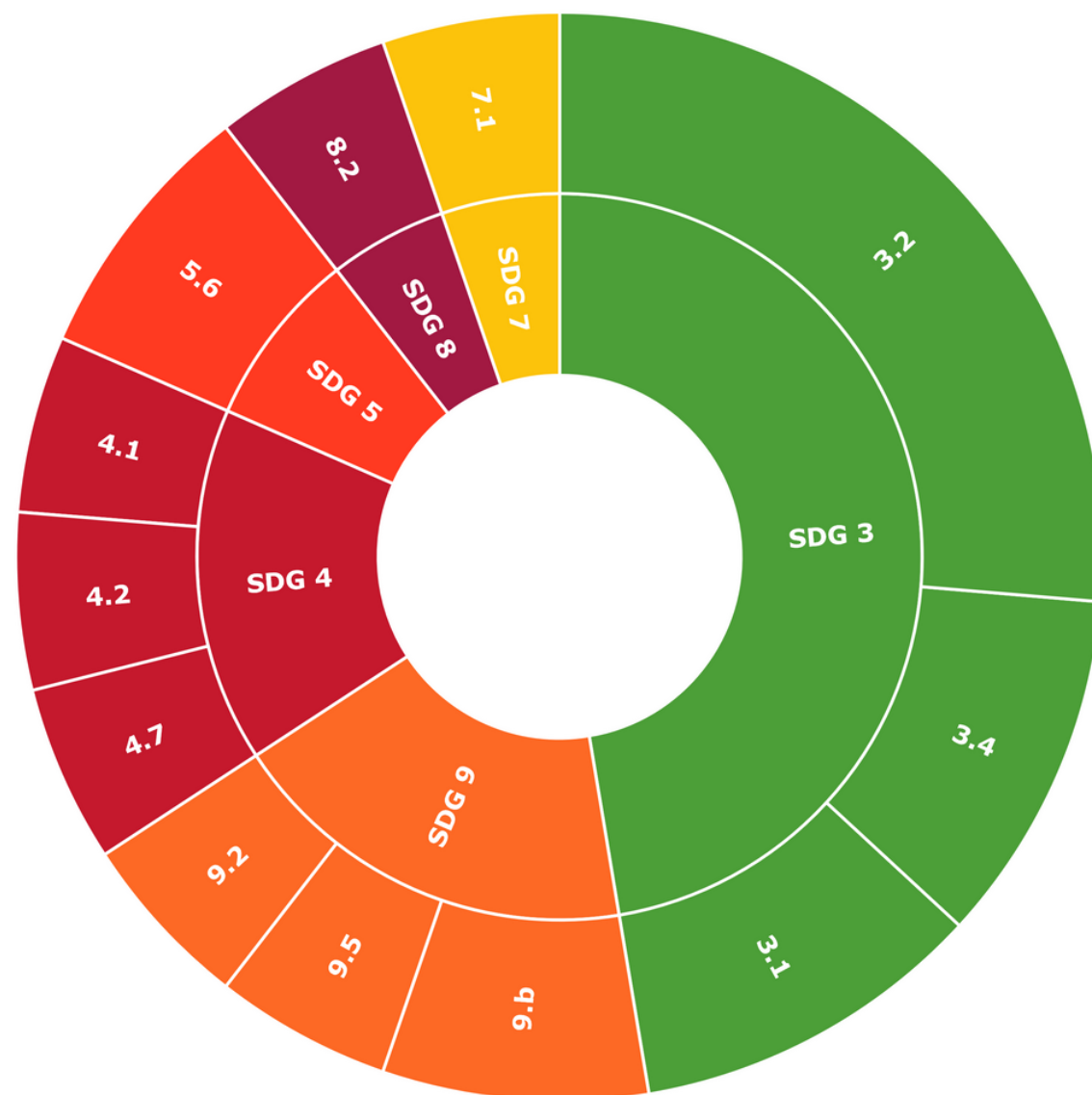
**APC Microbiome Ireland  
SFI Research Centre**



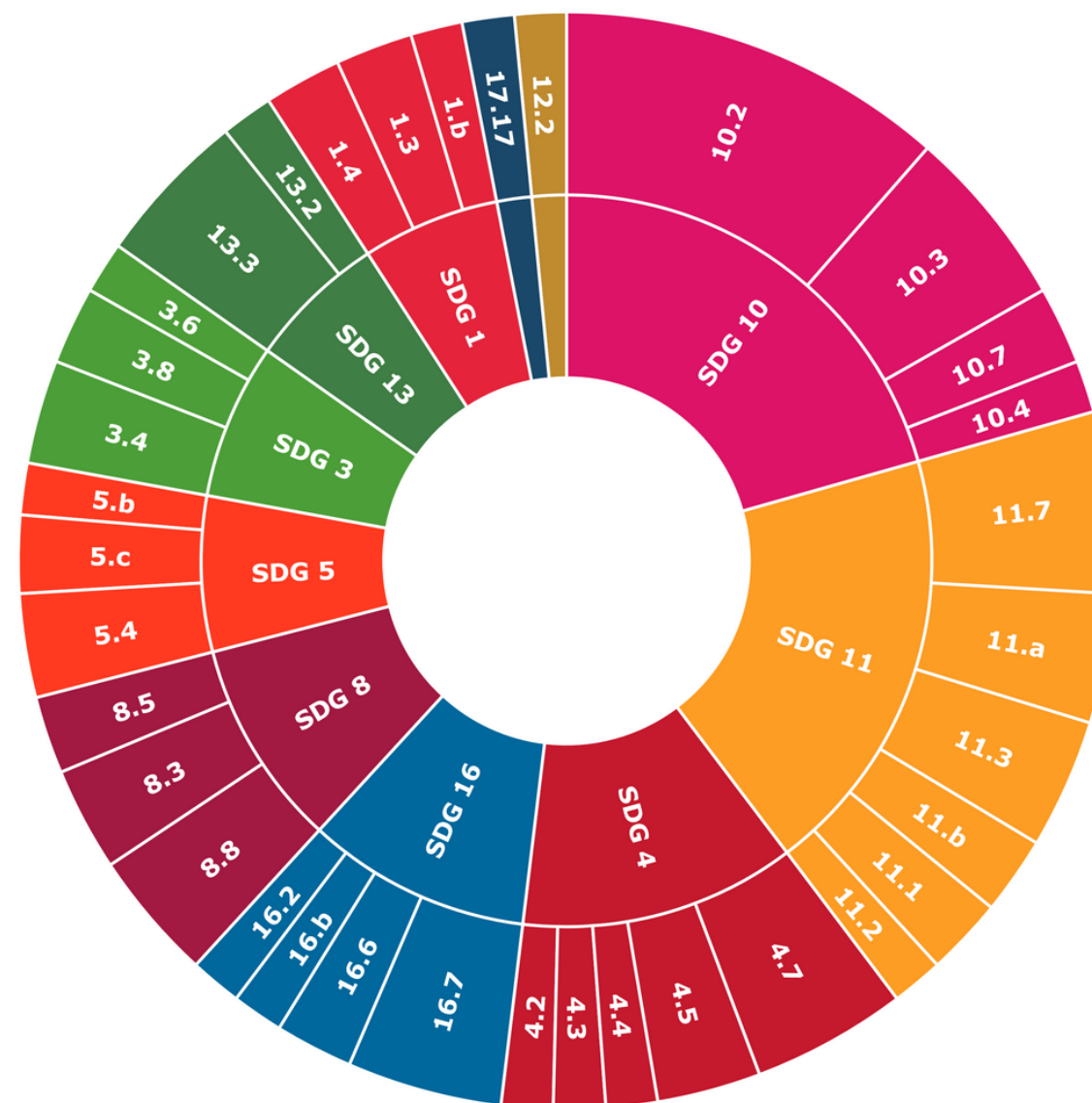
**Environmental Research  
Institute (ERI)**  
(includes MAREI SFI Research Centre for Energy, Climate and Marine)



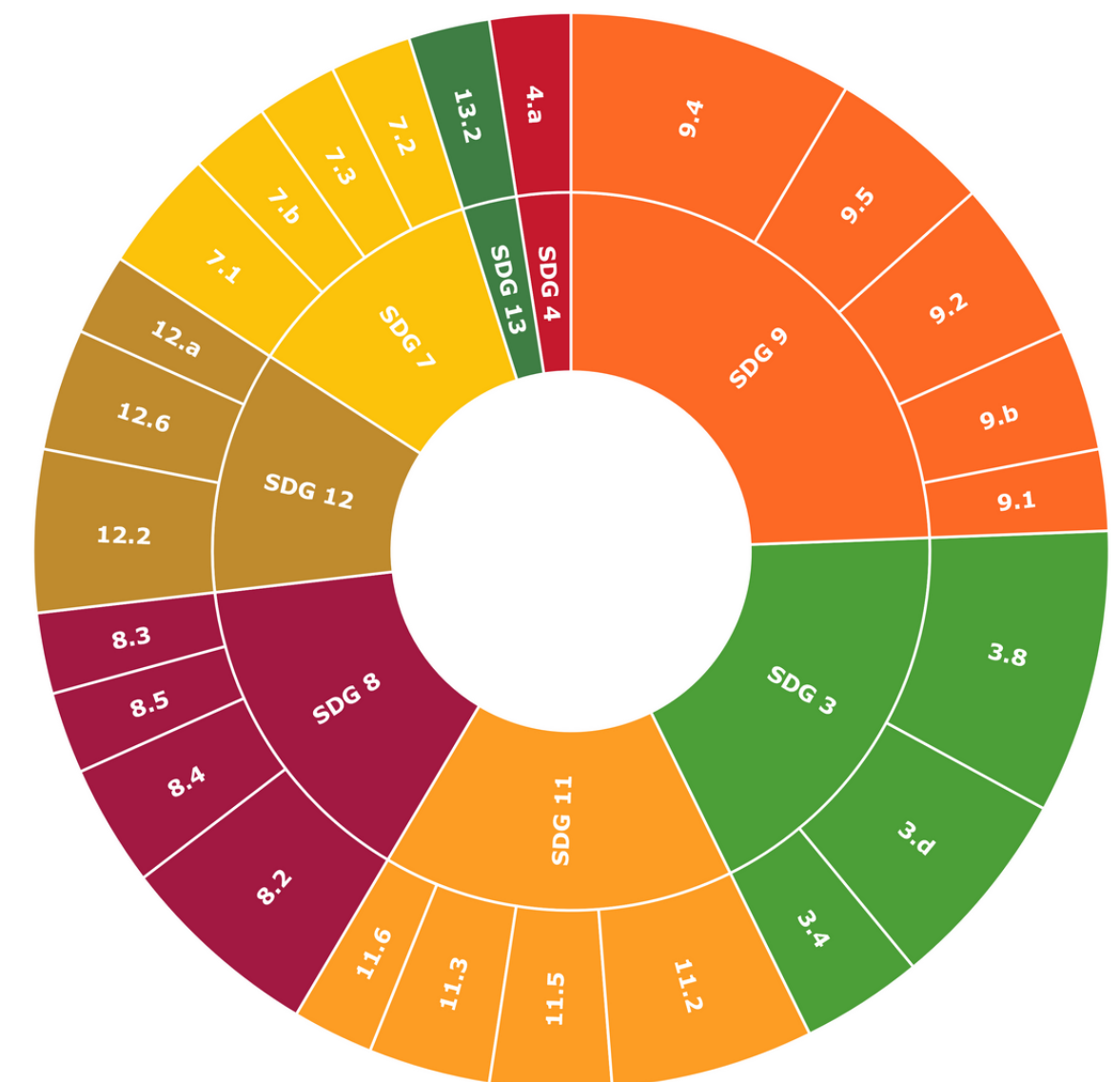
**MaREI SFI Research  
Centre for Energy,  
Climate and Marine**



# INFANT

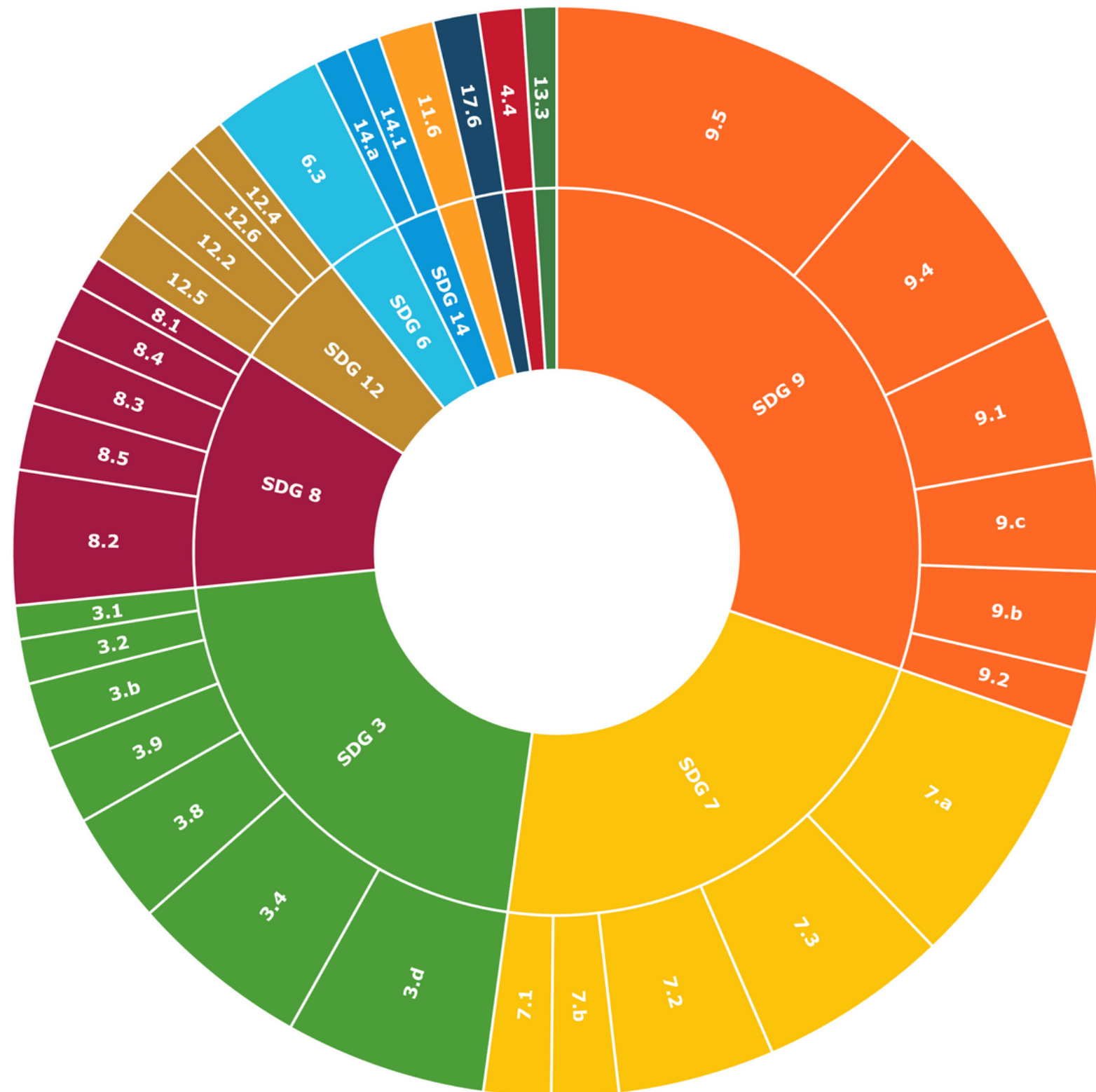


# Institute for Social Science in the 21st Century (ISS21)

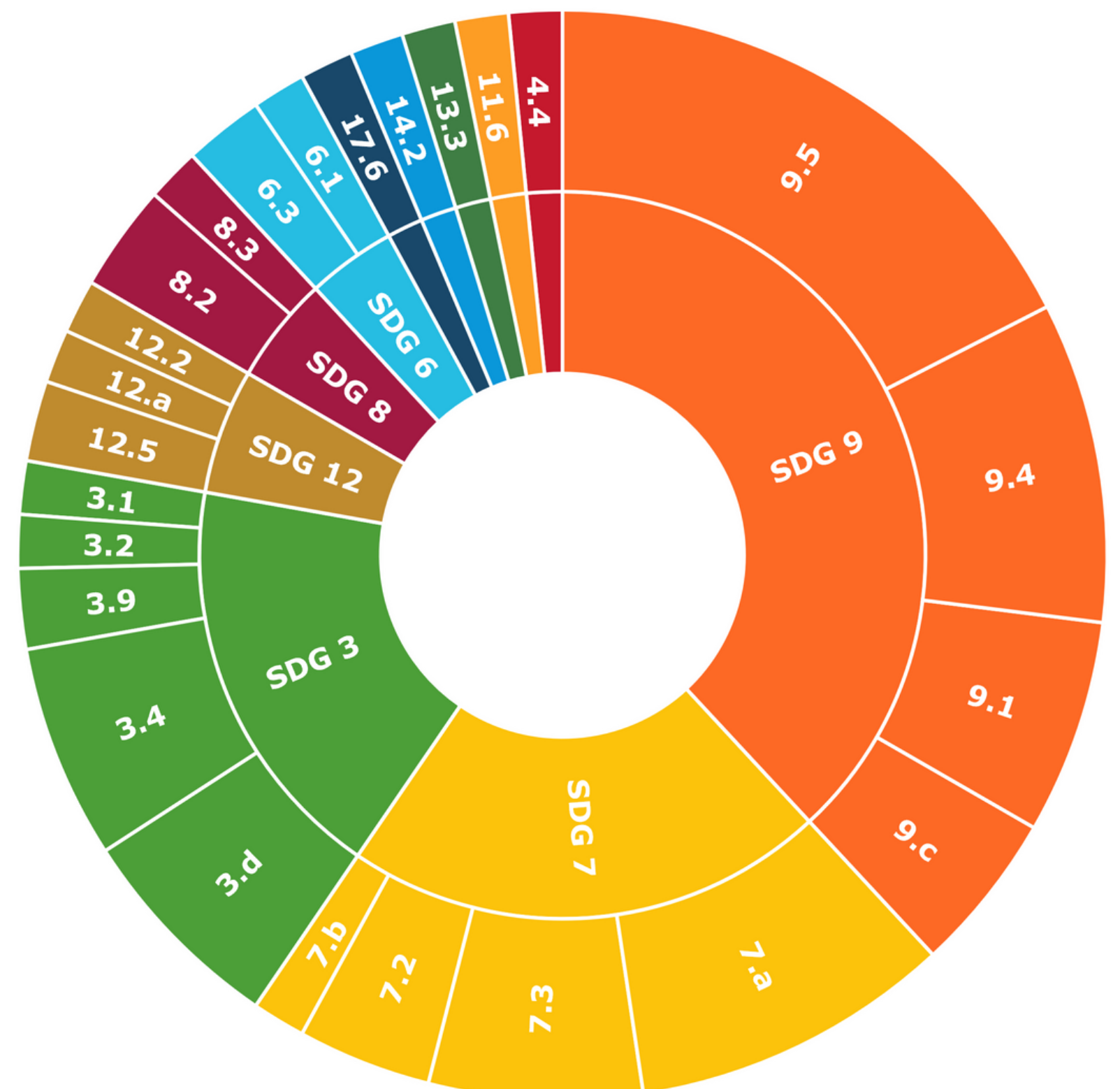


# Insight SFI Centre for Data Analytics





# Tyndall National Institute



# IPIC SFI Research Centre for Photonics

# **SECTION 5: OUR CONTRIBUTION TO THE SDGS**

# End poverty in all its forms everywhere



## Leave No One Behind – Developing Climate-Smart/Disaster Risk Management Laws that Protect People in Vulnerable Situations for a Comprehensive Implementation of the UN Agenda 2030

Dr. Dug Cubie, Centre for Criminal Justice & Human Rights (CCJHR), School of Law

Impact: International

This project investigated links, coherence and potential overlaps between two key international frameworks adopted in 2015, namely the Sendai Framework for Disaster Risk Reduction and the UNFCCC Paris Agreement on Climate Change, assessed through the lens of the SDGs. Dr. Tommaso Natoli led this Irish Research Council/Marie Skłodowska-Curie Action research project in partnership with the International Federation of Red Cross & Red Crescent Societies (IFRC). Understanding the relationship between climate change adaptation and disaster risk reduction is fundamental to successfully achieving key targets in the SDGs, such as building resilience and reducing vulnerability to climate-related extreme events and other disasters.

This partnership between academia and the world’s largest humanitarian organisation had direct operational impacts by providing guidance and evidence for the Red Cross/Red Crescent Movement to tackle poverty, climate action and the impacts of disasters. Dr. Natoli’s research was extensively showcased in the flagship IFRC publication, the World Disasters Report 2020. The country case studies have directly supported the work of the national Red Cross/Red Crescent societies in Fiji, the Philippines, Kenya and the Republic of Dominica by effectively drawing together the knowledge and experience of academics and humanitarian practitioners.

“For greater coherence between climate change adaptation and

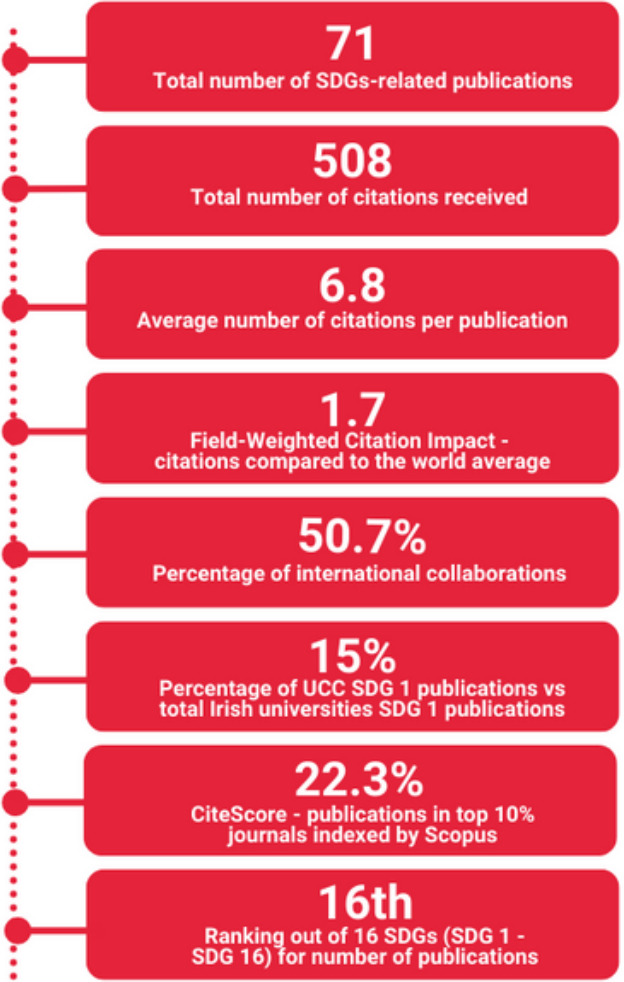


Figure 1: UCC SDG 1 publications 2017 -2021

disaster risk reduction to occur, we first must look closely and carefully at domestic laws and policies – which are instrumental for any effort to increase the harmonisation of implementing plans and measures. This research is a starting point for helping us to understand what is going on in some of the most exposed countries in the world, identify the main obstacles to good governance, and to trace out the features of suitable normative models.”

– Dr. Tommaso Natoli



## Digitocracy

Dr. Fergal Carton, Financial Services Innovation Centre, Cork University Business School

Impact: National, International

Digitocracy research explores the relationship between data and sustainability. For example, in the case of personal finance management, this research aims to influence the design of appropriate products for financially vulnerable customers, and sustainable economic models for future banking platforms. In questioning how data and artificial intelligence can be brought to bear on the lived experience of economically vulnerable citizens, this research seeks to understand how value can be co-created by both customers and service providers. The application of such collaborative economic models, allied with strong data governance around citizen data, will inform multi-disciplinary research on future sustainable economic models. Research outputs from this work include advising on FinTech solutions for Safeguarding Ireland, a not-for-profit organisation





established to promote safeguarding of vulnerable adults; presenting at MABS (Money Advice and Budgeting Service) and Banking and Payments Federation of Irelands workshops; building a citizen data model to address data governance and privacy needs; and integrating financial well-being case studies into undergraduate and postgraduate teaching and research.

***“The paper highlights the increasing aim of IT in data driven banking apps is to reduce “friction” in their use, thus potentially exacerbating the indebtedness of sections of the community who rely on that friction to limit impulsiveness. This is contrasted with how personal finance management apps may aim to increase “friction” as a way of persuading individual not to take on additional debt that they cannot manage effectively by themselves, leading to an unsustainable general climate of consumer indebtedness.”***

- Reviewer response to “Digital factors supporting decision making in the financial well-being of social housing residents”, Journal of Decision Systems.



**Socio-economic inequality in mental health: the role of housing quality**  
**Dr. Brendan McElroy, Department of Economics, Cork University Business School**

**Impact: International**

Income-related inequalities in mental health are high and this study will serve to highlight them. This research measures income-related inequality in mental health in Europe, decomposing it into its constituent parts, focusing on the role

of housing quality. By measuring cross country differences in income-related inequality in mental health in countries with similar levels of income and comprehensive access to health services, we can begin to unpick the factors that drive mental health inequalities. The role of housing quality is focussed on in explaining the results. This contributes to the debate on the value of pro-poor public spending (SDG 1); Mental Health promotion (SDG 3): and proportion of the urban population living in inadequate housing.

Outputs will be in the form of peer-reviewed journal articles and associated conference presentations. The academic literature on income-related inequalities in mental health in Europe is scant. The role of housing quality on mental health and mental health inequality is also relatively under-researched. This project contributes to both areas of investigation.



**The Role of Multilateral Development Bank (MDB) Independent Accountability Mechanisms (IAMs) in Promoting Sustainable Development**  
**Professor Owen McIntyre, School of Law**

**Impact: Local, National, International**

MDBs, along with other international institutions involved in financing development projects and activities around the world, play a pioneering role in extending the normative content and ambition, scope of application, and practical enforceability of a rapidly emerging corpus of global governance standards for environmental and social sustainability. The incremental adoption of increasingly far-reaching and sophisticated

environmental and social safeguard policies by MDBs, along with establishment of independent accountability mechanisms (IAMs) and processes which scrutinise the performance of MDBs in the implementation of their safeguard policies, ensure accountability to project-affected persons, civil society and beyond. Such IAMs thus play a critical role in elaborating applicable environmental and social standards for sustainable development.

This line of research outputs counts among the first academic analysis of the practice of Independent Accountability Mechanisms (IAMs), situating such practice within the broader framework of 'global' or 'transnational' law. It aims to inform critical understanding of the role of IAMs in the emerging global governance framework and of the complex relationship between formal legal frameworks and proliferating standards of global governance. Many MDB safeguard policies are largely based upon or defer to corresponding standards existing in national or international law, whilst others only apply where the relevant and applicable legal standards are considered inadequate. All IAMs are tasked with facilitating the practical and equitable implementation of environmental and social requirements, which largely reflect widely applicable legal rules and standards aimed, directly or indirectly, at achieving sustainable development. Few would argue that the quasi-legal character of the role of IAMs, and of the safeguard policies they apply and enforce, as well as the related legal implications for the banks, their clients, affected communities and individuals, and State actors, are issues which remain largely underexplored.





## AI-driven financial inclusion: value co-creation framework, subjective wellbeing and evaluation

*Dr. Huanhuan Xiong, Financial Services Innovation Centre,  
Department of Business Information Systems, Cork University  
Business School*

### Impact: International

The purpose of this research is to develop a conceptual framework of AI-driven financial inclusion that demonstrates the role of data science in increasing financial inclusion, as well as providing insights and theoretical support for a future “citizen value” research agenda towards SDGs. The planned outputs from this research may include publications, reports, and artifacts. The research outcomes include academic and societal outcomes. Academic outcomes may include: conceptualising the role of AI technologies and data science in increasing inclusive financial services; and providing insights and theoretical support for a future “citizen value” research agenda towards SDGs. While the societal outcomes may include: how the AI-driven inclusive financial services can impact household's subjective wellbeing; potential changes in public understanding, values, and attitudes regarding AI-driven inclusive financial services.

This research is aligned with the "Wellbeing framework towards the SDGs for Ireland" and UN SDGs, identifying what the inclusive financial services are and what the benefits (value) are towards SDGs; investigating how inclusive financial services can impact people's subjective wellbeing and how to improve people's subjective wellbeing by choosing/using the most appropriate financial services.

Contributing to  
Target 1.4

Contributing to  
Target 1.5

Contributing to  
Target 8.10

Contributing to  
Target 9.1

Contributing to  
Target 10.2



# End hunger, achieve food security and improved nutrition and promote sustainable agriculture



**An analysis of contract solutions for the sustainable delivery of agri-environmental climate public goods**  
**Dr. Tracy Bradfield, Cork University Business School**

**Impact: International**

Agri-environmental contracts have traditionally rewarded land managers for carrying out a particular action. However, these contracts often fail to incentivise land managers to focus on the success of their actions. This research is part of an EU Horizon 2020 project called CONSOLE which promotes the delivery of environmental climate public goods by agriculture and forestry through improving contractual solutions. This study examines different types of agri-environmental contracts in 15 EU countries to determine the factors that determine their implementation and success.

The aim of this research is to continuously support EU policy in its efforts to improve the long-term sustainability of agri-environmental public goods. The actions of land managers can benefit agri-environmental public goods such as biodiversity, air and water quality, soil quality and landscape scenery and this research seeks to determine the best form of contracts to encourage land managers to do so. Some innovative contracts offer financial payments for positive environmental actions that are based on results or collective action. Other contract options involve financial compensation through a price premium or reduced rent. This research examines the alternative contracts options available and the findings are discussed at stakeholder and practitioner dissemination events.

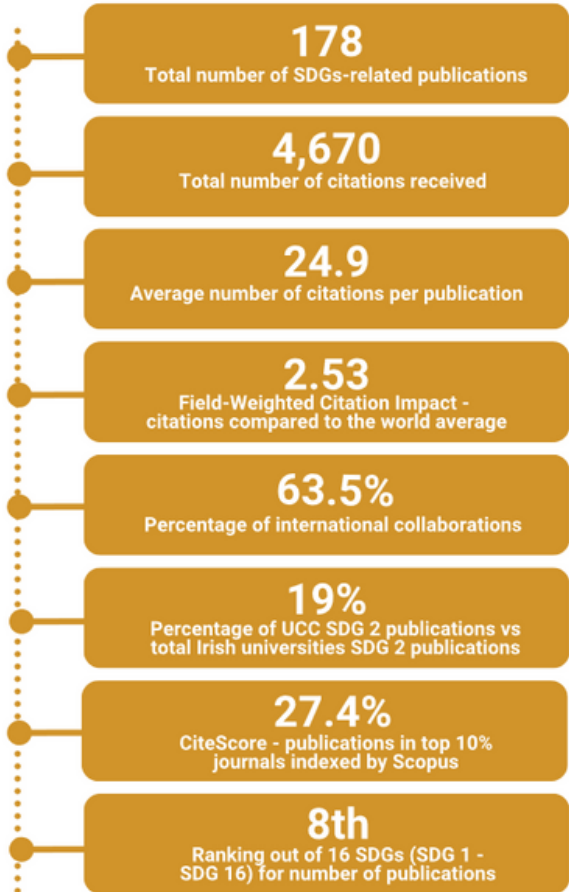


Figure 2: UCC SDG 2 publications 2017 -2021

**What's for dinner? Investigating plant-based routes to endorse a food transition towards a nutritious, affordable, and sustainable diet**  
**Dr. Emanuele Zannini, School of Food and Nutritional Sciences**

**Impact: National, International**

The Smart Protein project aims to industrially validate innovative, cost-effective, and resource-efficient, EU-produced, healthy plant proteins (fava bean, lentil, chickpea, quinoa) and microbial biomass proteins (food-grade yeast and fungi) to produce ingredients and products for direct human consumption. The project involves identifying legumes and protein crops cultivars fit for sustainable production, up-cycling the food side streams by using them as nutritious substrates for microbial biomass protein, and developing innovative bioprocessing strategies for sustainable protein extraction, fractionation processes and protein functionalisation. This research provides a new perspective and opportunities to the Irish agri-food sector on how to produce, process, and include alternative plant and single-cell proteins in a wide range of food and beverage products.

***"We are eager to produce more, better with less..."***







**Iron Deficiency Assessment for Protection of the Newborn Brain**  
*Dr. Elaine McCarthy, School of Food and Nutritional Sciences & INFANT Research Centre*

**Impact: Local, National, International**

Iron deficiency is the number one micronutrient deficiency in the world, with pregnant women and infants particularly vulnerable. This research aims to develop a first-of-its-kind screening strategy to facilitate the early detection of iron deficiency in pregnant woman and infants, providing an invaluable opportunity to prevent long-term damage to health. Anaemia is a major cause of morbidity in women of reproductive age. Iron deficiency is a leading cause of anaemia, affecting 2 billion people worldwide. Iron deficiency during pregnancy is especially concerning as it can result in preterm birth and a low birth weight infant, with damaging effects on fetal brain development also reported. The development of a screening strategy in our research to enable the early detection of iron deficiency in pregnant women and their infants will facilitate earlier treatment, resulting in a reduction in anaemia rates and ensuring the prevention of adverse health consequences for mother and infant. There are currently no screening strategies for the early detection of iron deficiency in pregnant women and infants in Ireland. The preventive nutritional approach outlined in this research will benefit the health and wellbeing of the Irish population, by protecting the brain development of the next generation, leading to improved educational attainment, job potential and quality of life. This screening strategy will also aid the diagnosis and treatment of iron deficiency in the clinical setting, a leading cause of malnutrition worldwide.



**Marine Biodiversity as Sustainable Resource of Disease-Suppressive Microbes and Bioprotectants for aquaculture and crop diseases (MARBLES)**  
*Dr. Stephen Jackson, School of Microbiology*

**Impact: International**

This research aims to address the urgent need for new treatments for aquaculture and crop diseases. It aims to discover novel small molecules and/or microbial consortia to (a) reduce the use of exogenous antibiotics in aquaculture systems while combating common diseases of farmed fish and (b) to develop novel small molecules and/or microbial consortia to treat plant crop rhizospheres to increase productivity and increase stress resistances. This work aims to combat common diseases in aquaculture and agriculture which will help to safeguard sustainable production of foods thereby working towards ending hunger. This will also ensure the sustainable management and efficient use of natural resources and minimize the use of prophylactic antibiotics which result in the increased spread of antimicrobial resistance, including in food chains. Our efforts to combat fish diseases in aquaculture can help to reduce over-fishing by providing sustainable food sources.

This research aims to address two of humanity's extant and pending crises. Sustainable, responsible food production to reduce food poverty and the reduction in the irresponsible administration of prophylactic antibiotics in food production systems, which exacerbates the antimicrobial resistance crisis which is having increasing detrimental effect on human health outcomes.



**Prevention and treatment of food borne pathogens**  
*APC Microbiome Ireland*

**Impact: International**

Illnesses such as ulcerative colitis and Crohn's disease that make up inflammatory bowel disease affect over 3 million people in Europe alone. This research aims to identify bacteria and archaea that are involved in food borne diseases. The particular research goals are to develop predictive models that best classify these diseases and to improve early diagnosis which can improve prognosis significantly. Another planned output of this research is identification of the most beneficial and effective clusters of bacteria that can later be developed into supplements and probiotics that can be used as a prophylactic measure in preventing food borne diseases. This research in computational aspects of microbiology creates and improves upon the currently available disease prediction and classification models. Looking at specific microorganisms that cause and are involved in food borne pathogens will lead to better control over water and sanitation, along with nutrition poverty.







## Developing an Innovation and Learning Platform for Enhanced Economic Opportunities and Resilience in Gergera Watershed: Action Research Programme

**Dr. Nick Chisholm, Department of Food Business & Development, Cork University Business School & Centre for Global Development**

### Impact: National, International

This research focuses on a degraded watershed in the Tigray Region of northern Ethiopia. It is a joint collaboration between researchers from the World Agroforestry Centre (ICRAF) and UCC. The research aims to work with communities in the watershed to build more resilient livelihoods, with a strong focus on improving agro-forestry-based farming systems, improving nutrition of women and children, and women's empowerment. The research area is drought-prone, environmentally degraded, and food insecure; there are high rates of child malnutrition (stunting); women's nutritional and educational status is generally poor. There have been physical interventions to reduce levels of environmental degradation such as conservation structures, but there is a need to develop more resilient livelihood systems which mitigate climate impacts. The ICRAF researchers are developing agro-forestry-based solutions in collaboration with farmers.

UCC researchers have undertaken surveys in the watershed to gain a detailed understanding of household farming and livelihood systems, nutritional status of women and children, and levels of women's economic and nutritional empowerment. All of this analysis will enable the identification of climate-resilient livelihoods which also improve nutrition, and identify key institutional and other interventions to support women's empowerment. It is anticipated that there will be a dissemination event in Ireland to highlight some of the main findings of the research. The research approach has combined



Local community leaders discussing with researcher in Gergera watershed, Ethiopia

agro-ecological field-based research with socio-economic community-based research, using holistic approaches to provide an integrated understanding of livelihoods, focused on key issues of food security, malnutrition, women's empowerment and climate resilience. The research is supported by Irish Aid.

***“The SDGs focus on the key global challenges we all face. They should not be taken in isolation. This project takes an integrated and multi-disciplinary approach to focus on a number of SDGs. Such approaches are needed to ensure the SDGs are translated into real improvements in people's lives and livelihoods on the ground.”***





# Ensure healthy lives and promote well-being for all at all ages



## Development of new drugs against Chagas disease Dr. Tim O’Sullivan, School of Pharmacy & School of Chemistry

Impact: International

Chagas disease affects approximately 6.5 million people worldwide. The purpose of this research is to develop new drugs for treating Chagas disease, a neglected disease which affects large parts of South America in particular. In this project, we aim to design, synthesise and evaluate novel molecules which are effective against Chagas disease, but have better side-effect profiles than existing drugs. Current treatments for this disease display limited efficacy and are often associated with severe side-effects. As a result, treatment is often cut short. By developing new drugs which are more potent and exhibit fewer side-effects, the disease can be more effectively treated. This should ultimately result in faster recovery from the disease, improved quality of life for the patient and a reduced burden on healthcare systems. Working with international collaborators at the Carlos Chagas Institute in Brazil, we have identified several novel molecules which are highly effective against the T. cruzi parasite, the causative agent of Chagas disease. This work has been published in a peer-reviewed publication.



## The host-microbe metabolic dialogue, directing their signalling landscapes in health and disease Dr. Susan Joyce, School of Biochemistry and Cell Biology

Impact: International

The purpose of this research is to form a mechanistic

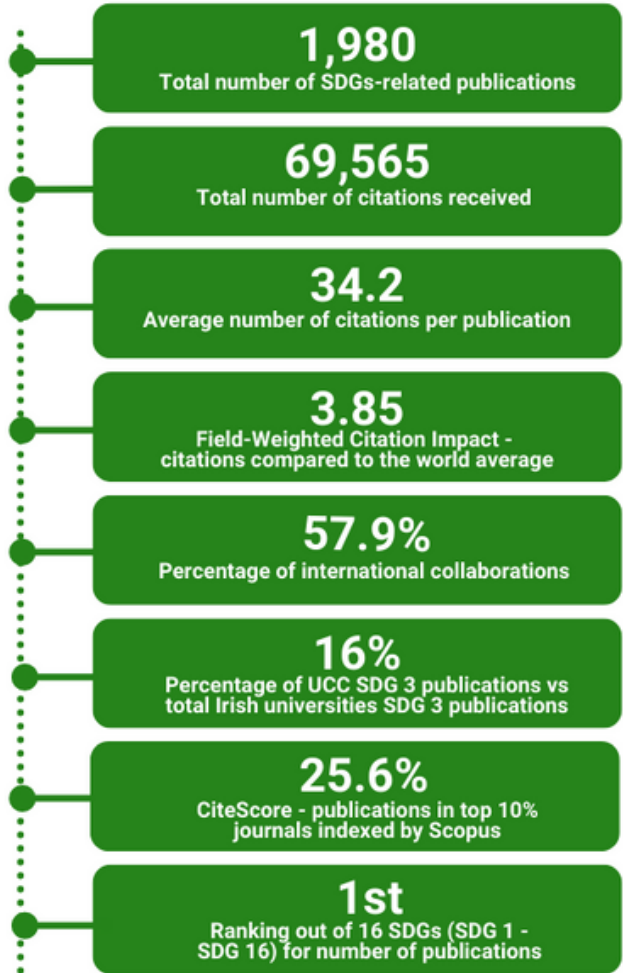
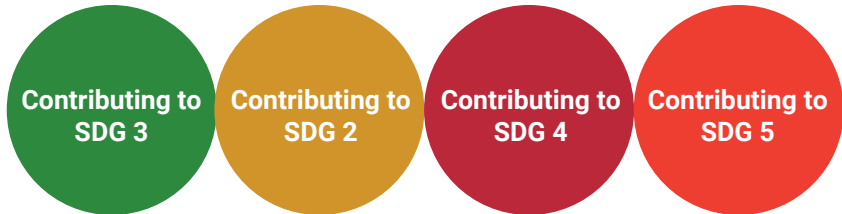


Figure 3: UCC SDG 3 publications 2017 -2021

understanding of food enrichment for specific classes of microbes and their fitness to function; to understand how microbial metabolism of diet and host-produced factors reprogramme cell and metabolic processes; the interactions between food-microbes and their hosts towards disease and in maintaining health; and defining health, in the context of microbial functions and modification of metabolites to influence cell signalling processes. This research has impact on an international level and contributes to efficient food production and safety through the Department of Agriculture, Food and Marine’s project to support alternative approaches to animal bulking. The research also supports female STEM development initiatives and the training of PhD students as part of exchequer and non-exchequer funded projects.

*“We are committed to untangling the intriguing multifaceted puzzle of what defines health and pushes towards disease.”*



## Promoting awareness and behavioural change around air quality in Cork Dr. Marica Cassarino, School of Applied Psychology

Impact: Local, National

The Cork Air Quality Partnership is a collaboration between the School of Applied Psychology UCC, the ERI Centre for Research into Atmospheric Chemistry, Cork City Council and Cork Healthy Cities. This partnership, still in its initial phase, aims to develop strategies to enhance the public's awareness



about the risk associated with air pollution and promote behavioural change for the improvement of air quality in Cork City. This research focuses on understanding public attitudes and motivations to inform effective communication /engagement strategies.

The research has already generated two policy-informing documents related to public's views of air quality in Cork City and around schools. Further research will test communication and engagement interventions at school and community level. The research developed within the partnership will help to advance and enrich the Cork Clean Air Strategy, which is the first in Ireland, with potential for implementation at regional and national level. Outputs will include policy recommendations, public engagement events, peer-reviewed publications and conference presentations. The research showcases the importance of collaboration and partnership between research and civic society stakeholders in achieving key sustainable goals in Cork, which is one of the main growing urban areas in Ireland. To this end, the partnership addresses the National Planning Framework 2040 and provides opportunities for international collaboration.



**Catching Stories of Infectious Disease in Ireland**  
*Dr. Cliona O’Carroll, Department of Folklore and Ethnology, School of Irish Learning*

**Impact: Local, National**

'Catching stories' brings oral testimony of infectious diseases

together with social history and immunological commentary in a cultural heritage resource, in order to bring conversations around public health initiatives and vaccination into the public sphere in an innovative way, and to provide public health communicators and communities with a platform for exchange. Twentieth-century vaccination initiatives have been victims of their own success in Ireland and elsewhere, in part due to a loss of awareness of the human cost of such diseases. Collecting and sharing community memories of once-common diseases makes these stories available to the public again, and contributes to public discourse in the field of vaccine hesitancy.

Cultural heritage methods and platforms are used to enhance public engagement with past and present experiences of infectious disease and vaccination in Ireland, in an online resource where visitors can listen to what it was like to live in a family ravaged by TB, lose a classmate to measles, or lose two stone through the sweat of fear when queueing up for ‘the branding iron’ of 1960s childhood vaccination. By presenting this oral testimony side-by-side with relevant biomedical commentary and social history, we offer multiple entry points to the topic, allowing the public and public health communicators to approach disease and vaccination through the interplay of human experience and scientific insight. The project trials and champions the creative use of cultural heritage platforms, materials and methods to address social challenges in a way that brings vernacular stories, voices and memories to the fore.

*“This is unique - it marries public health and cultural heritage very well, a mixture of old and new stories. This adds value to typical public health reporting - by relaying the personal experiences of real people - ordinary people - anecdotal*

**evidence to supplement the statistics we generally see - this is a great piece of work.”**

- Denise Cahill, Healthy Cities Co-ordinator, Cork City, on the ‘Catching Stories’ resource, May 2022



**LEANBH (Learning to Evaluate Blood Pressure at Home)**  
*Professor Fred Adam, Dr. Fergus McCarthy\*, Dr. Stephen McCarthy, Dr. Paidi O’Reilly, Dr. Simon Woodworth, Department of Business Information Systems, Cork University Business School \*Department of Obstetrics and Gynaecology, INFANT Research Centre*

**Impact: Local, National, International**

LEANBH delivers a complete, tested, easy to use connected health solution offering pregnant women with suspected hypertension in pregnancy a safe, clinically monitored, ambulatory alternative to BP monitoring in hospital, allowing them to monitor their BP from the comfort of their home. Hypertension in pregnancy, particularly the onset of pre-eclampsia, is a very serious condition which affects about 4% of pregnant women worldwide. Undiagnosed and untreated, it can lead to the death of both mother and baby, particularly in lo income settings.

LEANBH offers the following:

- Replacing direct patient clinician contact with self-guided outpatient or inpatient monitoring
- A clinically monitored interface allowing timely direction of care.
- A BP cuff validated for use in pregnancy.
- Reduced attendance at hospital reducing the need for travel.



- Reduced anxiety from not having to attend hospital or primary care while still having appropriate monitoring of BP in pregnancy.

Readings are monitored daily by consultants and patients can be contacted when a change in their care is required. LEANBH delivers a safe alternative to direct contact and provides automated self BP monitoring for women with confirmed or suspected hypertension in pregnancy. This allows early detection and care and can drastically reduce maternal and fetal morbidity. Research on connected health such as LEANBH and other projects conducted in INFANT in collaboration with CUBS researchers will change the face of our healthcare systems, not only in the developed world, but also in low resource settings where it will deliver greater scrutiny and care for patients at a viable cost.

Contributing to Target 3.1

Contributing to Target 3.c

**Non-invasive lung oxygen monitoring of infants**  
*Professor Stefan Andersson Engels, IPIC SFI Research Centre for Photonics, Tyndall National Institute*

**Impact: International**

Each year, 1.1 million infants die due to complications from Respiratory Distress Syndrome (RDS). RDS usually affects premature babies and occurs where the lungs are not fully developed, causing breathing difficulties and treatment requires very accurate monitoring of lung performance. Funded by Science Foundation Ireland, multi-disciplinary research undertaken by researchers from IPIC at Tyndall, INFANT,



Professor Stefan Andersson Engels

Cork University Hospital and Swedish industry partner, GPX Medical, has developed a new non-invasive optical device to provide real-time information on the lung function of newborn babies. The novel Gas in Scattering Media Absorption Spectroscopy (GASMAS) system uses light-emitting technology and sensors placed on a baby's chest to detect levels of oxygen in different parts of the baby's lungs. This powerful diagnostic technology has the potential to play a future clinical role in reducing sickness and mortality of infants by optimizing respiratory function monitoring.

A clinical study has been initiated and has the potential to significantly alter the way babies are monitored in the neonatal intensive care unit, particularly preterm infants and term babies on mechanical ventilation, reducing X-ray exposure, unnecessary blood tests, and stress-inducing treatment for both infants and their families. The team aims to explore this novel, potentially low-cost, non-invasive technique with an aim to facilitate treatment guidance of infants in all countries in the future, particularly in developing countries where infant mortality rates are higher.

Contributing to Target 3.2

Contributing to Target 3.4

Contributing to Target 17.16

**Evaluation of national clinical programme for the management of self-harm in Irish hospitals**  
*Dr. Brendan McElroy, Department of Economics, Cork University Business School*

**Impact: National**

This research evaluates the cost effectiveness of the introduction of a comprehensive, standardised national



programme in Irish Emergency Departments on the management of self-harm. Self-harm is a leading indicator of suicide. The variability in management policies across Irish Emergency Departments was addressed through a national clinical programme on self-harm. This study analyses the programme's effectiveness and value for money in reducing repeat self-harm. It informs the continued funding of the policy by the HSE whilst also providing evidence to the international community of health policy makers on the value of such a service.



**Providing Improved care for Self-harM: a mixed-methods study of intervention, economic and implementation outcomes from a national clinical programme (PRISM)**  
*Dr. Eve Griffin, School of Public Health & National Suicide Research Foundation*

**Impact: International**

For every 25 people who present to hospital with self-harm, one will die by suicide within 5 years. In 2014, a National Clinical Programme was introduced in Ireland to improve care for individuals who attend hospital with self-harm. This interdisciplinary, mixed-methods research project is comprehensively evaluating this national programme, to establish if it has resulted in changes to patient outcomes, processes of care and economic savings. This research will provide a better understanding of how patients are managed in acute settings and how well services are utilised to improve patient outcomes. The findings will be used to optimise delivery of acute mental health services, with the potential to positively

impact the wellbeing of this vulnerable group, and in turn lead to the reduction in mortality from non-communicable diseases. Furthermore, the investigation of suicide risk in this research will identify factors contributing to suicide deaths which may be preventable. The evaluation will yield a model for evaluating interventions related to self-harm, which will enable a more comprehensive understanding of how health service change and public health interventions impact on this population. The framework will also be applicable to other settings, including initiatives such as acute hospital reconfiguration.



**Exploring the wider role of transcription factors in diverse E. coli**  
*Dr. Nicky O'Boyle, School of Microbiology*

**Impact: International**

Transcription factors regulate response to the environment by switching on/off subsets of genes. This research has identified that some transcription factors, predicted only to activate genes for metabolism of a given nutrient, actually regulate a much wider gene set. The aim of this research is to harness this information to develop targeted approaches for combatting infection. Proteins (Transcription Factors) are being investigated that regulate metabolism of amino acids in neonatal meningitis-associated E. coli (NMEC) but also regulate other unexpected, and unrelated processes such as virulence, and infection by bacterial viruses/phage. Recent work has shown how one of these transcription factors modulates susceptibility to phage by binding to a transferase encoding

gene that alters the structure of NMECs slimy polysaccharide coat.

It is hoped that further understanding in this area could aid the development of improved therapeutics that clear this type of E. coli from the maternal or infant gut preventing this often-fatal infection. This relates to SDG target 3.4 in reducing incidence of non-communicable diseases, but importantly also SDG target 3.2, as this type of infection is only found in newborn infants. These alternative therapies could even take the form of simple dietary alterations that shift the metabolic profile of the gut in a targeted manner, reducing expression of fitness-promoting genes in NMEC. Such a strategy would be affordable and could be made broadly available (impacts SDG targets 3.8, 3b), even in developing countries. This work enhances basic understanding of how metabolism is interlinked with treatment efficacy in nasty bacterial pathogens like NMEC. There are concerted efforts globally to develop alternative approaches to traditional antibiotic-based therapies for bacterial infections. Enhancing phage therapy by modifying bacterial metabolism could represent a huge advance in our ability to treat life-threatening infectious disease.





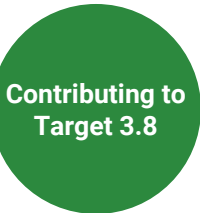
**Electrochemical discrimination of the active bronchodilatory ingredient from its excipients in Ventolin formulations at Nanoporous Gold**  
*Dr. Lorraine Nagle, Electrochemical Materials & Energy Group, Tyndall National Institute*

**Impact: International**

The emergence of specific drug–device combination products in the inhalable pharmaceutical industry demands more sophistication of device functionality in the form of an embedded sensing platform to increase patient safety and extend patent coverage. Controlling the nebuliser function at a miniaturised, integrated electrochemical sensing platform with rapid response time and supporting novel algorithms could deliver such a technology offering. Drug regulators worldwide indicate that specific drug–device combination nebulisers are preferred over the more common open-label nebulisers for increased control over dosing reproducibility and reliability to enhance patients’ safety. Desirable features include a lock-out system control to prevent overdosing and output signal confirming dose delivery.

Current technology fails to provide this crucial monitoring and the integration of a sensor that is compatible within the controller that regulates nebuliser function is challenging. The development of an electrochemical-based controller that accurately detects if the appropriate medication has been placed into a nebuliser’s medication reservoir is envisaged that is capable of distinguishing active pharmaceutical ingredients in drug formulations from its excipients. Nanoporous gold is an emerging electrochemical sensing platform candidate owing to its high specific surface area, superior catalytic activity, increased density of low-indexed crystalline planes, excellent conductivity and ease of fabrication. The present study

emphasizes the potential of harnessing its unique nanogeometrical properties in selectively discriminating active pharmaceutical ingredients from excipients in drug formulations.



**Missing Microbes In Infants Born By C-Section**  
*Iwona Kozak, APC Microbiome Ireland*

**Impact: International**

Rebalancing babies’ gut bacteria, whether after antibiotic exposure or Caesarean-section birth, is the topic of a new collaborative research project. Infant gut microbiota can be severely depleted in infants born by C-section or exposed to antibiotics. The population of bacteria in the gut develops over the first four years of life and plays a key role in human health. Establishment of a healthy gut microbiome in early life is influenced by birth mode, antibiotic use and nutrition, including breast milk components. This research project aims to develop microbiome-based solutions to help establish a healthy microbiome in early life to facilitate the long-term health of individuals. This longitudinal study of infant's microbiomes will generate multitude of information about the dynamic changes in gut microbial composition.



**SMARTProbe - point of care enhancement of breast disease detection during biopsy**  
*Dr. Eric Moore, School of Chemistry & Tyndall National Institute*

**Impact: Local, National, International**

There is a real issue with the current clinical pathway for breast cancer detection as it takes too long to receive a diagnosis (can be up to 12-14 days) and there is significant invasive and unnecessary breast tissue removal for millions of women annually. SMARTProbe will enable clinicians to test at the point-of-care, and discharge immediately up to 80% (benign) of women presenting for a biopsy, thereby reducing breast cancer diagnosis time from weeks to minutes and offers a new prioritisation for the treatment of women’s health. The potential to diagnose earlier and enable patients to avoid significant psychological distress from delays would be significant. This in particular impacts on SDG 3, ensure healthy lives and promote well-being for all at all ages. There is a credible, global opportunity to better service women's health through a technology like SMARTProbe, which can crucially improve both the patient experience through the provision of real-time information and additionally ease the clinical processing workflow which is currently burdened by significant levels of unnecessary biopsy samples.

***“SMARTProbe will offer "peace of mind" for patients undergoing biopsy for suspected cancer tissue. It will provide real time diagnosis and enable clinicians to immediately reassure and discharge patients that have benign tissue and fast track suspected cancer biopsies.”***



## Choosing Healthy Eating for Infant Health (CHERIsH) Study

*Dr. Karen Matvienko-Sikar on behalf of the CHERIsH team, School of Public Health*

**Impact: Local, National, International**

This study focused on reducing risk of childhood obesity and overweight by improving infant feeding practices among parents and primary caregivers. Its aims included the development, implementation and evaluation of a complex intervention to support and promote healthy infant feeding practices among parents and primary caregivers within primary care settings. This will prevent childhood obesity, thus ensuring a healthier start in life for infants and children. This intervention has been implemented in a primary care centre in Cork as part of a feasibility study, and the findings of this study can inform future obesity prevention efforts in primary care. Study conduct and findings also resulted in an invited presentation to the Oireachtas Joint Commission on Children and Youth Affairs Joint Committee on Tackling Childhood Obesity in 2018. The systematic methodological approach to developing the CHERIsH behaviour change intervention with stakeholders, and the robust approach to evaluating intervention acceptability, feasibility, and fidelity can, and has, informed further development of behaviour change interventions in Ireland and internationally.

Contributing to  
SDG 3



*Professor Patricia Kearney, UCC, and Dr Tony Heffernan, MPHC, at launch of CHERIsH feasibility study, March 2019*



*Students Bassem Soliman, Grace O'Sullivan, Aisling O'Connor and Sinead Ni Riada with Professor Máiréad Harding*

## The relevance of the UN SDGs in Dentistry

*Professor Máiréad Harding, Dr. Martina Hayes, Dr. Cris daMata, Hannah Binner, First- and Second-Year Dental Student Groups, Cork University Dental School and Hospital & Oral Health Services Research Centre & Environmental Research Institute*

**Impact: Local**

This research was completed by students in first and second year of the dental programme with the aim of introducing dental students to the 17 UN Sustainable Development Goals and encouraging them to explore through searching the literature how SDGs are important in the practice of Dentistry, the promotion of better oral health and why not addressing them impacts on the individual and society. Dental students were provided with a lecture introducing the SDGs and guidance with respect to sustainability in dentistry. Students also had the resources of the Brookfield Health Science library and tools to search for evidence informed literature. Students then worked in groups to develop presentations on the SDGs and Dentistry. These presentations were then shared with a wider audience amongst their peers. Through this research activity, students reviewed all 17 SDGs and worked in small groups to identify the relevance of the SDGs to dentistry and oral health. They also identified how dentists could attain specific SDGs through their practice. The research introduces students to the UN SDGs from the first year of dentistry, and allows students to apply prior knowledge to dentistry and establishes the SDGs as an integral part of their practice of dentistry. It supports the philosophies to 'leave no one behind' and 'think globally and act locally'.

A quote from one of the student presentations:

***"We are the future! We as citizens have a duty to inform the Department of Health the Minister for Health and the Dental***





***Council on issues affecting the progression of sustainable development with regards to dentistry.”***

Contributing to  
SDG 3

Contributing to  
SDG 2

Contributing to  
SDG 10

Contributing to  
SDG 17

**Understanding and Attitude towards resources stewardship and its integrations in the medicine curriculum in UCC**

***Dr. Gabriella Rizzo, Department of Medicine, School of Medicine***

**Impact: National, International**

The focus of this research is to explore the understanding of the “resources stewardship” programme about sustainable medicine amongst clinical and academic lecturers in UCC’s School of Medicine, whilst also exploring attitudes towards the “resource stewardship” approach to clinical practice and possible barriers to its implementation in the undergraduate curriculum. One of the significant outputs of this research is the mapping of the current undergraduate curriculum towards sustainable medicine and future integration of high-value, cost-conscious care (HVCCC) into it. This research initiative aims to foster a wider national collaboration with other Irish Medical Schools to join the challenge and create a focused movement, where HVCCC can be adopted nationwide as a core element of the education of our future doctors. This research expands knowledge in this under-investigated and under-published area.

Contributing to  
Target 3.8

**Tailoring strategies to support the implementation of DAFNE (Dose Adjustment For Normal Eating), a structured patient education programme for people with Type 1 diabetes**

***Dr. Sheena McHugh, School of Public Health***

**Impact: National, International**

This study aims to improve the implementation of effective evidence-based interventions in the health system, thereby improving the quality of care and health outcomes for people with diabetes. It involves working with health professionals in hospitals across Ireland to tailor implementation strategies to support their delivery of the DAFNE programme, an effective structured education programme for people with Type 1 diabetes. ‘Tailoring’ is a process of selecting strategies to suit local circumstances to increase the likelihood of successful implementation of evidence-based interventions in routine healthcare. By supporting the implementation of evidence-based interventions, this research has the potential to contribute to improved outcomes for people with type 1 diabetes in Ireland; thus, helping to achieve the SDG target of reducing premature mortality from non-communicable diseases.

Through an enhanced understanding of the tailoring process and what is acceptable and practical for health professionals and service users, the research findings will guide future tailoring efforts in the Irish health care system to help strengthen the adoption, implementation and subsequent health impact of evidence-based interventions for non-communicable diseases. Implementation science is a relatively young research field in Ireland. It refers to the scientific study of methods to promote the uptake of evidence-based practices into routine care, and, hence, to

improve the quality and effectiveness of health services. This work involves building research capacity and applying implementation science approaches to address persistent challenges in the Irish health service.

Member of Public and Patient Involvement Panel:

***“There are things out there that can help. We just need to make sure they happen.”***

Contributing to  
SDG 3

**Four avoidable deaths every day in Ireland are alcohol-related: from evidence to public health advocacy**

***Dr. Zubair Kabir, School of Public Health***

**Impact: National, International**

Alcohol consumption is a leading cause of death for people aged 15–49 years globally. Ireland has one of the highest per-capita alcohol consumption in OECD countries. This research estimates the burden of alcohol-related deaths in Ireland collaborating with Alcohol Action Ireland (AAI) towards evidence and public health advocacy. The Public Health (Alcohol) Act 2018 in Ireland is a landmark legislation. This contains a suite of modest measures to reduce per-capita alcohol consumption to the OECD average of 9.1 litres for every person aged 15 and over by 2020 and hence reduce alcohol harms. However, this got delayed in implementation. AAI’s advocacy work is instrumental in translating our research findings into an impactful and a more sustainable future. Alcohol is inextricably linked to SDG 3. However, reducing alcohol harm will impact 14 of the 17 SDGs. The research finding of 4 deaths per day in Ireland attributable to





alcohol has formed an important part of AAI's advocacy work which aims to reduce alcohol harm. Research outputs have been broadcasted through several platforms, including the Oireachtas Health Committee. The research has provided significant impetus towards the full implementation of the Public Health Alcohol Act 2018, which is closely watched internationally.

***"Alcohol is an obstacle to sustainable human development. Alcohol plays a complex role in the Irish society. Four people die every day in Ireland due to alcohol- which are totally preventable. Alcohol is linked to 14 of the 17 SDGs. The Public Health (Alcohol) Act 2018 can address several of these targets in Ireland. We need political commitment and action, coupled with robust scientific evidence and strong public health advocacy. UCC partnering with AAI will help achieve this goal!"***



**Anti-virulence approaches to combatting infections with pathogenic E. coli**  
**Dr. Nicky O'Boyle, School of Microbiology**

**Impact: Local, National, International**

Certain types of E. coli can cause serious infections including meningitis in newborn babies, recurrent urinary tract infections and severe diarrhea. With many of these infections, antibiotics are ineffective or can even make disease outcomes much more severe. This research explores how some compounds can reduce expression of genes important for virulence without actually killing these E. coli, thereby reducing emergence of resistance and enhancing outcomes for patients.



This research has identified a new function for an old antibiotic. Aurodox - an antibiotic used throughout the 80s as a growth promoter in poultry has a surprising ability to shut off expression of a set of genes required for attachment of enterohaemorrhagic E. coli (EHEC) to the gut lining. EHEC is a nasty bacterium capable of causing haemolytic uremic syndrome (HUS) - a condition that is exacerbated by many antibiotics and leads to kidney failure, with a requirement for lifelong dialysis. As such, this work relates directly to target 3.4 in reducing incidence of non-communicable diseases. EHEC has caused several large outbreaks due to contamination of bean sprouts, beef products, unpasteurised milk, and spinach in recent years. It is hoped that it will be eliminated from the food chain by improving our basic understanding of the bacterium, enhancing food safety and addressing target 2.1. Anti-virulence approaches take many forms, including inexpensive probiotics and dietary interventions.

By enhancing our understanding of the regulation of virulence in pathogenic E. coli, we can make effective therapies globally accessible (targets 3.8, 3b, 3d). A foundation of basic understanding of the regulation of virulence is essential for the development of precision therapies that target processes essential for bacterial infection. This work is informing the design of such therapies, and revealing new targets for future drug design. By exploiting anti-virulence approaches, it is hoped to produce strategies with less selection for resistance, which will be of increasing importance as last line of defence antibiotics become ineffective.





**Blue ecosystem sustainable solutions for health and industrial innovation**  
*Dr. F. Jerry Reen, School of Microbiology and SSPC Funded Investigator; Professor Anita Maguire, School of Chemistry and SSPC Principal Investigator; Professor (Emeritus) Fergal O’Gara (BIOMERIT Research Centre, School of Microbiology and SSPC Funded Investigator; Dr. Stuart Collins, School of Chemistry and SSPC Funded Investigator*

**Impact: International**

The rich tapestry of the ocean microbiome presents an exciting canvas upon which multi-disciplinary teams can design the next generation of sustainable technologies. The purpose of this research is to harness the unique and untapped potential of marine microbes, delivering sustainable and efficient biotransformations for societal, industrial, and climate benefit. A long standing and fruitful multidisciplinary collaboration with colleagues from the Schools of Microbiology and Chemistry this research has delivered several ‘first in class’ enzymes from marine bacteria that can perform pharmaceutically important transformations.

Green Pharma relies on solutions that can shorten and optimise the drug synthesis pipeline, replacing the finite chemical catalysts used heretofore. Marine enzymes have the potential to deliver these enhancements with the added benefit of being environmentally friendly and sustainable. An additional suite of enzymes from this research is currently under development. The unique properties of the enzymes discovered in this research provide new possibilities for how the drug synthesis pipeline can be re-designed. The natural diversity that exists within the marine ecosystem can expand the capabilities of chemical transformation, offering new frameworks and platforms for drug development pipelines of the future.

*“Nature already has the solutions to many of our challenges, we simply need to listen and understand that we may learn for the benefit of all.”*  
 – Dr. F. Jerry Reen



**Ensuring Adequate Funding for Ireland's Health System**  
*Dr. Brian Turner, Department of Economics, Cork University Business School*

**Impact: National**

This ongoing research examines the funding of the Irish health system, advocating for adequate funding to provide high quality health services to a growing and ageing population into the future. It also examines the Irish health system reform proposals (currently Sláintecare), informing stakeholders on their progress and challenges to achievement. The outputs from this ongoing research include peer reviewed journal articles, book chapters in edited volumes, responses to consultations, reports, presentations at national and stakeholder events, and media contributions. These help to inform stakeholders on the issues involved in funding and reform, with evidence-based conclusions and balanced discussion. There is also evidence of impact on policy-makers as an invitation was received to appear before the Oireachtas Committee on the Future of Healthcare and the submission was cited in multiple places in the Sláintecare report. This research is informing the research landscape in Ireland as evidenced by frequent citations of the research outputs in

other research and invitations to present to, or attend meetings with, stakeholders to help inform their discussions on the future Irish health care and funding landscape.

*“Ensuring that Ireland's health system is adequately funded into the future will help to ensure the availability of high-quality health services to those who need them into the future, in the face of an ageing and growing population.”*



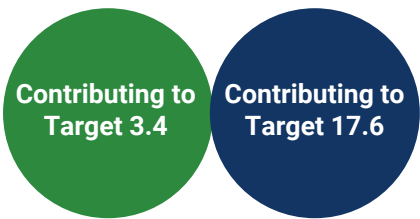
**Developing biophotonics technology to improve cancer detection**  
*Dr. Marcelo Saito Nogueira, IPIC SFI Research Centre for Photonics, Tyndall National Institute*

**Impact: International**

Colorectal cancer is the second most deadly type of cancer worldwide. The purpose of this research is to create a light-based instrument that senses and differentiates tissues more accurately and faster to improve the accuracy of detection. This method is non-invasive, cost-effective, allows for early detection, and enables data analysis algorithms to extract molecular information from medical instruments, wearables, and portable test kits. This cutting-edge cancer research has the potential to decrease mortality rates associated with colorectal cancer, helping to achieve SDG target 3.4 - to reduce by one third premature mortality from non-communicable diseases through prevention and treatment by 2030. Following initial positive results, a probe for colon cancer detection during colonoscopy is being developed.



These techniques can be integrated into existing clinical tools, which enhances their potential to improve the current healthcare system and also makes them commercially attractive. With deaths from colon cancer expected to increase by over 70% by 2040, this technology has the potential to save countless lives in the long term and have international impact.



**Kilimanjaro ULTRA 2020: A Digital Delivery Register for Reproductive Health in Low Resource Settings**  
**Daire Buckley<sup>1</sup>, Dr. Simon Woodworth<sup>1,2</sup>, Dr. Ali S Khashan<sup>1,3</sup>**  
**1. INFANT Research Centre 2. Cork University Business School 3. School of Public Health**

**Impact: International**

The objective of the project is to prove that inefficient, ubiquitous paper-based maternal and neonatal health records can be replaced with an easy-to-use, cost-efficient, and sustainable electronic records. Further, ULTRA aims to demonstrate data harmonisation is possible to enable comparisons across institutions, populations and on a global scale. ULTRA is based entirely on open-source software and is designed to be portable and integrated well into other settings, with no license costs to consider.

This proposal will lead to significant improvement in maternal and reproductive health and will ensure every child is registered and counted This will be achieved primarily by improving data quality and better use of existing staff who already maintain the conventional delivery registers. It also enables evidence-informed decision-making and can dramatically shift the odds of



The Kilimanjaro ULTRA 2020 team visiting the Kilimanjaro Region of Northern Tanzania

survival of mothers and their babies. Furthermore, high-quality perinatal data will improve women’s chances to take part in their sexual and reproductive health decision-making.

The ULTRA application is a mobile electronic registry designed to cover all stages of pregnancy and childbirth from the first antenatal visit through delivery, to the final postnatal visit. It is implemented through a specific configuration of the DHIS2 software and is based directly on Tanzania’s paper-based MTUHA Health Management Information System (HMIS). ULTRA has been developed in partnership with clinicians and ICT specialists in Tanzania to address the current problems that arise from paper-based registries in capturing accurate pregnancy and birth data.

ULTRA aims to address some of the underlying structural gaps that would, at a health systems level, better enable robust, comprehensive, and useable health records and data to mitigate stark incidence rates of maternal and perinatal morbidity and mortality. Thus, enabling health care systems to record and monitor obstetric data accurately in low-income countries to provide knowledge of the nature and magnitude of the need for obstetric care within this defined geographical region of sub-Saharan Africa. The project will enhance global health research collaborations between Ireland and low-income countries but more importantly, it may strengthen collaborations among researchers based in low-income countries. The project will create opportunities of implementing the system in different countries, leading to data harmonisation and more research collaborations.





# Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all



## Higher Education Capacity Building in Northern Malawi Dr. Rosarii Griffin, Centre for Global Development

Impact: Local, National, International

This collaborative research project with Mzuzu University, Malawi, aims to build research capacity with the Department of Nursing and Midwifery to generate research data of import in relation to national targets vis-a-vis Malawi's Health Strategic Sector Plan. This will also assist Malawi, one of the world's least developed countries, to meet the UN SDGs. The impact of the research project will work towards improving the quality of higher education in relation to learning, teaching and research capacity building in partnership with the Department of Nursing and Midwifery at Mzuzu University (MZUNI), Malawi.

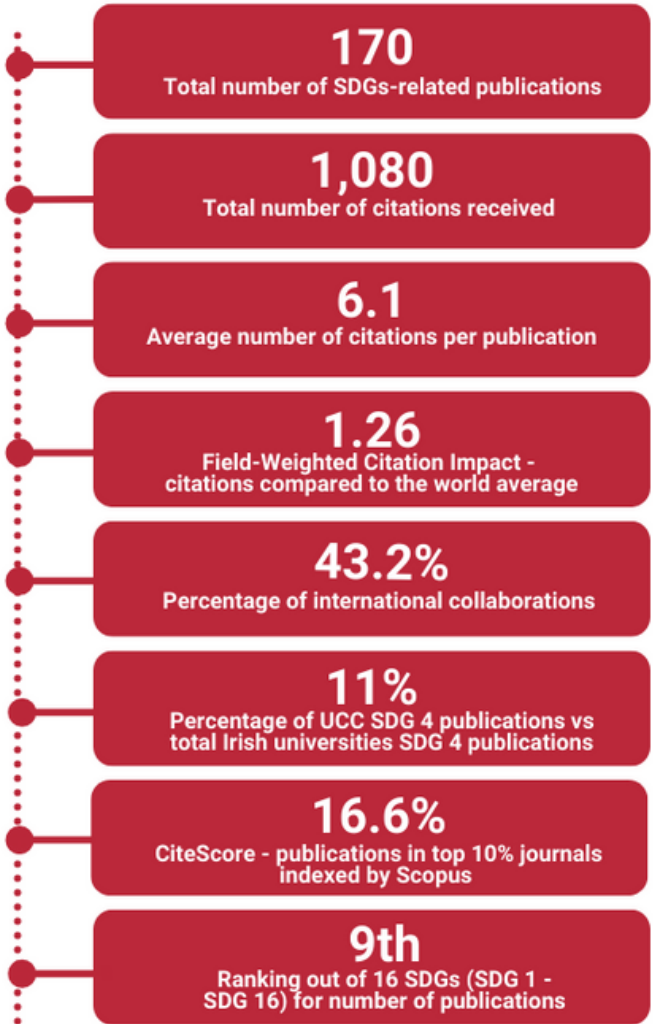
The planned outputs include: the generation of empirical data through a joint research project into the reasons behind Covid-19 vaccine hesitancy; the generation of academic research papers for publication; the publication of policy briefs that will inform Malawi's national healthcare policy and public health messaging, and the contribution of additional baseline data on issues pertaining to public healthcare messaging and the power of social media to assist. This research project is assisting our Irish colleagues to understand the complexities of global partnerships in relation to culture, context, resources and communication issues. The collaborative project also encourages Irish academics to reflect on their own ethnocentric assumptions, and to broaden their understandings of undertaking complex research in partnership with the global south, for the purpose of assisting Malawi's healthcare sector, thus meeting UCC's obligations towards the SDGs.



Learning Spaces in Undergraduate Dental Education



Figure 4: UCC SDG 4 publications 2017 -2021



## Learning Spaces in Undergraduate Dental Education Dr. Siobhán Lucey, Cork University Dental School and Hospital

Impact: Local, National, International

The aim of this research is to explore the impact of physical and virtual learning spaces on dental professional students during clinical training. Impact will be considered as effects on students such as acquisition of, or change in, knowledge, skills or attributes, or attainment of competences or learning outcomes. The outputs of this research include a scoping review to map the available evidence regarding the impact of dental learning spaces. This will inform the direction and format of subsequent enquiry with student research partners to investigate various learning spaces. Following this consultation process, recommendations for improvements will be developed with a view to ensuring that dental education facilities are inclusive and effective learning environments for all.

It is anticipated that the findings will be transferrable to other institutions nationally and internationally. Over time, it is envisaged that this research will increase awareness of the impact of learning spaces on dental professional students. To date, the impact of various teaching settings, such as hospitals, clinics, and community sites, on dental professional students has not been explored through the learning environment paradigm. This research will therefore facilitate the consideration of learning spaces within dental programmes at local, national, and international levels.







## IMMERSE: Integration Mapping of Refugee and Migrant Children in Schools and other Experiential Environments in Europe

**Dr. Shirley Martin, Dr. Reana Maier, Dr. Deirdre Horgan and Dr. Jacqui O'Riordan, School of Applied Social Studies**

**Impact: International**

IMMERSE, Integration Mapping of Refugee and Migrant Children in Educational and Other Experiential Environments in Europe, is a multi-partner research study funded under the European Commission's Horizon2020 research and innovation programme. The project's consortium comprises 11 partners in six countries: Belgium, Germany, Greece, Ireland, Italy, and Spain. The project commenced in 2018 and is examining the socio-educational integration of refugee and migrant children in schools and other educational environments across the partner countries. It is due to be completed in 2023.

The central aim of IMMERSE is to develop a dashboard of 30 key indicators of socio-educational integration and gather data to fill the dashboard. The objective is that using this tool, researchers, educators, and policy makers have a practical tool explore data related to children's integration in schools in the six partner countries and evaluate programmes and practice in their own locations. The project involves large-scale quantitative and small-scale qualitative data collection methods, as well as creating an online digital databank of resources and an online community, the IMMERSE Hub, where ideas and resources are being shared. It is expected that data collected and analysed will inform policy recommendations on migrant children's integration in education across Europe.

Contributing to  
Target 4.5

Contributing to  
Target 10.2

Contributing to  
Target 10.3

Contributing to  
SDG 17

## Certificate in Continuing Professional Development in Community Based Mentoring: An Evaluation of the Pilot Initiative

**Dr. Elizabeth Folan O'Connor, Dr. Fiachra Ó Súilleabháin, Sheila McGovern, Professor Máire Leane, School of Applied Social Studies & SOAR Inter-institutional Collaboration on Access**

**Impact: Local, National, International**

Target 4.7 of the United Nations Sustainable Development Goals calls on countries to provide learners of all ages with the knowledge and skills to promote sustainable development through education as a human right. In the spirit of developing a mutual and collaborative approach to knowledge creation and exchange, the Access Services in both University College Cork (UCC) and Munster Technological University Cork Campus (MTU Cork) set about exploring the feasibility of a community-based mentoring initiative to increase access amongst under-represented groups. This research was designed to evaluate one university-community partnership which trained and empowered natural mentors in the Cork area to promote access to education and lifelong learning in their neighbourhoods and communities in line with Goal 4 of the UN Sustainable Development Goals to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

This research revealed the potential for success when both the university and the community – and their networks of institutions, community organisations, affiliations and individuals – engaged in mutual and reciprocal initiatives to promote education and lifelong learning in the community through the Certificate in Continuing Professional Development in Community Based Mentoring Programme. For the university, this initiative complemented existing access

initiatives and programmes and extended these efforts into neighbourhood community centres to promote access to education and lifelong learning. For the community, the programme allowed them to tap into their existing talent and resources to more fully empower the first cohort of mentoring certificate students to engage with their communities and promote inclusive and equitable quality education and lifelong learning opportunities for all. The success of this university-community partnership, as detailed in the report, can be viewed as a framework for action on how to empower the community to provide learners of all ages with the knowledge and skills to access education and lifelong learning throughout life.

To quote one research participant in the Certificate in Continuing Professional Development in Community Based Mentoring Programme, the valuable lesson they learned from the certificate course about mentoring in their community was that -

***"You are not supposed to be the sage, the one with the solutions, you are just there to guide them to find the solutions themselves. I love that idea. I am sorry I didn't know that years ago."***

Contributing to  
SDG 4

## Are Human Development Indices Reflecting the SDGs?

**Dr. Marie Ryan, Department of Economics, Cork University Business School**

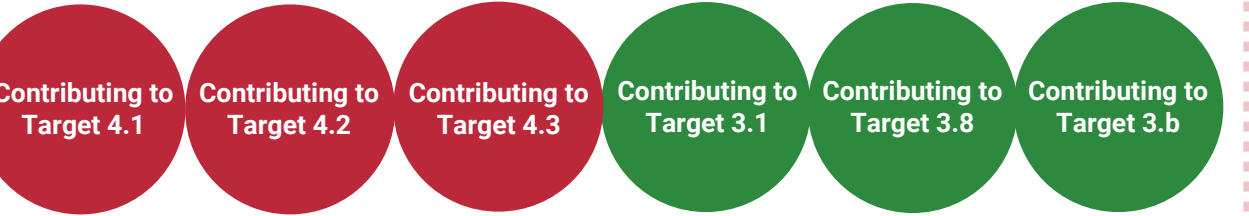
**Impact: Local**

The purpose of this research-led initiative is to examine the role governments play in a country's development. Analyzing their



chosen country using data retrieved from the Human Development Indices (HDI), students qualitatively assess, critically analyze, and evaluate the role the respective government plays in achieving SDG 2 and SDG 3. This helps students, particularly those studying social science, to understand the relevance and significance of comprehending and applying the SDGs in their future working contexts.

Students studying social science are taught about the SDGs and are required to investigate, among other things, why wealthy countries with high GNI per capita have shorter life expectancies or shorter expected years of schooling. Students must analyze why nations that devote a sizable portion of their GDP on health and education do not exhibit decreased death rates or greater primary education. Students ask what function institutions or systems of government serve and evaluate what may be done to ensure there is equitable access to education and free primary education among other targets through a comparative study. The sources of the data are left open to critical inquiry by the students. Students' motivation is stimulated with an enthusiasm to question, research and analyse if SDGs are going to be fulfilled. Moving forward, offering options and supports for students to present their SDG work using multiple means of expression (video/ppt/qualitative essay) paves the way to present SDGs in a more accessible and understanding manner, ultimately benefitting society.



Dr. Bozena Cierlik

**Promoting democratic competences through Service Learning and international mobility**  
*Dr. Bozena Cierlik, School of History*

**Impact: Local, National, International**

The aim of this research is to enhance module HI2048 already offered to UCC students of History, Politics and European Studies by positioning it within Global Citizenship and Development Education (GDCE) methodology. Pedagogy is based on the concept of integration of GCDE and certain SDGs into teaching to promote democratic competences through Service Learning. This community-engaged module partners with Cork City Council and UCC's Civic & Community Engagement Office and International Office. The module emphasises the development of graduate attributes of social responsibility and effective global citizenship.

Meaningful engagement with local community organisations and Cork City Social Inclusion unit will enable participation in the process of identifying needs and policies at a local level that facilitate social inclusion, diversity, integration, social capital, social enterprise, cultural expression, identity and community participation and empowerment. Students will enhance local Cork community development work, across practice, policy, strategies and ethics, drawing on their own international or home perspective and their countries community development work. Issues vital to social, civic, cultural, economic and political society are explored, as personal and social competencies are as important a category of students' learning goals, as academic goals. It promotes sustainability by engaging in active learning in collaboration with the Polish community and local administration (Cork City Council). It integrates diversity and civic learning, facilitates the move from the language of service to the language of justice





and social responsibility and links diversity and civic work to the learning outcomes we want to cultivate in students.

***“The UNICORN project will design and test a new mobility scheme for university students that combines international mobility with a Service-Learning (Community Based Learning) experience in the community. University College Cork (UCC) and Cork City Council are working together with four other HEIs and their community partners: Università di Bologna (UNIBO), Universidad de Madrid (UCM), Completense Universitaet Leipzig (UL) and Universiteit Antwerpen (UA).”***

- Martin Galvin, Anna Kingston, UCC Civic Engagement Office



**The Praxis Project, integrating Global Citizenship and Development Education (GCDE) across UCC**  
***The Praxis Project, Centre for Global Development***

**Impact: Local, National, International**

The overall aim of this the research study is to understand, through critical engagement with UCC staff, students and policy makers, how best to integrate the theory and practice of GCDE into the work of UCC across all disciplines and across the work of the university. The central question is: how can we integrate the theory and practice of GCDE into the work of UCC across all disciplines and across the work of the university as a whole and what are we learning as we do so?

This research has an impact on a local, national and international basis:

Local:

- Integrates GCDE Pedagogy, Practice and Curriculum Design across UCC;
- Supports the provision of quality GCDE to UCC staff, undergraduate and postgraduate students and wider community;
- Develops a strong research culture which informs the deep-rooted embedding of GCDE in Higher Education;
- Enhances delivery and maximises impact of GCDE across UCC and Ireland, through networking, collaboration, and partnerships.

National:

- Builds GCDE capacity and increases awareness of SDG 4.7 within Higher Education in particular, and across the wider GCDE sector in Ireland and internationally.

International:

- Contributes to an international conversation on GCDE and enables UCC to enhance its global justice reach.
- Higher-level education, apart from initial teacher education, is not as well developed as other sectors, in terms of GCDE pedagogy, research and curriculum design. This is a gap which Praxis strives to fill, not just within UCC but alongside other higher education institutions in Ireland and beyond.

***“Since 2018 the Praxis Project has directly impacted many students, staff, departments and schools at UCC and beyond. We have been developing our capacity to integrate a sense of global justice education into all aspects of the work of the university. Working with colleagues in other higher education institutions and civic society organisations, we will continue to foster a critical perspective, including of the SDGs themselves, on higher education, with a view to transforming how we view education, development and citizenship. We hope to foster***

***knowledge, skills, values and outrage in the face of global social, economic, political and environmental injustices and encourage local, national and global actions which will create a more just, equitable and sustainable society for all.”***



# Achieve gender equality and empower all women and girls



**The spatialities of soft power projection - Ireland's third national action plan for the implementation of UNSCR1325**

**Dr. Liam Coakley, Department of Geography, School of the Human Environment**

**Impact: International**

This project explores the spatialised nature of soft-power in 2022. It particularly focuses on Ireland's evocation of UNSCR 1325 on women, peace and security and seeks to demonstrate how Irish foreign policy is beginning to present the country as a 'thought-leader' in this area. This research paper will inform academic/policy debate on the evolution of Ireland's current foreign policy platform. Previously, foundational White/Western/Catholic narratives of nation have been replaced by a geographically grounded strategic 'post-colonial/post-conflict edge/island' policy narrative. This foundation is being used to present Ireland as a 'thought-leader' in similar global contexts - such as in Small Island and Developing States (SIDS). Ireland's engagement with UNSCR 1325 is core to this projection.

Research will impact on policy formation as Ireland builds on its recent UNSCR membership to push the international 'women, peace and security' agenda. This research will inform academics and policy-makers about the spatialities of Ireland's power projection in international relations. The physical foundations of Ireland's soft power projection are laid bare, and readers are invited to re-engage with the inherently geographical discourse intertwined with Ireland's NAP3 on 'women peace and security'.

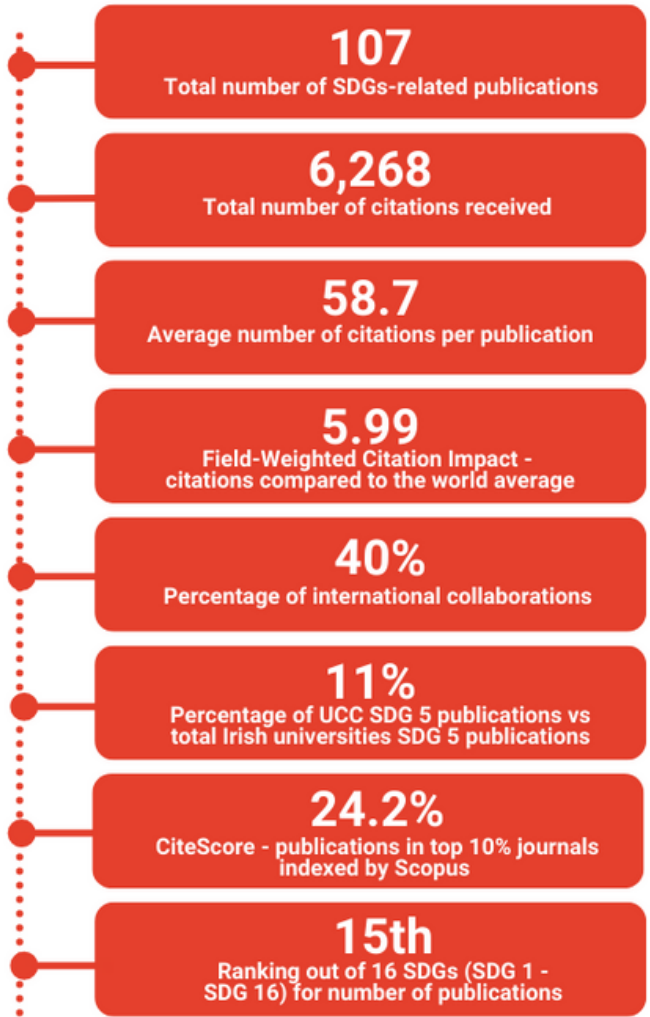


Figure 5: UCC SDG 5 publications 2017 -2021

**Bystander Intervention at UCC**  
**Professor Louise Crowley, School of Law**

**Impact: Local, National, International**

The Bystander Intervention programme educates and empowers participants to contribute to a visible institutional culture of positivity and support. By developing a collaboration across the campus community, it provides the catalyst for crucial learning, allyship and empowerment, and demands an end to all forms of sexual harassment and violence. The impact data demonstrates a significant and meaningful enhancement of participants' understanding of what constitutes sexual harassment and violence, a realization of their capacity to make a difference and the significant enhancement of their own ability to make effective interventions. The programme has been adapted and is now being delivered in 45 second-level schools nationwide and a workplace training programme has been developed for the workplace environment. As a targeted initiative capable of effecting cultural change, it has been expressly identified in the National Framework as the sector leader, now being rolled out in Higher Educational institutions nationally, at the request of, and funded by, the Minister for Higher Education; and to second-level schools funded by the Irish Research Council.

***"The impact of the Bystander Intervention programme reaches across the UCC campus and far beyond and has effected real cultural change. In empowering all bystanders to demand better through safe and effective interventions, this programme is having a transformative effect on individual behaviour and in turn contributes positively to the everyday lives of women and girls."***







## Gender-related labour market inequality: the continued relevance of unpaid care and domestic work in women's working lives

*Dr. Lauren Bari, Department of Marketing and Management, Cork University Business School*

### Impact: National, International

While the gender pay gap is receiving much attention in Ireland and abroad, this research highlights the more complex factors that lie behind gendered pay differentials and the unintended consequences of policies aimed to alleviate them. Theoretical frameworks are applied to a topic often viewed through a purely economic lens. This research explores relationships between parenthood, elder care, household labour and labour market outcomes such as pay, working arrangements and occupational choice. The theoretical focus point of this work is how human capital theory interacts with women's continued role as primary carers in society.

Previous research undertaken in 2020/2021 explored gendered flexible working and the variations in financial outcomes experienced by freelance self-employed. Current research highlights how parenthood has diverging effects on the income of women and men, reflecting not only divisions of unpaid labour, but also cultural perceptions of fathers as breadwinners. This analysis will also be expanded to explore fatherhood wage premiums in more depth and the topic of gendered elder care, using both Irish and international data. All of these areas pivot around recognising unpaid labour (target 5.4) and ensuring equal opportunities for women (target 5.5).

Contributing to  
Target 5.4

Contributing to  
Target 5.5

## Gender Matters, Women's Lives and Experiences in the Criminal Justice System

*Dr. Joan Cronin, Department of Sociology and Criminology, School of Society, Politics and Ethics*

### Impact: International

This work critically reflects on women's lived experiences of involvement in the criminal justice system and the intersecting oppressions, challenges, barriers and possibilities to accessing justice for women. Historically women's lives have been considered inferior, they have been subjected to private and public abuse and discrimination, their trust had been broken, their lives shattered and sometimes their only form of hope for a better life for themselves is by assessing support services, however the initial and indeed ongoing interaction with key service providers is critical to their recovery. Oftentimes, their trust in these services is betrayed, they are treated with suspicion, disdain, considered inferior and unworthy. A kind word, a trusting person can make all the difference to their lives. All women should be treated with the utmost respect and admiration, they should be revered for their strength and determination in trying to free themselves from a life of abuse and exploitation. Through first person accounts documented in Open Clasp's production SUGAR, the course is being delivered to service users and service providers in Ireland and the UK, to generate awareness of the background factors that impact on women's lives and life choices and the barriers and challenges they face in their daily lives.

**"All Women's Lives Matter!"**

Contributing to  
Target 5.1

Contributing to  
Target 5.2

## CareVisions: linking care with SDG targets

*Dr. Felicity Daly, Dr. Claire Edwards, Dr. Carol Kelleher, Dr. Cliona Loughnane, Dr. Jacqui O'Riordan, Institute for Social Science in the 21st Century (ISS21)*

### Impact: National

CareVisions aims to develop an experience-based care ethics to reframe how we understand present and future care relations and practices in contemporary Ireland in light of the challenges and issues revealed by the COVID-19 pandemic. It uses qualitative methods to explore (i) how care was constructed and understood during the pandemic (ii) the care experiences of two key groups in Irish society, people with disabilities, and asylum seekers, and (iii) what we can learn from these experiences to envision future care relations.

CareVisions contributes understandings relevant to target 5.4 by recognising and valuing unpaid care and domestic work and promoting shared responsibility for care within households and families. Outputs also provide an impetus for social policy analysis of provision of public services, infrastructure and social protection policies that are or are not responsive to care. Our research also contributes insights related to target 8.8 regarding working environments of care workers, in particular women migrants, and target 10.2 related efforts to overcome social and economic exclusion on the basis of disability, origin and intersectional factors grounded in care needs. CareVisions is building a collaborative, interdisciplinary network of scholars and community/voluntary organisations committed to advancing knowledge and theory that explores moral and ethical questions about the future of care in Ireland and beyond. We also seek to engage policymakers to inform public policy debate and development about the ethics and practice



of care in Ireland.



### **LIBRA: Future Proofing Gender Equality in Higher Education Institutions - Experiential Learning in Simulation for Students Leaders**

**LIBRA Research Group: Míde Power 1, Dr. Siobhán Lucey 2, Dr. Avril Hutch 3, Dr. Siobhán Lucey 4, Dr. Patrick Henn 5, Anne-Marie Curtin 3, Dr. Tanya Dean 6, Michelle Scott 1, Dr. Claire Condon 1**

1. Royal College of Surgeons in Ireland SIM Centre for Simulation Education and Research, 2. School of Economics, Cork University Business School & Mná@UCC Women's Network, 3. Equality and Diversity Unit, University College Cork, 4. Cork University Dental School and Hospital & Mná@UCC Women's Network; 5. ASSERT Simulation Centre, UCC, 6. Conservatoire, Technology University Dublin

#### **Impact: Local, National, International**

The purpose of the LIBRA (balance) project is to future-proof gender equality in Irish Higher Education Institution leadership by working with future leaders to address biases and accelerate culture change. This pilot project employs simulation technology to provide gender equality-based leadership training to student leaders in three Irish institutions. Participants are equipped with the knowledge and skills required to promote gender equality in their daily lives.

To date, the outputs from this research include completion of a consultation process with students and gender equality experts, in addition to a scoping review of the literature, both of which informed the development of a competency-based skills framework and simulation training programme for student



leaders in the domain of gender equality-based leadership. The LIBRA programme has been piloted and evaluated by student leaders in three institutions. LIBRA has the potential to be activated across the higher education sector nationally and internationally. LIBRA creates a co-operative simulated learning experience to build the capacity of future leaders to dismantle disadvantage, influence change and strengthen diversity and inclusion. Developed in partnership with student leaders and gender equality experts, this innovative research project uses an evidence-based approach in the development of high-fidelity simulation methodologies.

***“LIBRA is designed to effect meaningful and sustainable change by empowering the leaders of the future to promote gender equality.”***





# Ensure availability and sustainable management of water and sanitation for all

6 CLEAN WATER AND SANITATION



**United Nations Environment Programme Global Environmental Monitoring System for Water, Capacity Development Centre (UNEP GEMS/Water CDC)**  
**Dr. Timothy Sullivan, UNEP GEMS/Water Capacity Development Centre & Environmental Research Institute**

**Impact: International**

The UNEP GEMS/Water CDC based in UCC was founded in 2015 to provide global capacity development in water quality monitoring and assessment tailored to meet the needs of developing countries. Since then, the Centre has trained over 330 people in 108 countries from around the world on water quality monitoring, which is fundamental to successful achievement of SDG target 6.3 on water and sanitation. The Centre encourages best practice in collecting water quality data across national, regional and global assessments through research on stakeholder needs, best practice and innovation in all aspects of water quality monitoring and assessment. The CDC is the designated partner, on behalf of UNEP, to provide technical support in implementing the monitoring methodology for indicator 6.3.2, which requires progress towards “Good Ambient Water Quality” by 2030.

Key activities have included development of the 6.3.2 indicator methodology, piloting and refining the methodology, providing in-country support for the global rollout of the indicator, producing interactive on-line tutorials on the technical implementation of the methodology for the indicator, delivering in-situ workshops and advice, and leading on the reporting of the global results for SDG indicator 6.3.2. Additionally, the Centre’s research on the potential for the use of citizen monitoring of water quality for indicator SDG 6.3.2, has successfully led to its implementation in developing countries. The CDC focuses on inclusivity and openness in training to maximise participation and access and takes great



Figure 6: UCC SDG 6 publications 2017 -2021

pride in having designed and delivered training at national, regional and international level, including free courses, university accredited continuous professional development courses, and a Postgraduate Diploma (PGDip) and MSc in water quality monitoring and assessment.

Contributing to Target 6.3

Contributing to Target 4.7

## Bridging the Gap between the Environment and Human Health

**Dr. Jean O'Dwyer, School of Biological, Earth and Environmental Sciences & Environmental Research Institute & SFI Centre for Research in Applied Geosciences (iCRAG)**

**Impact: Local, National, International**

This research aims to bridge the gap between the natural environment and human health. This involves an assessment of the links between water contamination and waterborne infectious disease, as well as the impact of climate change on human health and wellbeing. Research into groundwater contamination, both nationally and internationally, has provided a mechanistic understanding of the source, fate and transport of microbiological contaminants of drinking water allowing for the creation of models to 'predict' contamination events and safeguard human health. Research into the impacts of Climate Change on human wellbeing has shown that, globally, there is a greater than 90% likelihood of a negative psychological outcome for those who experience an Extreme Weather Event, with women and those who are socioeconomically disadvantaged particularly at risk.

This research has shed light on the link between our natural environment and human health, resulting in increased funding for research in this area (via the Environmental Protection Agency and Science Foundation Ireland) and more outputs highlighting this important research area.



**SDG 6 and International Water Law: Consensus and Complementarity**  
*Professor Owen McIntyre, School of Law*

**Impact: Local, National, International**

Research is being undertaken to explore how implementation of SDG 6, and the values enshrined therein, will influence the continuing evolution of international water resources law, whilst also examining how established legal frameworks will play a central role in shaping the actions necessary for realisation of SDG 6, despite the latter's non-legally binding character. The intention behind this ongoing research is to highlight the relevance of the global consensus reached on the SDGs for effective implementation of the corresponding legal commitments of State and other actors. Results are disseminated widely through academic channels and policy engagement, including a recent report prepared for the intergovernmental Nile Basin Initiative (NBI) on 'The Status of Transboundary Water Governance and Implementation of SDG Indicator 6.5.2 in the Nile Basin' (May 2022).

*“This research aims to illustrate the close, two-way interrelationship between international law and the SDGs by*

*exploring the mutually supportive approaches embodied in international water, environmental and human rights law and in SDG 6. The former bodies of law continue to develop rules and principles intended to promote normatively broad and inclusive rights to water and sanitation and to require environmental protection of shared international water resources and the ecosystems dependent thereon. However, the articulation and solemn adoption of SDG 6 by almost the entire international community of States represents a universal formal political commitment to such values, which can only serve further to legitimise and inform such emerging norms.”*





# Ensure access to affordable, reliable, sustainable, and modern energy for all



## Corca Dhuibhne/Dingle Peninsula 2030

**Dr. Clare Watson, MaREI SFI Research Centre for Energy, Climate and Marine, Environmental Research Institute**

**Impact: Local, National**

Established in 2018, this is an innovative multi-partner initiative on the Dingle Peninsula, Co. Kerry, involving the Dingle Hub, ESB Networks, NEWKD, and MaREI – working with the local community to enable the broader societal changes required for the sustainable transition. Through engaged research with its partners, MaREI is supporting the practical development and tracking, analysing, and documenting of experiential learnings. MaREI has also provided analysis on the Dingle Peninsula's current energy demand and renewable energy potential and analysed the ESB Networks' 'Dingle Project' Ambassador and EV trials. Outcomes of this research include the development of the West Kerry Dairy Farmers Sustainable Energy Community (SEC); a local roadmap for anaerobic digestion; a more informed and involved local community; national and international recognition; and the designation of the Peninsula as Kerry County Council's Decarbonisation Zone. As a result of this project there has been a noticeable diffusion of sustainability in the local community, especially within the home energy and farming sectors, and an increase in solar PV usage on the peninsula. Further anticipated impacts include a policy change relating to the provision of core funding and support for community-based climate action initiatives and a decrease in local carbon emissions. MaREI's involvement in this initiative is contributing to learning on engaged research through organizations such as Campus Engage and Science Foundation Ireland (SFI). The project recently won the Engaged Research Award at the UCC Research Awards 2021.

Contributing to  
SDG 7

Contributing to  
SDG 13



Figure 7: UCC SDG 7 publications 2017 -2021

## ACT4ECO: Becoming an Energy Prosumer via eLearning

**Dr. Wendy Rowan, Dr. Stephen McCarthy, Dr. Ciara Fitzgerald, Laura Lynch, Professor Fred Adam, Department of Business Information Systems, Cork University Business School**

**Impact: National, International**

ACT4ECO is an online platform that helps citizens to become more energy efficient. On ACT4ECO one can learn how to make changes to their homes, both on a small and large scale, and also, how to change habits, becoming more aware of the unconscious energy consuming traps one can fall into after improving the energy efficiency of the home. ACT4ECO is timely and relevant, as we see how humans are continuing to have a major impact on the environment. By providing the home energy consumer with a free online resource, ACT4ECO has increased awareness and consumer understanding of climate change and its consequences. ACT4ECO provides education on the sustainable use of resources to foster resilient societies, whilst also stimulating public debates and heightening awareness of environmental issues. Funded by Horizon 2020, ACT4ECO has fed back and engaged with policymakers to enhance evidence-based decisions.

This project has documented multiple KPIs including – Consumer Engagement, Communications, Innovation, and Policy Outreach. Over 11,000 home energy consumers across Europe and beyond engaged with the ACT4ECO platform. This project closely aligns with the UCC policy for research as it engages with the wider community, in this instance ACT4ECO is a pan-European project. It contributes to UCC's goals of sustainability and education for the greater good of society. ACT4ECO demonstrates one way of connecting with citizens for the greater good by informing, inspiring action, being partners in the process to influence future policy.



ACT4ECO research has been published in media and academic outlets.

***“ACT4ECO bridges on the one side the problem of bringing relevant information out when and where people need it, and on the other side the problem that mere information is not enough, it takes learning processes to change behaviour.”***

- Ms. A. Cacciani, SINERGIE, Reggio Emilia, Italy



**ENERGISE: Enhancing the Transition to Energy Citizenship**  
**Dr. Olive McCarthy, Centre for Co-operative Studies & Department of Food Business and Development, Cork University Business School**

**Impact: Local, National**

In this project, researchers from UCC work with the Money Advice and Budgeting Service (MABS) to explore the barriers and enablers to greater energy efficiency in the home, with a focus on households with low disposable income, and provide peer-based case studies to promote and support greater efficiency. Prior research has examined issues pertaining to a just energy transition for those experiencing low incomes. This research focuses on the experiences of those with low disposable incomes, many of whom may be in employment but face mounting or crisis debt. Many of the energy efficiency schemes remain unsuitable for people in this situation and this research helps to shed light on why this is the case.

A policy briefing based on existing literature and the findings of the research supports the Money Advice and Budgeting

Service (MABS) in advocating for a just transition to affordable, sustainable and modern energy for all, based on the gathered evidence. The peer-based information leaflets are available for use by clients across all MABS offices nationally to encourage engagement with energy efficiency measures that can decrease household costs through reduced energy consumption. Media outputs increase awareness of and debate around the difficulties facing households with low disposable income in terms of energy consumption and increasing energy efficiency. This research received funding from the Irish Research Council.



**Motivations, Incentives and Commitments for Co-Investment in Onshore Wind Energy Projects**

**Dr. Geraldine Ryan, Department of Accounting and Finance, Cork University Business School**

**Impact: National, International**

This project explores the motivations and characteristics of those who invest in local energy schemes and explores how an understanding of this can be used to better promote financial incentives schemes for community investment. Achieving net zero by 2050 requires considerable investment to scale up clean energy generation capacity, expand and modernise power networks, and electrify end users. However, clean energy projects are facing growing opposition. While policy makers have introduced measures aimed at incentivizing citizen co-ownership to foster acceptance, little is understood about how these measures interact. Using novel data for Ireland this research examines whether, how, and to what

extent, willingness to accept and willingness to invest into onshore wind farms are associated. It examines how best to design co-investment schemes to mobilise citizen participation in private, community and joint private/community ventures.

This work is funded by the European Union's Horizon 2020 research and innovation program under the Marie Skłodowska-Curie Actions grant agreement MISTRAL (Multi-sectoral approaches to Innovative Skills Training for Renewable energy & social acceptance) [grant number #81383]. MISTRAL comprises of fifteen researchers based across seven countries (Ireland, UK, Denmark, Germany, Netherland, Portugal, and Switzerland) each evaluating the complexity of social acceptance issues facing the deployment of renewable energy infrastructure, and proposing innovative solutions in a variety of research, government and business contexts.



**Wind Value - End of Life Decisions for Wind Farms: An Opportunity for Climate Action and for Energy Communities**

**Dr. Peter Deeney, Environmental Research Institute**

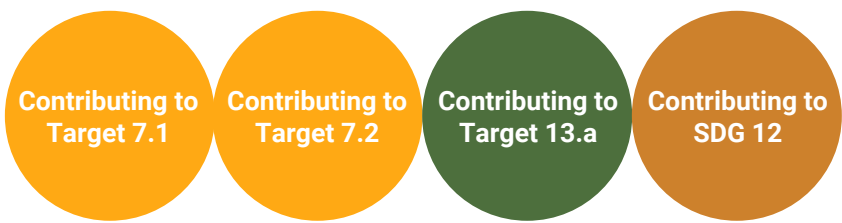
**Impact: Local, National, International**

It is easier to keep a current wind farm in operation than to build a new one. Wind Value aims to encourage investors to understand their choices near the end of the life of their wind farm and facilitate local communities to invest in purchasing wind farms. The principal impact will be to increase investment in wind energy by making the risks and rewards more easily understood for end-of-life wind farms.



At this stage wind farm owners face choices regarding decommissioning, life extension and repowering. Decommissioning can be expensive and does not provide any income. Life extension of existing machinery may be a way to keep income streams while not committing too much money. Repowering (buying new turbines) can be expensive but makes use of existing infrastructure. Both life extension and repowering will normally require new planning permission. Local communities may find this easier than outside owners, giving them an advantage. By using current financial techniques for company valuation, such as real options analysis, our research project will show how developments in academic finance can be used to support sustainable development.

*“It is easier to keep a wind farm working than to build a new one. Local communities can take advantage of the low price of a wind farm near its end.”*



**Firm research, development and commercialisation and triple helix interactions in the offshore marine energy sector**  
**Dr. Frank Crowley, Dr. Gillian Barrett, Professor Justin Doran, Mark Kelleher, Spatial and Regional Economic Research Centre & Department of Management and Marketing, Cork University Business School**

**Impact: National, International**

In the developing and emerging offshore marine energy sector

in Western Europe, this research explores the significance of triple-helix connections between business, academia, and government. The first research objective focuses on the relationship between the stage of technological development the company is at (i.e., research, development, and commercialization) and the kinds of triple helix interactions occurring at each step. Secondly, this research explores the factors triggering and limiting the formation of the triple helix system in the marine energy sector case. This work addresses important societal issues around future energy security and has direct implications for policymaking under SDG 7 and 13. This research was funded by The Selkie Project and is part of the wider Selkie network which has received funding from the European Union’s European Regional Development Fund through the Ireland Wales Cooperation Programme.

Novel qualitative data was collected for a sector in its infant stages and the results of the data collection exercise was disseminated to interviewees and stakeholders in the industry and participants in the SELKIE network. The information will provide actors with novel insights into the unique innovation trajectory of the industry and enable them to better navigate triple helix interactions. This paper will be submitted to a high impact top international journal. An understanding of the mechanisms of firm-level innovation is enhanced by shedding light on how different actors are important at different stages of the innovation process for a firm. This work answers calls by Lerman et al., (2021, p. 9) to investigate “more complex relationship mechanisms using other theoretical models as a research framework for energy systems”. The qualitative analysis finds that interactions with universities are identified as being important at the early research and late development stages of the innovation process, while interactions with government are important only at the late development stage of the innovation process.

A complex web of industry-level interactions involving consultants, suppliers, competitors, and customers take place at various stages of the innovation process, and into full commercialisation. The qualitative data reveals the motivations and bottlenecks that are impeding interactions for innovators in this sector providing rich research insights.



**Interactive Linkages, Non-Interactive Linkages, and Innovative Activity in the Offshore Renewable Energy (ORE) Sector**  
**Shane Barrett, Dr. Frank Crowley, Professor Justin Doran, Dr. Mari O'Connor, Spatial and Regional Economic Research Centre, Cork University Business School**

**Impact: National, International**

Using novel firm-level data from Europe on the offshore renewable energy sector, a high-tech sector in the early stages of development, this research examines the effect external linkages (interactive and non-interactive linkages) have on innovative activity. This work addresses important societal issues around future energy security and has direct implications for policymaking under SDG 7 and SDG 13. This research was funded by The Selkie Project and is part of the wider Selkie network, which has received funding from the European Union’s European Regional Development Fund through the Ireland Wales Cooperation Programme. The research collected novel data for a sector in its infant stages and the results of the data collection exercise are being disseminated to stakeholders in the industry and participants in the SELKIE network, which will provide actors with novel

insights into the unique innovation trajectory of the industry.

This paper has been submitted to a high impact international journal and is currently under review. Findings indicate the importance for policymakers to recognise the role of interactive linkages, with customers, suppliers, and consultants for the development of product and process innovation in the offshore renewable energy sector. To enhance product and process innovation in the ORE sector, policy interventions which promote and build collaborations or interactive partnerships among ORE firms may be fruitful. These types of relationship create a wider benefit which extend past participating firms through stimulating knowledge creation and diffusion. These are important considerations that should be taken by policymakers and academics addressing renewable energy and climate change policy under SDG 7 and SDG 13.



**Community Engagement in Wind Energy: Innovative approaches to achieving a social license**  
*Dr. Bernadette Power and Co-Wind Research Team, Cork University Business School*

**Impact: Local, National, International**

This project aims to develop innovative approaches to achieve a social license for onshore wind energy development through i) community engagement; ii) community ownership/co-investment; and iii) enhancing current benefit sharing practices. This project provides insights on preferences for engagement, benefit sharing and co-ownership/co-investment mechanisms

to increase community acceptance of onshore wind developments thereby assisting in increasing the share of renewables in Ireland’s energy supply (SDG 7). The project examines options for community ownership and co-investment (SDG 9) enabling citizens to invest, especially those that live near wind turbines, in a way that is affordable and equitable.

The project informs national policy on climate mitigation (SDG 13) by identifying the values, requirements and expectations of all stakeholders and through improving community and institutional capacity to navigate pathways to increase social acceptance of wind farms. Using mixed methods to gather data from multiple stakeholders and innovative approaches to capture how citizens may tradoff their preferences for different aspects of new wind energy installations including engagement, co-investment and community benefit funds key aspects of RESS I, it can identify mechanisms to increase social acceptance of developments.



**Residential Solid Fuel Use in Ireland and the Transition Away from Solid Fuels**  
*Dr. John Eakins, Department of Economics, Cork University Business School & Environmental Research Institute*

**Impact: National**

The Environmental Protection Agency has highlighted air quality issues in urban centres in Ireland in recent years. Emissions of fine particulate matter (PM 2.5), attributable to

the burning of solid fuels, such as coal, peat and wood, are a particular cause of concern. This research develops a better understanding of solid fuel use in the residential sector in Ireland, including examining the factors that influence choices regarding residential heating and the barriers to transitioning from solid fuels to affordable, reliable and modern energy services. A key contribution was the development of new data sources to examine aspects of the solid fuel residential heating market.

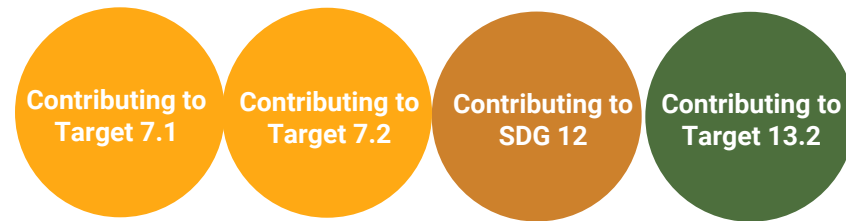
In providing a deeper understanding of residential solid fuel use using existing and new sources of data, the outputs from the research can be used to both inform and monitor the design and implementation of new solid fuel regulations, which will encourage a transition to affordable, reliable and modern energy services in the residential sector in Ireland. The research outputs can feed into the development of policy at national level including the National Clean Air Strategy, the Annual Climate Action Plan, the National Planning Framework, the National Energy Efficiency Action Plan, the Just Transition Plan and the National Energy and Climate Plan. These policies are closely aligned with the SDGs, particularly in ensuring access to affordable, reliable, sustainable, and modern energy for all (SDG 7).

The research outputs can help statistical agencies collect accurate data on residential energy use including issues such as measuring the extent of informal solid fuel use. The research also draws attention to the need to monitor trends in solid fuel use as new solid fuel regulations come into effect. The research highlights and makes recommendations to overcome barriers to a transition to affordable, reliable and modern energy services in the residential sector, such as the possibility of substitution to informal solid fuel use as an





unintended behavioural consequence.



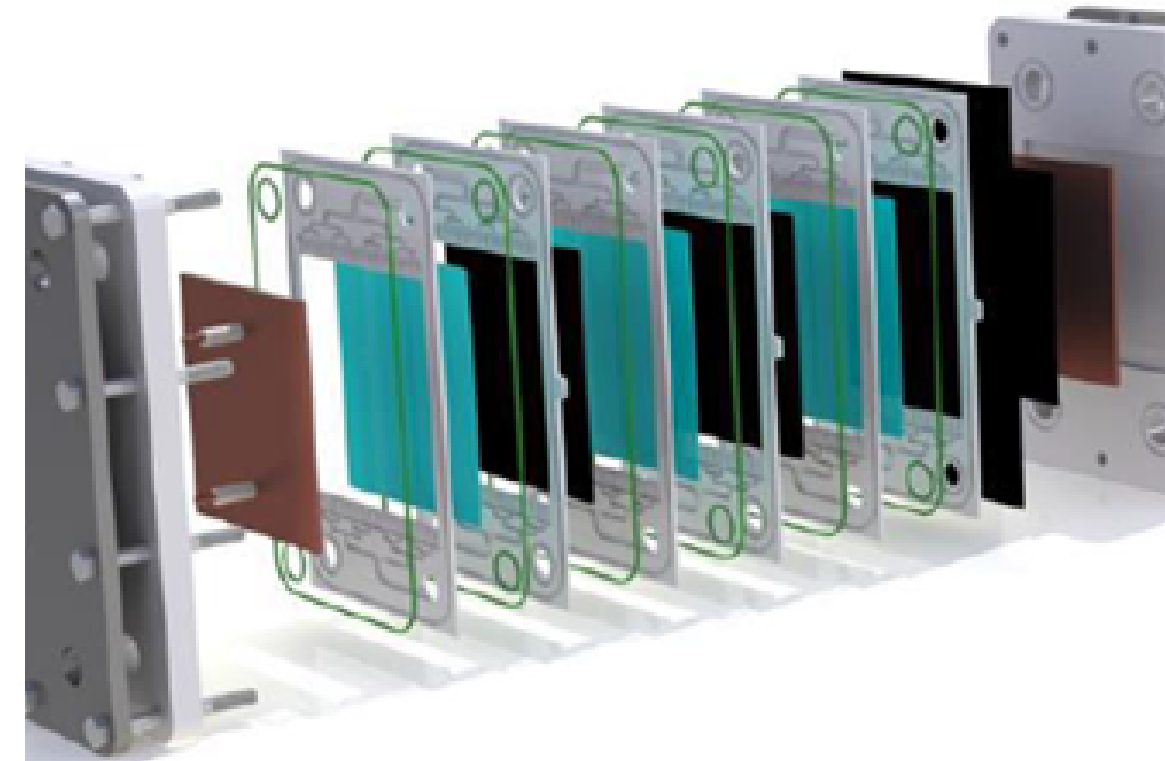
## Copper-based Flow Batteries for Energy Storage and Renewables Integration

**Dr. James Rohan, Tyndall National Institute**

### Impact: International

CuBER focuses on improving the infrastructures for renewables self-consumption and grid integration. It seeks to unify the expertise of different European actors in the field of Electrochemistry, Electrochemical Energy Storage, Electronics, Process Engineering, Smart Sensors, IoTs and Solar Power Industries with the objective of deploying functional pilots capable of validating an holistic and innovative way of producing and consuming renewable energy in urban, rural and industrial areas in the EU.

The overall objective of CuBER which is ongoing, is to develop and validate in a relevant environment a low-cost and scalable stationary energy storage technology with a proven superior environmental performance based on a non-critical and earth-abundant material (copper), relying on a fully European value chain from primary production to recycling. CuBER will provide a low-cost energy storage solution, thus greatly supporting the market penetration of renewable energy and their integration in the Global Energy sector. CuBER will base its superior cost competitiveness on the use of abundant and recyclable materials, thus enjoying comparatively low electrolyte cost and



*Copper-based Flow Batteries for Energy Storage and Renewables Integration*

the utilization of low-cost components and solutions (e.g. inexpensive microporous separators instead of costly ion exchange membranes). Our role in the project is to assess different additives and pre-treatments applied to the electrode materials to enhance reaction kinetics. This is required, to maximise the amount of active material that can be stored in the negative half-cell compartment, increasing the capacity and the energy and power capabilities of the system.

***“The Cuber project is developing a low-cost and scalable stationary energy storage technology with a proven superior environmental performance based on a non-critical and earth-abundant material (copper), relying on a fully European value chain from primary production to recycling with a view to enhancing the security of supply for the EU energy sector.”***





# Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

**Social inclusion of rural migrants in Hanoi City, Vietnam**  
*Dr. Edward Lahiff, Department of Food Business and Development, Cork University Business School*

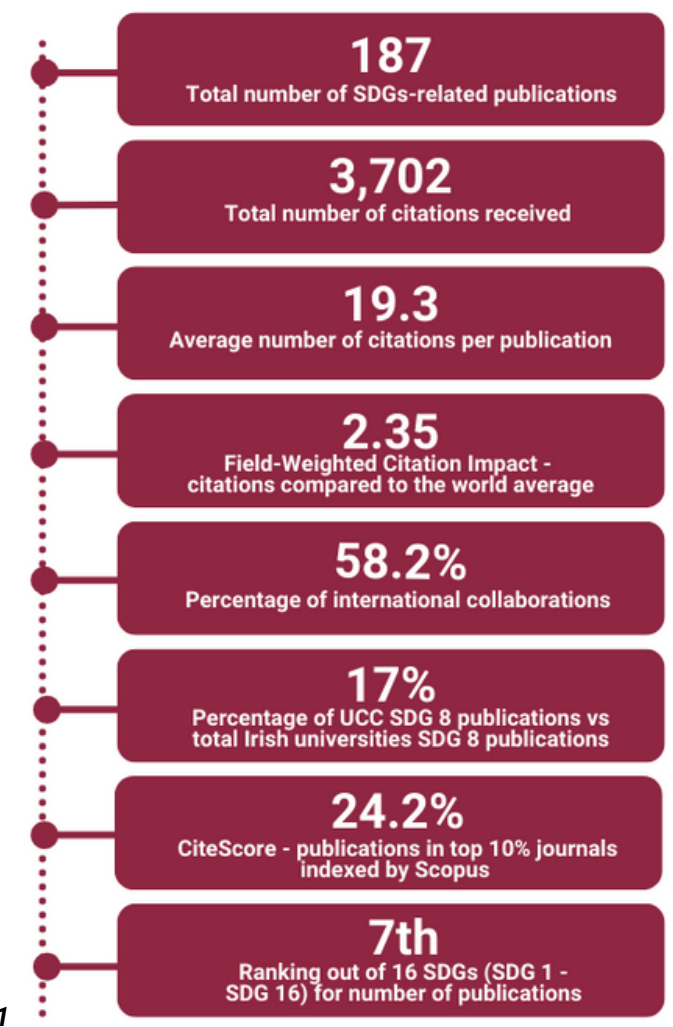
**Impact: International**

Rural-to-urban migrants constitute a vulnerable group in developing countries such as Vietnam, and often struggle to access employment, housing, and social services. Migrants are routinely discriminated against in official policy and practice and are widely recognised as socially and economically marginalised. The aim of this study is to contribute to greater social inclusion of migrants in Vietnam through enhanced understanding of the needs of diverse groups of migrants, particularly women and those in precarious employment, and more effective policy responses by state and non-state agencies. Through close engagement with migrants, advocacy groups and state agencies, this project contributes to current debates around planned and well-managed migration policies, which impacts mainly at national level.

The theoretical framework for this study is socioeconomic inclusion, with a focus on employment, housing, education, healthcare and social protection. The specific objectives are to identify barriers to social inclusion of migrants in Hanoi, to critically analyse the policies and programmes aimed at social inclusion and to engage with stakeholders to develop detailed policy solutions. This research is contributing to ongoing policy reform, by raising awareness among advocacy groups, policy makers and the wider community. This project is closely aligned with Irish and EU development aid priorities, elaborated in close cooperation with the Government of Vietnam, and focuses on mutually agreed objectives of socioeconomic development and capacity building, thereby contributing to enhanced North-South cooperation. Moreover, as a truly collaborative effort between UCC and USSH (part of the Vietnam National University), this



Figure 8: UCC SDG 8 publications 2017 -2021



project contributes directly to skills development and knowledge-sharing among researchers, an example of international cooperation within the university sector that enhances capacity for further cooperation among all parties.



**The Role of Entrepreneurship in Stimulating Economic Growth in Developed and Developing Countries**  
*Dr. Nóirín McCarthy, Spatial and Regional Economics Research Centre, Cork University Business School*

**Impact: International**

This research analyses the relationship between different measures of entrepreneurship and economic growth in both developed and developing countries. SDG 8 aims to ensure that the benefits of economic growth accrue to the whole planet – both developing and developed countries. Given this goal, this research takes a novel approach to exploring the relationship between entrepreneurship and economic growth by using country level data for developed and developing countries, in addition to 14 different indicators of entrepreneurship. It has important implications for SDG 8, demonstrating both differences in, and the importance of, entrepreneurial attitudes and aspirations which can ultimately impact upon the creation of new jobs and enterprises across both developed and developing countries.

This research suggests that while entrepreneurial activity, in and of itself, is insufficient to support economic growth, positive entrepreneurial attitudes and aspirations are key.





This has significant policy implications for countries, highlighting the need to cultivate a positive view of entrepreneurship, rather than focusing on increasing the quantity of entrepreneurs.

Contributing to  
Target 8.3

### **Employment threats and Labour Market Shocks: What workers and places are more at risk to the economic shocks of automation?**

***Dr. Frank Crowley, Professor Justin Doran, Spatial and Regional Economic Research Centre, Cork University Business School***

#### **Impact: National, International**

The results of this research suggest that the pattern of job risk from automation across Ireland demands policy that is not one size fits all. Instead, a localised, place-based, bottom-up approach to policy intervention is needed in Ireland and Europe, to reduce inequality and promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. In the European automation study, low risk regions are more prosperous, have a disproportionate share of talent and more sophisticated innovation systems. These technological and regional trends are likely to exacerbate the growing 'geography of discontent' evident in many European regions, which will require a rethinking of place-based intervention policies.

This research has been widely communicated, with the "Automation and Irish Towns" paper presented to academics, business practitioners, government departments, regional assemblies, local development agencies, local authorities,

and social entrepreneurs at a 'Creative Rural Economy' workshop. The paper was covered on all major national, regional and local TV and radio stations. This work has subsequently received significant policy interest, with invited speaker presentations at the Department of Finance, meetings with the OECD and a citation in the OECDs 2020 Economic Survey of Ireland. An invitation was also received to present to the Low Pay Commission, to discuss the implications of the research findings for regional pay disparities. The "Automation and Industrial Structures" paper, co-authored with Prof. Philip McCann (University of Sheffield), adds to the nascent regional literature by identifying the regions in Europe that face the highest job risks associated with automation, and how the characteristics of the region's economic structure contribute to this susceptibility or vulnerability.

It is understood that this paper is the most detailed yet undertaken in investigating these regional and spatial implications of automation in the EU context. The results of the automation work indicate that future automation and artificial technologies are predicted to hit already lagging areas harder. Present and past national and local institutional settings and policies in Ireland have failed to dampen significant regional inequalities from occurring and new frameworks, strategies and policies to tackle the concerns of lagging areas need to be considered by policymakers in the Irish case.

Contributing to  
SDG 8

Contributing to  
SDG 9

Contributing to  
SDG 10

### **Research and innovation and the role of competition in family-owned and family-managed firms**

***Yuping Yin, PhD candidate, Dr. Frank Crowley, Professor Justin Doran, Dr. Mari O'Connor, Spatial and Regional Economic Research Centre, Cork University Business School***

#### **Impact: International**

This project examines the innovation behaviour of family-owned firms versus non-family-owned firms. Innovation is a key tool for businesses to survive competition from rivals and this holds true for family-owned firms that are the main firm type in most economies. This project aims to improve our understandings around the innovation potential of family businesses by identifying the factors affecting innovation in family businesses versus their nonfamily firm counterparts. Contrary to the bulk of literature in this area, we find that that family firms are more innovative than non-family firms for all types of innovation activities, including R&D investment, product innovation and process innovation. Therefore, this work highlights the importance of family firms for the economy and informs policy makers that providing family firm intervention supports will be critical to sustainable economic growth. The role of internal family governance and the influence of external stimuli (competition) on innovation are also considered.

This research provides novel insights into family firm innovation dynamics by identifying family firms as more innovative than non-family firms for all types of indicators, debunking the idea that family firms are conservative, reluctant to change, and averse to the risks in innovation activities. The study's data set is based on a sample of companies in 38 countries in Europe and East Asia (including developed economies, developing economies and emerging economies), covering manufacturing, services and retail. Therefore, the research conclusions are new and relevant for family firm policy-making across most economy types.





***“The path to survival and sustainable longevity in a globalized competitive market begins with a continuous ability to innovate. Therefore, family business owners, managers and policy makers need to develop strategies and policy’s that will help family businesses and in turn the global economy thrive.”***

Contributing to  
Target 8.2

Contributing to  
Target 8.3

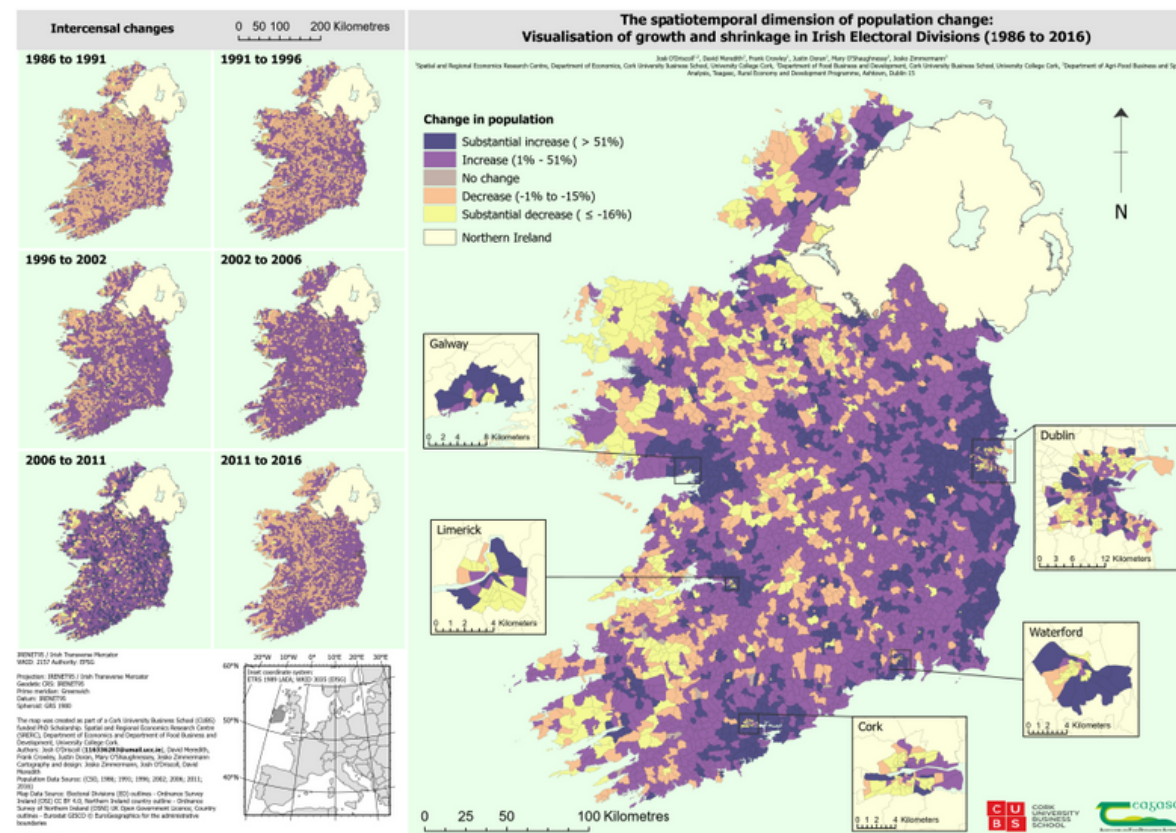
Contributing to  
Target 9.2

## The economic and social burden of population loss across Irish regions

**Josh O'Driscoll, PhD student, Spatial and Regional Economics Research Centre (SRERC), Department of Economics & Department of Food Business & Development, Cork University Business School**

### Impact: International

In recent years, the importance of reducing spatial inequalities and ensuring areas and regions are not left behind has moved to the forefront of academics and policymakers' attention. This research aims to show why certain areas are shrinking and others are not shrinking. The research will help inform regional development policy in shrinking areas aligning to SDG target 8.3 on the promotion of development-orientated policies and SDG target 10.4, which addresses inequalities across regions. It also helps to inform targets 11.3 and 11.a, providing important evidence on the links between urban, peri-urban, and rural population growth. Population shrinkage is not just an urban or rural problem, and a complicated regional shrinkage typology is emerging. Several areas are consistently losing population from census to census, while others only experience occasional intercensal shrinkage, whilst many others are experiencing population growth. This means policy solutions are complicated,



*The economic and social burden of population loss across Irish regions*



and a one size fits all policy approach will likely fail in maximising the growth of shrinking regions. Rather than just 'urban' or just 'rural', an examination is undertaken of population shrinkage and growth in small areas across the short- and long-term time periods. A Core-periphery framework is applied to understand distance to larger towns and its effect on population shrinkage. The subregional data allows for a clearer picture of the trends which better informs policymaking with international relevance.

***“Our research aims to empirically identify shrinking and growing regions and model the characteristics which shape who remains and who leaves these regions. This provide insights for policy makers and local agents on why regions are shrinking and growing with a particular focus on appropriate policy interventions.”***

Contributing to  
Target 8.3

Contributing to  
Target 10.4

Contributing to  
Target 11.3

Contributing to  
Target 11.a

## What workers and places are more at risk to the economic shock of COVID-19 and what impact will increased working from home have on the environment?

**Dr. Frank Crowley, Professor Justin Doran, Spatial and Regional Economic Research Centre, Cork University Business School**

### Impact: National, International

COVID-19 is impacting labour markets, with evidence that social distancing and remote working effects are having an unequal impact across people and places, and further exacerbating existing job polarization and regional disparities.





The changing nature of work could also have significant implications for the environment and the climate change challenge. This body of work examines the impact of COVID-19 on the geography of employment and the environment in an Irish context, with transferable lessons for other advanced nations. COVID-19: an occupation, sector and regional perspective was published (Oct, 2020) in the journal - *Regional Science: Policy and Practice*, which was one of the top downloaded and cited papers from 2019-2020 in that journal. At a time when economies throughout the world are experiencing one of the greatest health and economic shocks in recent memory, this COVID-19 publication shows more affluent, dense and highly populated, better educated, and better broadband provisioned urban areas have a greater potential for social distancing and remote working.

These results have direct implications for work (SDG 8), urban development (SDG 11) and climate change national, regional local planning (SDG 13). The impact of labour market disruptions and transport choice on the environment during COVID-19 is published in the journal - *Transport Policy*. The Climate Change Council requested use of the analysis and it has subsequently been cited in the 'Greening Transport: Final Report' by the Environment Protection Agency (EPA). The results show that while those who commute by car have a relatively high potential for remote work, they are less likely to be able to engage in social distancing in their workplace. While this may be negative for employment prospects in the short run, this dynamic has the potential for positive environmental implications in the short and long run. This work addresses a significant academic and policy need in Irish society with transferable lessons for other countries internationally.



## Enhancing Consumer Protection in Financial Services *School of Applied Social Studies*

### Impact: International

This research looks at the evolution of financial regulations and how such regulations have responded to crises in recent years (the Global Financial Crisis, impacts of pandemic, and responding to calls for ethical, accountable and citizen-focused financial industry practices). This research aims to engage academics, civil society organizations and those within regulatory and financial industry sectors. By so doing, it seeks to build research networks between researchers and practitioners as to the nature of 'ethics' within financial services and if citizens' needs (including calls for sustainable, ethical, responsible practices) can be accommodated within regulations and industry conduct. This research seeks to contextualize the evolution of Irish and European financial regulations, particularly in how such regulations can/have responded to citizens' needs and institutional accountability.



## Management control choice in the twilight zone: the organisation of emergent risk *Dr. Michelle Carr, Department of Accounting and Finance, Cork University Business School*

### Impact: International

Companies encounter a multitude of deep uncertainties and emergent risks that can threaten organisational functioning

and performance. Emergent risks include the potential of severe economic downturns, threats of cyber terrorism, rapid and unexpected demographic and climate changes, energy challenges, shifting customs and tax agreements, and, of course, pandemics caused by exotic diseases. These emergent risks pose distinct challenges for management control. So far, however, we know little about the management control processes, practices and techniques which help to organise an emergent risk. How much attention is paid, and who pays attention to, an emerging risk? To what extent do organisational roles and work routines change in response to an emerging risk? When are existing and new management control processes and practices advanced in response to an emerging risk. There is a need for research to better explain what we know about the organisation of emergent risk, including how to enable management control choices which not only respond to risk but which, help to, mitigate it as and when it arises also. The purpose of this research is to contribute by relating management control choice in the organisation of the same emergent risk in three similar, but different, companies.

This research has been presented at leading international accounting conferences (e.g. Aalto Business School). The findings have also been contained in a report edited by Dr. Mary Murphy of UCC called *Brexit and the Cork Effect*. This report was presented to and launched by Taoiseach Michael Martin and was subsequently reported upon by the Irish Examiner in June 2022. The research is currently under review by the European Accounting Review for publication.



**Automated processing of regulatory documents to enhance organisations' information systems**  
*Department of Business Information Systems, Cork University Business School*

**Impact: Local, National, International**

This research aims at developing annotated datasets, and natural language processing (NLP) methods and models leveraging knowledge representation artefacts, to advance the automated processing of rules and definitions in legal documents to assist organisations in areas such as regulatory compliance in the financial sector. This research builds on the work in the Marie Curie Fellowship titled "RegDef: A Computer-assisted Definition Authoring and Formalisation System for Legal Experts" carried out in partnership with a private company in the area of financial Regulatory Technologies (SDG 17). The outputs of the research will provide organisations with technological advances for compliance checking that will benefit them and workers in related sectors by reducing the amount of labour-intensive, repetitive tasks that can be automated to shift the focus on meaningful tasks, thus improving workers conditions and strengthening operational resilience of financial organisations (SDG 8 & SDG 9). This research has opened research collaborations with researchers within the BIS department in UCC, in Spain, in the UK, and in Peru.



**Workplace mental health and well-being practices, Outcomes and Productivity: A Causal Analysis**  
*Dr. Jane Bourke, Department of Economics, Cork University Business School & Social & Regional Economics Research Centre, UCC & Enterprise Research Centre, University of Warwick*

**Impact: International**

This project addresses the link between employee mental health and well-being and productivity outcomes. It focuses on the causal processes by which employers can support better mental health and well-being and so boost productivity performance. Despite the scale of the impact of poor employee mental health and productivity little is known about the outcomes when employers implement mental health and well-being (MH&W) practices on employees' mental health and well-being and even less about the causal mechanisms through which poor MH&W influences firm-level productivity. The 2020 Australian Productivity Commission report on mental health concluded, for example, that 'there is limited evidence on the effectiveness of these interventions ... there has been difficulty in establishing the effectiveness of different programs and initiatives' (Productivity Commission, 2020, p. 342).

The ambitious aim of this research is to address this gap in understanding and to establish the causal mechanisms through which firms' adoption of MH&W practices can benefit productivity and productivity improvement. Which MH&W practices have the greatest benefit for employee mental health? Which have the greatest benefit for employee well-being? And, how do these effects impact firm-level productivity? Understanding these linkages is critical both during the recovery from Covid-19 and its attendant mental health impacts and in building higher and sustainable productivity in future years.

This international project will collect firm-level data in Ireland, the UK and Sweden, providing new insights on the effects of the adoption of MH&W practices in the workplace, both in terms of employee mental health and on firm-level productivity.





# Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation

**Workload Prediction in Cloud Computing**  
*Andrea Rossi, PhD student, SFI Centre for Research Training in Artificial Intelligence*

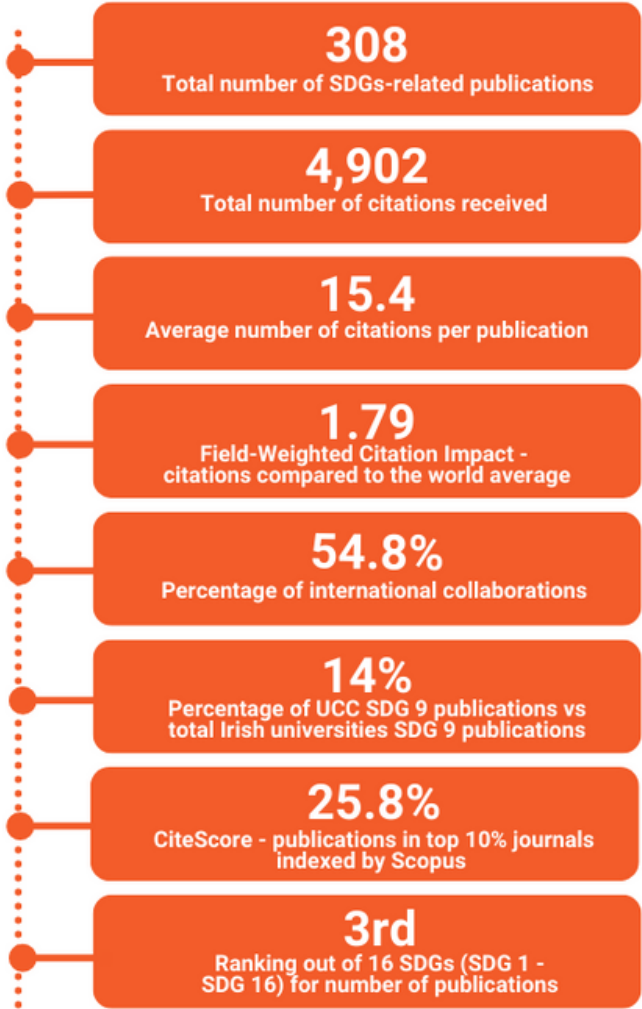
**Impact: Local, National, International**

Providers of cloud computing systems need to allocate resources carefully to reduce waste due to overallocation. To allocate resources to service requests without excessive delays, we need to predict future demand. Most current state-of-the-art methods make only point predictions of resource requests and ignore uncertainty. Predicting the future demand distribution is more informative and allows the providers to reduce resource waste during the resource allocation phase, reducing the cost of electricity and maintenance. Predicting the future demand distribution in the cloud computing environment allows the providers to reduce resource waste during the resource allocation phase, reducing the cost of electricity and maintenance. Currently, proposed models can provide better estimations of resource usage bounds, allowing a reduction of both overprediction and the number of unmatched requests.

The predictions will be used by the resource manager for the pre-provisioning of the virtual machines to minimize the waste and the electricity consumption, guaranteeing a high quality of service level at the same time. The project is presented at International Conferences and SFI CRT in AI events. Moreover, the project is part of Task 3.6 on the Sustainability of Trustworthy AI of the European TAILOR network.



Figure 9: UCC SDG 9 publications 2017 -2021



**Intelligent MOtion Control under Industry 4.E (IMOCO4.E)**  
*Dr. Alfie Keary 1, Dr. Michael Walsh 1, Dr. Javier Torres 1, Dr. Masoud Emam 1, Dr. Dara O’Sullivan 2, Dr. Daire McNamara 3,*

*1. Tyndall National Institute, 2. Analog Devices, 3. Emdalo Technologies*

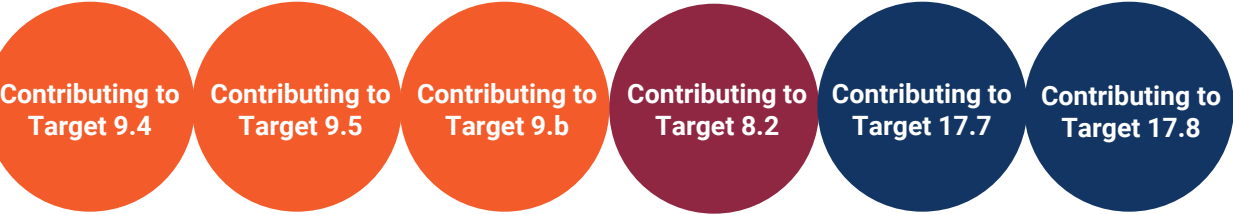
**Impact: Local, National, International**

The IMOCO4.E project’s target is to provide vertically distributed edge-to-cloud intelligence for machines, robots and other human-in-the-loop cyber-physical systems. IMOCO4.E’s aim is to perceive and understand complex machines and robots, with the two main pillars of the project associated with the fields of digital twins and advanced AI principles (machine learning/deep learning).

The IMOCO4.E research project has the potential to impact across a range of the SDGs. In particular, and with reference to SDG 8, the project outcomes will lead to economic growth for Europe and beyond, coupled with the generation of a range of new forms of working outcomes and re-engineered jobs, with significant increases in productive employment options for manufacturers. Also, the work conducted across all IMOCO4.E partners will address SDG 9 in relation to industrial infrastructure and fostering innovation, leading to advances in scientific research across all forms of manufacturing industries. In the context of the longer-term potential from IMOCO4.E outcomes, it can be expected that the benefits will reach far beyond Europe and will address a number of the sub-goals of SDG 17 in relation to global partnerships and sustainable development opportunities. The IMOCO4.E research led by Tyndall in Ireland also involves two industrial partners, Analog Devices and Emdalo. Tyndall leads a particular use case relating to edge based and AI powered tactic robotic tele-operation with a core focus on latency,

reduction targets. This research will contribute to the advancement of industrial automation systems in Ireland and also across the EU and worldwide. Specifically, the IMOCO4.E related research conducted will contribute to the factory of the future and the internet of skills and has also got applied potential for the creation of virtual workforces on a global scale.

***“The IMOCO4.E project must be seen as mandatory technical infrastructure for the advancement of smart manufacturing across Europe and worldwide.”***



**Calculating the cost of rural infrastructure access in South Africa**  
***Professor Don Ross, School of Society, Politics, and Ethics, UCC & School of Economics, University of Cape Town***

**Impact: International**

This research involves the design of sustainable rural transport infrastructure improvement in Southern Africa, with emphasis on improved rural access to basic services, labour-intensive maintenance, and resilience against climate change effects. Consultant services are provided to governments and international agencies to estimate costs of such improvements. This work generates strategic plans, detailed local implementation models, and associated financial models, for policy implementation by governments, including management of pilot projects that test these models. This work does not apply to developed countries (e.g. Ireland). Transport models,

which this research contributes to, have been adopted as policy in South Africa. Current research by others takes them as a basis.

***“Sustainable growth in Southern Africa depends on better management of urbanisation. This requires providing rural communities with infrastructure that allows people who choose to remain in rural areas to do so, particularly in the face of pressures from climate change effects.”***



**Ensuring Corporate Sustainability: Strategic Perspectives for Developing a Sustainable Organisation**  
***Dr. Stephen Treacy, Department of Business Information Systems, Cork University Business School***

**Impact: Local**

Using judgement studies conducted with eighteen industry experts, this research explores the key obstacles faced by organisations when pursuing transformative sustainability initiatives, and reports these across three specific domains: leadership, business processes, and business models. As both governments and consumers begin to hold companies accountable for their sustainability practices and carbon output, there is more pressure than ever for organizations to drastically adapt their operations. It has now become the responsibility of organizations to display proactive initiatives towards providing a solution to the world’s environmental issue, instead of adding to the problem. The burden must now be taken up by business leaders to reconceptualise the

global environmental issues into sustainable business opportunities. Extant literature identified the absence of a clear path for organizations to achieve their sustainable goals and identified areas which must be addressed in order to succeed in this transition.

This research sought to address the obstacles surrounding corporate sustainability and targeted practitioners who were able to divulge the key insights required for sustainable reformations. This investigation contributes to existing literature by presenting eight specific themes (lack of internal knowledge, side project mentality, leadership structure, complexity, mindset shift, transformation, cost barriers, and renewability) across three main areas (leadership, business processes, and business models) developed from empirical data collected from eighteen industry experts, while also offering distinct managerial implications.

These findings enable a guided transition to an improved ecoconscious paradigm that takes stakeholder requirements and leadership vision into account. The research adds to the sustainable literature, and develops the importance of leadership in this transition, while establishing the need for a three-dimensional approach for the organization pursuing these strategies. The obstacles identified herein allows practitioners to develop a more holistic evaluation of the areas of primary focus, which organisations need to target if they wish to enjoy the full benefits of sustainable business operations. Taken together, these findings present organizations with a strategic blueprint to ensure they are capable of delivering their visions of sustainability.





**DYNAMO: Dynamic Resilience Assessment Method including combined Business Continuity Management and Cyber Threat Intelligence solution for Critical Sectors**  
**Dr. Karen Neville, Centre for Resilience & Business Continuity (CRBC) & Department of Business Information Systems, Cork University Business School**

**Impact: International**

The H2020 DYNAMO €5 million project combines the two fields of business continuity management (BCM) and cyber threat intelligence (CTI) to generate a situational awareness picture for decision support across all stages of the disaster resilience management lifecycle (to prepare, prevent, protect, respond and recover) for critical infrastructure organizations.

The results will generate knowledge concerning susceptibility and vulnerability of the Critical Infrastructure sector (e.g. Health Services, Telecommunications, Transportation). DYNAMO will support Business Continuity Management (BCM) with respect to the five disaster resilience phases. The Cyber Threat Intelligence (CTI) solution will deliver data that will be integrated into the resilience and BCM methodology. DYNAMO will enable organizations to conduct analysis of threat intelligence across and between organizations.

***“Cybersecurity attacks have far reaching consequences, as is evidenced by the HSE Attack. This project, of which UCC is a key partner, is coordinated by the Fraunhofer Research Institute and it will support organizations and countries in utilizing Cybersecurity Threat Intelligence to be resilient against attacks.”***



Calculating the cost of rural infrastructure in South Africa

**EU EnABLES Power IoT Research Infrastructure and Ecosystem**  
**Dr. Mike Hayes, Micro & Nano Systems Centre, Tyndall National Institute**

**Impact: International**

78 million batteries will be dumped worldwide every day by 2025 if we do not improve the life span for powering Internet of Things (IoT) devices. Currently, it is estimated that by 2025, there will be 1 trillion IoT devices in the world – smart objects and automated systems that gather information, communicate with each other, and analyse data – such as sensors, smart phones, wearable devices and heating control systems. There is now an urgent need to make IoT batteries more sustainable so they can outlive the devices they power. EnABLES is asking everyone to think about battery life from the outset, to ensure that batteries outlive the devices they power. This will help tackle the issue of e-waste and guarantee safer, more reliable power sources for devices where batteries are not easily changed, such as medical technologies, implantable devices and technology in harsh and difficult to reach environments. There is a need to not only increase the energy supplied by batteries, so they last longer, but to also reduce the amount of power the devices consume. EnABLES fosters and guides key ‘power IoT’ advances to harvest tiny ambient energies such as light, heat and vibration and converting them to electricity, whilst minimising energy consumption by the sensors. For example, a solar panel half the size of a credit card could power a temperature and humidity sensor in an office indefinitely.

The purpose of this research is to develop an energy harvesting related 'power IoT' ecosystem of collaborators (developers, manufacturers, system integrators, end users)

that develops power solutions that dramatically extends battery life of wireless IoT edge devices. The ecosystem can be used to guide and accelerate development of solutions around real-life applications using ambient energies. This research will result in longer battery life; more reliable Wireless sensors; less batteries going into landfill (SDG 7, SDG 11, SDG 12); enabling wireless sensors to be retrofitted on, in near equipment, infrastructure, people to reliably offer services including more energy and resource efficient factories (SDG 9, SDG 11, SDG 12); assisted living & wearables (SDG 3, SDG 11); environmental monitoring (SDG 6, SDG 7, SDG 14, SDG 15); lower carbon footprint transportation (SDG 12, SDG 13); and condition monitoring of renewable energy infrastructure (SDG 7, SDG 11, SDG 13).

This research puts Ireland and the EU at the forefront in technology and thought leadership by fostering the ecosystem to maximise the benefits of the wireless IoT retrofit value proposition. This results in the building of academic and industry partnerships particularly in manufacturing and med tech sectors (both manufacturing and product development) where Ireland is very strong.

Contributing to  
SDG 9

Contributing to  
SDG 11

Contributing to  
SDG 12

**Urban Sprawl: Land-Use, Travel Behaviours, and Emissions in Irish Regions**

*Conor O'Driscoll, PhD Student, Spatial and Regional Economic Research Centre, Department of Economics, Cork University Business School*

**Impact: Local, National**

This research investigates the relationship between, and the economic and environmental impacts of, land-use and transport policies in Ireland. It analyses how Ireland's historically unsustainable and inefficient developmental landscape has shaped current travel behaviours and land-use developments and provides insights into what policymakers can do to re-align regional development with the SDGs.

The most significant medium-to-long term impact of this research will involve setting research agendas in defining future sustainability-centred policymaking directions in line with the SDGs. Accordingly, the research outputs prioritise advancing the field of sustainable urban and regional development through the publication of research papers alongside research dissemination activities which will inform the general public on issues surrounding unsustainable land-use and transport policies. This research is contributing to debates on regional development in Ireland by analysing how existing travel behaviours can be altered by policymakers to facilitate shifts away from car-use. In an international context, this research is producing novel insights surrounding the sustainability of regional land-use developments through data-driven innovations.

Contributing to  
SDG 9

Contributing to  
SDG 11

Contributing to  
SDG 12

**The Use of Manganese, an Earth Abundant Metal, as an Economically Viable, Safe, and Tuneable Alternative to Rare Precious Metals, in a Range of Important and Pharmaceutically Relevant Transformations**

*Ben O'Donoghue, PhD student, School of Chemistry*

**Impact: International**

Positioning Manganese (Mn) as a sustainable alternative to precious metal catalysis will ease reliance on Pd-group metals, as well as financial, toxicity, environmental, and geopolitical concerns (Russia are one of the leading world-suppliers). As an output from this project, Mn catalysis will be developed as an alternative to precious metal catalysis– this will be a more sustainable means of production if adopted in the pharmaceutical industry. Mn is cheaper, safer, and far more abundant on the Earth's surface. Avoiding extensive and deep mining along with adopting a robust supply chain for Mn is critical. Avoiding the dependence on Russia for supply is also critical. In obviating our dependence, pharma companies may quicker achieve sustainability goals and improve adherence to related policies. Along with this, collaborations (national & international) in academia & industry will promote partnerships for furthering sustainable development.

This research will greatly advance the understanding and scope of Mn-catalysis. This diversification away from precious metal usage will reduce the reliance of the pharma industry/academia on the purchase and supply of these metals and the environmental cost of their sourcing. It will also provide a pivot-point for further research in these sectors.

Contributing to  
Target 9.4

Contributing to  
Target 9.5

Contributing to  
Target 12.4

Contributing to  
Target 12.6

Contributing to  
Target 17.14

Contributing to  
Target 17.16



# Reduce inequality within and among countries

**CIPHER: Hip Hop Interpellation (ERC CoG)**  
**Professor J. Griffith Rollefson, Department of Music, School of Film, Music and Theatre**

## Impact: Local, National, International

CIPHER is investigating the international spread of hip hop culture and its attendant musical, lyrical, artistic, and performative forms on six continents. It is building new infrastructure, ethnographic and digital methods, and socio-cultural theory for the interdisciplinary field of hip hop studies, leveraging hip hop's 'third space' of intercultural dialogue to build a more informed, equal, and just world. Through its focus on hip hop's 'third space' of dialogue and transformation between young people of diverse backgrounds CIPHER addresses UN SDG goals including 4.) Quality Education, 10.) Reduced Inequalities, and 16.) Peace, Justice and Strong Institutions.

CIPHER has raised both the scholarly standards and community impact of hip hop studies globally launching the first-of-its kind journal *Global Hip Hop Studies*, hosting major international conferences in collaboration with major cultural institutions like La Place and La Philharmonie de Paris, publishing its findings in scholarly journals and colloquia, and undertaking important community-engaged arts research work. As evidenced by reaction to the nationally televised feature on RTÉ's Change Makers series, CIPHER has already caught the imagination of the public. That documentary followed CIPHER's community-engaged hip hop performance and knowledge project, 'Ubuntu: Local is Global', in collaboration with local youth arts NGOs, the Kabin Studio and Cork Migrant Centre, to explore the 'glocal' diversity of hip hop knowledge through performance, linking under-resourced youth from Cork's North Side with migrant youth from Africa, South Asia, and the Middle East.



CIPHER: Hip Hop Interpellation (ERC CoG)

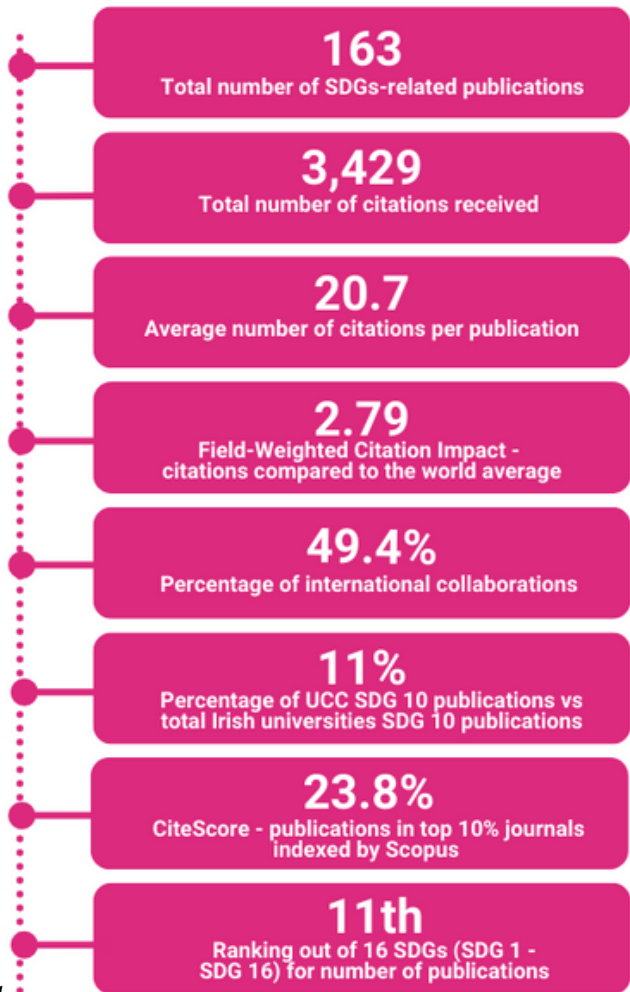
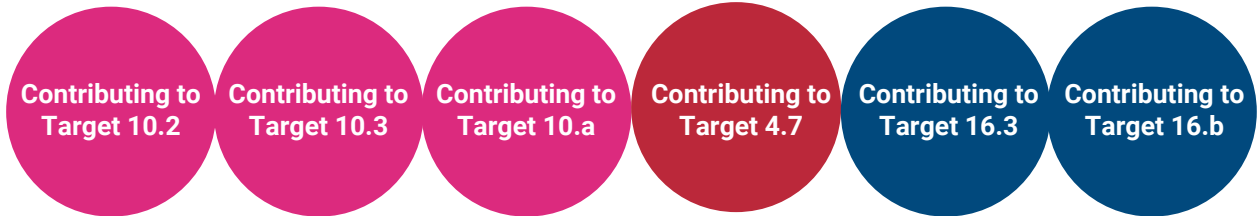


Figure 10: UCC SDG 10 publications 2017 -2021

The primetime television broadcast reached a national audience of 143,000+ and advanced the national conversation on immigration, belonging, and the future of Ireland. Its community-engaged research, scholarly publications, multimedia creative outputs, and international conferencing activities offer a new state of the art for the field and look to refigure the university knowledge trade to be more just, equal, responsive, and open. CIPHER's findings indicate that hip hop's oral and performative "gems" of knowledge to help local communities recognise global calls--for equality, justice, political voice, or simply to be allowed to live--and reterritorialise them through performance in their own local style and attending to their own local needs.

On hearing of CIPHER's shortlisting for the Times Higher Education (THE) Award for Research Project of the Year in Arts, Humanities and Social Sciences, Professor Rollefson explained -

***"On behalf of the CIPHER team, I want to thank the THE Awards Committee for recognising the importance of community-engaged social justice work in the university research ecosystem. We're thrilled to have the spotlight focussed on hip hop's organic intellectual world of art and ideas, especially in these challenging times when young people and marginalized communities are increasingly vulnerable."***





**The Men’s Shed Movement and the Sustainable Development Goals: Local Responses to Global Challenges**  
**Dr. Carol Power\*** and **Dr. Ray O'Connor^**, *\*Department of Food Business & Development Centre for Co-operative Studies, Cork University Business School; ^Department of Geography Department, School of the Human Environment*

**Impact: Local, National, International**

Irish men's sheds are part of a growing international movement and this research explores the role of Irish men’s sheds in 'living the SDGs' within their communities. Men’s sheds are particularly well-recognised for their positive impact on health and well-being. This research explores how they also support other SDGs related to environmental sustainability and provide related lifelong learning opportunities for older men. In 2019, the Irish Men’s Shed Association was designated one of twelve Sustainable Development Goals (SDG) Champions - organisations that lead by example in achieving the SDGs. While there has been a significant volume of research on men's sheds' impact on health and well-being, this research breaks new ground by highlighting the potential of men's sheds in Ireland, and internationally, to promote awareness and facilitate more sustainable behaviour within their communities.

The project is funded under the Irish Research Council's New Foundations scheme - Enhancing Civil Society strand - and is a collaboration with the Irish Men's Sheds Association. This research highlights the important role that men's sheds play in promoting environmental sustainability at local and community level in Ireland. This is the first time that men's sheds have been examined as agents of environmental sustainability.



**Performing Political Memory as Hip Hop Knowledge in Mozambican Rap (POME-RAPMOZ)**  
**Dr. Janne Rantala**, *Department of Music, School of Film, Music and Theatre*

**Impact: Local, National, International**

POME-RAPMOZ focuses on rap performance of historical knowledge in four cities in Mozambique (Maputo, Beira, Chimoio and Nampula) to examine public political memory in the country. The project builds on previous research on the ‘counter-remembering’ of Maputo rappers considering non-textual aspects of memory like intertextualities audible in sampling. POME-RAPMOZ uses the theoretical tools of the postcolonial theory, community-engaged ethnographic research, and musical analysis. The research bridges global Hip Hop studies with political memory studies in southern Africa to examine how rappers and producers as young and more-often marginalised citizens shape public memory through their art and performed histories. This project addresses UN SDG goals including decent work and economic growth (SDG 8), reduced inequalities (SDG 10), gender equality (SDG 5) and peaceful and inclusive societies (SDG 16).

The scheduled outputs include workshops where local artists and researchers share their knowledge and show their skills. Additionally, publications will be produced including about rap performances, which interrogate post-colonial wars in neo-colonial global context, demand social justice, equality and recognition; sampling a musical heritage, region and political memory co-authored with a local researcher and Hip Hop producer; and publications about efforts of local artists to challenge and revisit established historical narratives, which tend to marginalise younger generations and (globally and nationally) peripheric regions. The policy contribution of this

project is to recommend fair, effective and inclusive ways to promote creative industries and related civic rights (e.g. liberty of expression), especially in developing countries, using local artists’ and stakeholders’ experiences as a starting point. The project will contribute to further visibility of Mozambican Hip Hop, emphasising peripheric parts of the country, and is thus able to empower local artists, Hip Hop culture and industry, and through these micro-impacts can promote decent work opportunities, creativity, entrepreneurship and equality between regions, genders and social groups in local, national and global levels. The project's community-engaged research, a dialogue with other knowledges aiming to question scholarly hierarchies, scholarly and popular publications, conferencing and lecturing activities and media engagements all aim to change how academic knowledge producers recognise their non-academic sources and dialoging partners and research participants.



**Exploring the Potential for the Development of Care Co-operatives to Support Older People to Age Well at Home (CO-AGE)**  
**Dr. Carol Power**, *Cork University Business School & Centre for Co-operative Studies & Institute for Social Science in the 21st Century (ISS21)*

**Impact: National**

This research explores the co-operative as an alternative, inclusive organisational model to provide care services that support older people to age well in the community. It engages with stakeholders to assess the feasibility of developing care



co-operatives in Ireland. Co-operatives are motivated by the need to provide a service rather than the desire to generate a profit. Where surpluses are generated, the priority is to reinvest in the business rather than delivering a profit to shareholders. Care co-operatives may be owned by service users and/or producers and/or other stakeholders. Their inclusive and democratic principles offer an opportunity for older people and their families to influence care service design and delivery. The model can empower care recipients and care workers. Most older people in Ireland prefer to remain in their own homes as they age. Those who suffer ill health and experience age-related frailty may need homecare supports to enable them to remain at home. Care may be accessed through the public system, delivered either by directly employed carers or contracted private companies, or through private procurement by care recipients/their families. Those receiving care often have little say in how support is provided. Furthermore, there is a shortage of homecare workers, which has been attributed to poor pay and conditions for those employed by for-profit companies.

This research is intended to stimulate awareness and discussion of the co-operative care model and to influence policy on care of the older person in Ireland. It relates to SDG 3 by considering innovative models to support people to age well in the community; SDG 8 - by providing a model for democratic business ownership and promoting labour rights for care workers, including women, migrants and those in precarious employment; and SDG 10 - by empowering older people to have more influence over service design and a better experience as care recipients and empowering care workers, who are predominantly women, and often migrant women, whose work is undervalued because it is considered 'domestic work'.

Through engagement with care workers, family carers, people



anticipating future care needs, the health services and other stakeholders, this research seeks to stimulate awareness and discussion of the co-operative model as an alternative way of providing and accessing care. This approach to the research fits with SDG 17 Partnership for the Goals by involving a range of stakeholders in a deliberative inquiry approach. The project is a collaboration with Age Action Ireland and is funded under the Irish Research Council's New Foundations scheme.

***“Older people have a right to the supports that they need to age well in their own homes and in the community. As a society, we are facing an increased demand for homecare as our population ages. We need to explore and identify innovative models of care that improve the experience of care recipients and that recognise the value of care work, and reward workers in the sector appropriately. This is essential to the overall objective of the SDGs to ‘leave no-one behind’.”***





# Make cities and human settlements inclusive, safe, resilient, and sustainable

**Cork Folklore Project**  
**Dr. Cliona O'Carroll, Department of Folklore and Ethnology, School of Irish Learning**

**Impact: Local, National, International**

The Cork Folklore Project explores the following questions through its practice. What does responsible, engaged cultural heritage stewardship look like? What can tradition and oral history archives contribute to the world of research and the ‘real world’? Whose histories do we record, and for whom? And how do celebration, creativity and slow, critical engagement come together in a cultural heritage context? The safeguarding of cultural heritage (Target 11.4) is the central activity of this community-based ethnographic interviewing and archiving centre. CFP also supports and champions the creative approaches required by the SDG’s bold developmental vision. CFP cultural heritage practices and platforms are uniquely placed to encourage and support conversations about how we experience and engage with our world, how this has changed over time, and how we wish to shape it in the future. CFP’s structure, where job-seeking project researchers are trained in digital and ethnographic methods to document local communities, supports targets 4.4 (education for relevant skills in adults) and 8.3 (supporting productive activities). Our work crucially supports Goal 11, making cities inclusive, safe resilient and sustainable, as we provide resources for communities, local authorities, tourist and business initiatives to find resonances for their activities our accounts of how people lived, created, built livelihoods, responded to challenges and inhabited spaces.

The Cork Folklore Project stands as an internationally-recognised engaged oral history and tradition archives unit, which has been collecting, archiving and sharing documentation and oral testimony on vernacular urban life since 1996.



Cork Folklore Project

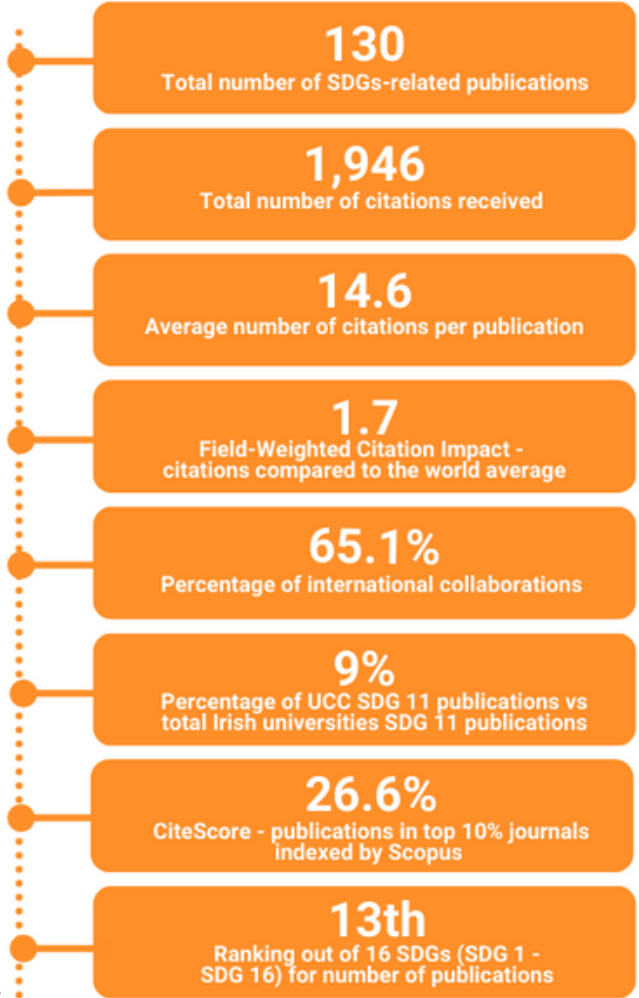


Figure 11: UCC SDG 11 publications 2017 -2021

It is a leading iteration of slow and thoughtful engagement with the cultural expression and testimony of various communities, which supports the foregrounding of the value and richness of oral testimony in community, creative, archival and academic research contexts. Its work informs international conversations on approaches to the collection, safeguarding and use of intensely qualitative data.

An interviewee and supporter of the Cork Folklore Project’s work, ‘Irish Jack’ Lyons, expresses some of the ways in which the CFP engages with, animates and safeguards the cultural heritage of the city - *“It’s valid, it’s near Shandon, it’s where the old Credit Union first operated in 1969, it’s got amazing, dedicated people pulling the culture pumps, it’s cerebral, uplifting and it’s the anecdotal voice of Cork. It can be subversive.”*



**Socio-Cycle: Exploring the Socio-Cultural Significance of Cycling in an Irish Regional City**  
**Dr. Eileen Hogan, School of Applied Social Studies & Institute for Social Science in the 21st Century (ISS21)**

**Impact: Local, National**

In partnership with Cork Environmental Forum and the Cork Cycling Campaign, this study investigates the socio-cultural meanings of cycling with a view to informing effective pro-cycling policy in Irish regional cities. In current policy and planning discourse, there is great interest in reimagining and redesigning cities as more cycling-friendly spaces. In Ireland, government and local councils have recently announced





significant investment in long-awaited cycling infrastructure. While positive, it remains to be seen how effective these interventions will be in promoting and sustaining cycling for transport and leisure. Ireland currently has a low cycling uptake in comparison to other European countries with a strong cycling culture, such as the Netherlands, Denmark and Germany. The most commonly-cited barrier to cycling is road safety and therefore improved cycling infrastructure is key to promoting bike use. However, research indicates that investments in the built environment are not enough to increase cycling rates. Social and cultural factors are also significant in determining the strength of a city's cycling culture but are complex and inadequately researched in policy-making contexts. This project addresses this research gap in the Irish context.

The outcomes of this project will:

- address a gap in the sociological and social policy literature on cycling in Ireland
- contribute to knowledge on cycling culture and practices and the impact of pro-cycling policy and planning in Ireland
- develop an evidence base for cycling advocacy and the promotion of cycling as a sustainable mobility mode.

This research has the potential to shape:

- evidence-informed environmental policy and planning and better cycling infrastructure
- improved individual and collective well-being due to an uptake in cycling rates
- new connections to cycling-centred international research expertise and new international collaborations

***"In collaboration with Cork Environmental Forum and the Cork Cycling Campaign, we hope to collectively contribute to a deeper understanding of cycling as a social practice, thereby advancing social scientific knowledge on cycling in Ireland and beyond. In turn, we can contribute to dialogue on policy and planning that advances low-carbon, sustainable modes of transport and inform pro-cycling policy-making through evidence-based research."***



### **Emergency Management (EM) Decision Support Tools for COVID-19**

***Dr. Karen Neville, Centre for Resilience & Business Continuity (CRBC) & Department of Business Information Systems, Cork University Business School***

#### **Impact: Local, National**

Dr. Karen Neville and her team - Dr. Nora McCarthy and Dr. Simon Woodworth - were asked by the HSE South/Southwest Hospital Group to deliver 3 COVID-19 solutions:

- A mass training-and-assessment Virtual Course on Donning and Doffing Personal Protective Equipment (PPE) was deployed in 10 hospitals for 8,000 staff.
- An Emergency Management Information System (EMIS) was implemented in 14 hospitals with immediate impact to patients and 80 clinical end-users.
- A Transport Request System (TRS) for COVID-19 and major weather events was implemented for national use.

The ability to prevent, manage and recover from emergencies is vital to the safety of European citizens. The three solutions have advanced research in this work. Research from FP7, Horizon and locally awarded grants was leveraged to support communities as part of the national effort in response to COVID-19. The EMIS supports decision-making, and its lessons are being shared with EM academics and practitioners to ensure its application in different countries. The PPE training and TRS solutions are regionally and nationally deployed. Each solution has impacted regional and national policies and directly contributes to SDG 9 and SDG 11. The tools were built from lessons-learned through the successful €3.5 million FP7 S-HELP project and other grants awarded to Dr. Neville, resulting in decision support and training tools for decision-makers. The tools have advanced research in managing and learning from emergencies. This is a requirement of EC:FP7/H2020 research, but it is rarely achieved.

***"It was an honor, for us, to be asked to support the national effort in the response to COVID-19. The result is an Emergency Management Tool-set that provide training and assessment for health professionals, automated real-time reporting to alleviate pressures on intensive care units (ICUs) and transport resource management during extreme emergencies."***

- Dr. Karen Neville (PI & Founder of CRBC), Dr. Nora McCarthy and Dr. Simon Woodworth







## Parents' Willingness to Pay for Safe Cycling Infrastructure in an Urban Area

**Dr. Declan Jordan, Spatial and Regional Economics Research Centre, Cork University Business School**

**Impact: Local, National**

The research aims to address the lack of evidence on barriers to cycling for schoolchildren in an Irish urban setting and the assesses the value perceived by parents for safe cycling infrastructure for their children's' commute to school. It provides evidence on how Ireland can encourage a generational shift to active travel to achieve associated significant health, environmental, social, and economic benefits. Regular physical activity brings significant health, environmental, social, and economic benefits. Active travel to school is a mechanism by which children and young people can counter the effects of more sedentary lifestyles, contribute to environmental challenges, and enhance wellbeing. Investment in safe cycling infrastructure for school children may provide generational shifts in behaviour. However, international evidence indicates that currently fewer children and adolescents are cycling. The climate emergency, urban congestion, and concerns over rates of childhood obesity have increased attention on the need for greater levels of active commuting in urban areas in Ireland and internationally.

This research addresses the lack of scholarly empirical research on the demand, costs, and benefits of cycling infrastructure in Ireland and contributes to the evidence base for policy making on developing liveable and sustainable Irish cities. It will underpin demands for a shift away from fossil fuel car dependency in our urban areas and contribute directly to Cork's transition to becoming a climate neutral and smart city by 2030 as part of the EU Cities Mission. Willingness to pay



studies are an under-utilised method for assessing the value of sustainable travel investments in Irish urban areas. Also, the focus on safe cycling to school seeks to ensure a generational shift to break Ireland's car dependency and childhood obesity crisis.



## Cities of Neurodiversity

**Dr. Therese Kenna, Department of Geography, School of the Human Environment**

**Impact: International**

This project explores the lived urban experiences of those who identify as neurodiverse and encourages these voices to be integrated into urban planning and policy to create more inclusive and sustainable cities. This project will produce several peer-reviewed papers to address a current gap in knowledge of neurodiverse experiences of urban space. It is anticipated that these outputs will be used to inform urban planning and decision making, as well as the formulation of urban policies for inclusive and sustainable cities.

This research will contribute to meeting SDGs 10 and 11, specifically aimed at targets for the inclusion of diverse groups in society (10.2), reducing inequalities through relevant urban and social policies (10.3), encouraging inclusive and sustainable urbanisation (11.3) and the creation of more inclusive public spaces within cities (11.7).



This work is contributing to the development of an urban geography of neurodiversity that attends to the plurality of neurodiversity and of neurodiverse experiences of the city, allowing careful contributions to urban planning and policy for inclusive and sustainable cities.

*“I engage in research-led teaching and this project forms part of the teaching and learning of urban geography at UCC. Beyond SDGs 10 and 11, this project extends to SDG 4 (quality education) as positioning this research within the urban geography curriculum ensures 'all learners acquire the knowledge and skills needed to promote sustainable development' (4.7).”*



Energy ECS
Dr. Mike Hayes, Micro & Nano Systems Centre, Tyndall National Institute

Impact: International

Energy ECS will develop a set of technologies to improve the connectivity, flexibility and digitalization of e-mobility systems, linking their use with the electric network, and using energy to provide services, generate data and interact with other vehicles and smart mobility infrastructure. The set of Electronics, Components and Systems (ECS) developed in the project will tackle important challenges and issues in connectivity components, flexibility, and digitalization for e-mobility, including electrical connection to grid, intermodal transport, autonomous

driving, data generation and vehicles as service providers. The Irish partners in this EU ECSEL project – Tyndall and NetFeasa (SME) - will focus on 1 of 6 project use cases related to intermodal transport, developing their own technologies as well as integrating those of other partners. NetFeasa aims to develop a monitoring platform ('IoTpass') to monitor dry containers for rail, sea and road transportation to assure safe, compliant and energy efficient transportation of goods. Tyndall will develop energy harvesting based power management solutions to provide longer battery life of the NetFeasa wireless device. 95% of dry containers globally are not sensorized due to battery life on comms issues.

Adding intelligence will help reduce the energy and carbon footprint, cost and time of transporting goods (SDG 12, SDG 13). It also enables stakeholders to track goods, minimize losses, detect anomalies, assure safe and compliant transportation. This gives NetFeasa a major edge over competitors by offering such asset tracking services (SDG 9, SDG 11). This research leverages Tyndall's expertise in energy harvesting, power management and system integration and provides funds to build on this. This work also helps academia (Tyndall) and industry (NetFeasa) to build international relationship with partners to co-develop the solutions.



# Ensure sustainable consumption and production patterns

**Re-Wind: Reuse and Recycling of Decommissioned Composite Material Wind Turbine Blades**  
**Dr. Paul Leahy, School of Engineering & Architecture & MaREI SFI Research Centre for Energy, Climate and Marine, Environmental Research Institute**

**Impact: International**

The purpose of Re-Wind is to develop sustainable end-of-life reuse and repurposing strategies for composite material wind turbine blades. Repurposing blades to create new artefacts that are socially, environmentally, and economically beneficial can avoid the negative impacts of conventional disposal methods such as landfill. Re-Wind combines structural engineering and testing, architecture, Geographic Information Science, coupled with environmental, economic and social Life-Cycle Assessments and stakeholder engagement. Re-Wind has helped to shift thinking around end-of-life wind turbine blades (and other composite products) from "waste" to "resource". This links with SDG 12 - reducing the number of blades which will go to landfill or other undesirable disposal methods. Up to 2300 turbines (6900 blades) will be decommissioned in Ireland by 2038.

Substituting other materials with blades also reduces the need for resource extraction for virgin materials, allowing local knowledge and capabilities to be leveraged in deployments. The outputs of Re-Wind have demonstrated the feasibility of incorporating end-of-life non-recyclable, non-biodegradable "waste" composite materials into new, technically feasible, socially beneficial, and environmentally benign infrastructure. Re-Wind has also provided a framework to gauge the effectiveness of end-of-life solutions for wind turbine blades and other artefacts and has placed waste prevention and resource recovery on the public agenda in Ireland and

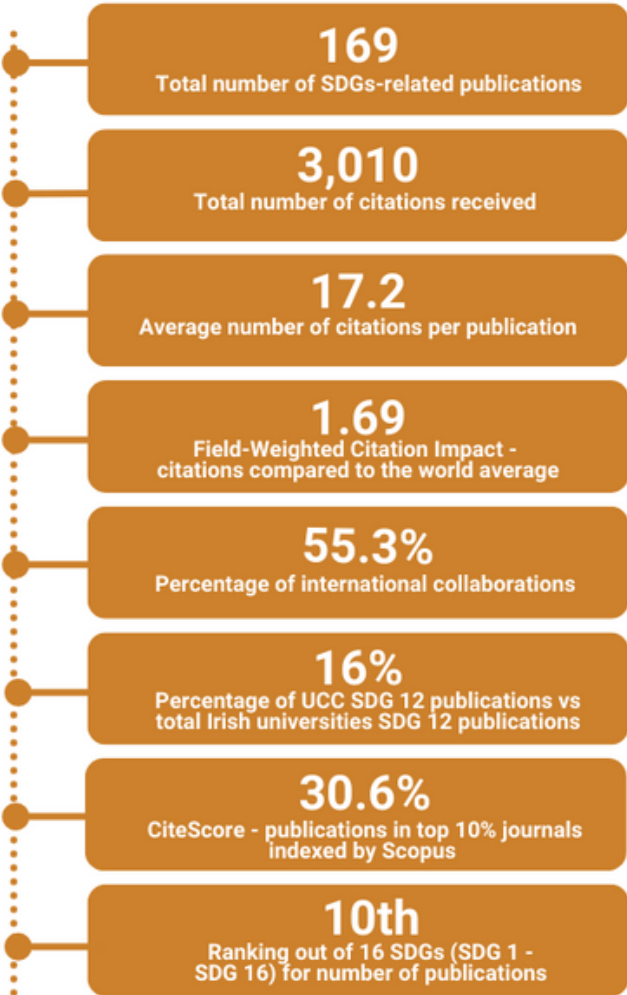


Figure 12: UCC SDG 12 publications 2017 -2021

internationally through publications, demonstration projects and outreach.

*“Re-Wind has developed and demonstrated a framework for integrated social, environmental and economic assessment of end-of-life approaches for dealing with composite wind turbine blades at their end-of-life. The framework is readily adaptable to other products and initiatives and can be used to provide evidence for sustainable decisions for green public procurement and dealing with waste prevention and reduction. The greenway bridge constructed from decommissioned wind turbine blades on the Youghal-Midleton greenway is an example of the output of the Re-Wind framework: sustainably-designed infrastructure on a sustainable transport route.”*



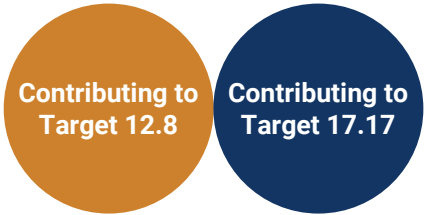
**Transitioning to Sustainable Agriculture - Role of agricultural co-operatives and agri-advice**  
**Dr. Noreen Byrne, Dr. Olive McCarthy, Martina Ryan Doyle, Centre for Co-operative Studies and Department of Food Business and Development, Cork University Business School**

**Impact: Local, National**

The research explores the role of agri-advice, co-operatives and landscape-based approach in transitioning to sustainable agriculture. An exploration is undertaken into the role of Agri-advice in providing relevant information and increasing awareness for the development of farm operations and practices which are in harmony with nature. It also draws on the Water Directive Framework Catchment Areas as a platform



to explore current and potential collaborations in this Agri-advice space. These collaborations are between co-operatives, public and private entities and farmers/citizens. Agri-advice within the co-operative sector has been almost invisible with the academic and policy literature. This research shines a light on what is already happening in this space and outlines the potential and opportunities for further development to enable a transition towards sustainable agriculture.



**Formulation and processing of sustainable and nutritious plant-based dairy alternative products**  
**Nadia Grasso, PhD candidate, Food Ingredients Research Group, School of Food and Nutritional Sciences**

**Impact: International**

This PhD project aims to study plant protein ingredients and their application in developing sustainable, high-quality, and healthy alternatives to dairy products, with a particular focus on the formulation of plant-based alternatives to cheese. This project could ensure sustainable consumption and production patterns (SDG 12) informing industries on the potential of plant protein ingredients, which are less resource intensive compared to their animal counterparts. Presentations at conferences, scientific publications, and meetings with food companies inform about the possible applications of plant protein ingredients and promote the development of sustainably produced and high-quality alternatives to animal-based products. A lack of knowledge about the science behind the development of plant-based alternatives to cheese is observed in the scientific literature. This project informs both industries

and researchers on the role and potential of promising plant protein ingredients in formulating and developing plant-based alternatives to cheese with desirable functional properties.

***“We believe that this project contributes to understanding the role of plant protein ingredients in shaping the food products that in the future will represent valid and more sustainable alternatives to animal-based products.”***

- Food Ingredients Research Group



**Valorisation of brewing by-products**  
**Professor Elke Arendt, Dr. Aylin Sahin, School of Food and Nutritional Sciences**

**Impact: International**

This research is revealing the upcycling of brewing side-streams, which are currently used for landfill and animal feed, to generate nutritious ingredients for human consumption. This is linked to development of food products rich in dietary fibre and protein promoting the concept of circular economy. Brewers’ spent grain (BSG) has been labelled as the most abundant side-stream generated by the brewing industry and accounts for approximately 85% of the total by-products in the brewing process. Upcycling side-streams has become a central part of research in the food industry to promote circularity and reduce waste. This project provides strategies to sustainably manage natural resources (SDG 12.2), reduce food losses along the production and supply chain (SDG 12.3), and reduce waste by recycling (SDG 12.5). Moreover, BSG is

rich in dietary fibre and protein which makes it a highly nutritious raw material. This project focuses on the incorporation of upcycled BSG to develop food products with a high nutritional value for everyone (SDG 2.1 and 2.2).

The amount of craft and microbreweries in Ireland increased significantly over the last decade and is likely to expand further, and so will the amount of side-streams. Providing industry with the concept of circularity and information on the nutritional value of the by-products, will enable producers to find their own sustainability strategy plan and contribute to a more sustainable future in the food sector.



**Sustainable food practices - the role of citizen consumers**  
**Department of Management and Marketing, Cork University Business School**

**Impact: National**

Household food practices can have significant sustainability implications. Through understanding the meanings, abilities, resources and practices of individuals and households, insights can be offered to policymakers and supply chain stakeholders on how to enable a transition to more sustainable food practices. According to IPCC Working Group III (2022), one of the biggest contributions that individuals can make to reduce carbon emissions is to modify their food consumption behaviours. This work seeks to understand barriers and facilitators to change and provide insights on how transitions in food behaviours can be achieved. Overall, the research



suggests that circular food consumption behaviour is quite limited, and much work is required to motivate and enable households to transition to more sustainable food lives. The research draws attention to potential ways that the meso- and macro-environment could be adjusted by supply chain stakeholders and policymakers to facilitate and support more sustainable practice. Retail store choice architecture, incentivisation of more circular food packaging behaviour, support for alternative food supply networks, consumer relevant information provision, and regulation of food promotion policies are some examples of actions that could be progressed.

Contributing to  
SDG 12

### Examining the Relationship Between Consumers' Food Related Actions, Wider Pro-Environmental Behaviours and Food Waste Frequency

*Stephanie Marwood, PhD student, Centre for Co-operative Studies & Department of Food Business and Development, Cork University Business School*

**Impact: Local, National**

The purpose of this research is to explore consumer food waste and the role of practices and actions in influencing food waste frequencies. To do so, a range of selected food related actions, as well as wider pro-environmental practices, are examined with regard to their impact on consumers likelihood of wasting food. Food waste carries with it environmental, societal and economic implications. The practices and actions of consumers are found to be central to driving this groups contribution to global food waste levels.



*Examining the Relationship Between Consumers' Food Related Actions, Wider Pro-Environmental Behaviours and Food Waste Frequency*



This research sheds light on consumer practices that reduce the likelihood of wasting food. One such example is composting and growing food, found not only to reduce the likelihood of wasting food, but also lessen the disconnect with food that is often perpetuated by supermarkets and encourage an overall shift in mindset. Recommendations for interventions and initiative at individual, community and broader societal levels are laid out, focusing on practices and actions to encourage a reduction in food waste and work towards meeting SDG targets 12.3 and 12.5. This research explores Irish consumers' food related actions and their impact on food waste, unique to which is the inclusion of how wider environmental behaviours factor into this.

This research will inform policy at varying levels as to how consumers can be mobilised through practices and actions to reduce food waste, while also encouraging a shift in mindset towards a more appreciative view of the interconnected nature of the food system and their role within it.

Contributing to  
Target 12.3

Contributing to  
Target 12.5

### Sustainable Production and Consumption: The Influence of Social Norms (SPAC)

*Dr. Stephen Onakuse, Centre for Sustainable Livelihoods, Department of Food Business and Development, Cork University Business School*

**Impact: National**

The SPAC Project investigated the linkages between the habits and norms that drive behavioural attitude and preferences towards consumption, with key factors that influence consumer shopping and waste behaviour. The study findings point to a



number of actions that could be taken to enhance sustainability in consumption and production patterns aimed at achieving goal 12. Firstly, identifying gaps in consumer knowledge and environmental attitudes that support policy developments. Secondly, development of a consumer environmental knowledge ‘toolbox’ that increase demand for environmental education campaigns, adverts, integration into curriculums. Thirdly, environmental, and social policy interventions used to shift consumers towards sustainable behaviour and increase their willingness to pay for sustainable and healthy products. Finally, identification of groups or clusters in rented accommodation, either shared or privately rented by incentives that stimulate their transition to sustainable consumption. The study is published as a report by the Environmental Protection Agency (EPA) and widely circulated available.



**CONNECT eSiP Energy source in package**  
*Dr. John Flannery, Micro & Nano Systems Centre & SFI  
 CONNECT, Tyndall National Institute*

**Impact: National, International**

The purpose of this research is to develop power sources for wireless IoT (Internet of Things) edge devices that have energy harvesting technology embedded. IoT edge devices can be placed on, in or near people, equipment, assets, infrastructure and can gather data for applications such as condition monitoring (SDG 9, SDG 11, SDG 12), asset tracking (SDG 9, SDG 11, SDG 12, SDG 13) environmental monitoring

(SDG 6, SDG 7, SDG 14, SDG 15), medtech/assisted living/rehabilitation (SDG 3, SDG 11). This includes components such as transducers, storage devices, power management, microcontrollers, transceivers, sensors, substrates, interconnect, packaging, 3D and flexible electronics. eSiPs will make batteries last longer resulting in less batteries going to landfill (SDG 12, SDG 13). This work involves the fostering of collaborations initially within CONNECT partners and encouraging collaborations beyond this to demonstrate extension of battery life of wireless sensor networks devices. This work shows leadership in doing collaborative research in solving the 'power IoT challenge' - devising longer battery life wireless sensing platforms so they can reliably provide the services for the abovementioned applications.





# Take urgent action to combat climate change and its impacts

## Quantifying burnt areas, habitats burned, and emissions from wildfires in Ireland 2015-2021

**Dr. Fiona Cawkwell, Department of Geography, School of the Human Environment & Environmental Research Institute**

### Impact: Local, National

Information on wildfires in Ireland is incomplete and inconsistent, and the atmospheric emissions and loss of biodiversity caused is poorly known. Satellite images can provide an objective approach to mapping burn scars, and identifying the habitats that burned, from which the emissions can be calculated using standard values. Information on wildfires is important as both an indicator of changes in climate, e.g., vegetation becoming drier and more combustible, and as a contributor to climate change, e.g., release of greenhouse gases from vegetation burning.

This research provides objective information on spatio-temporal trends in wildfires in Ireland and how wildfires can be better managed and integrated into national climate change and land use policies and planning. With more information on their location and timing, people can be better informed about air quality issues arising from fires, how to mitigate against fires occurring, and how to protect vulnerable habitats. The work to date provides information on wildfires from 2015-2021, but to understand spatio-temporal trends in their behaviour, and how these relate to land use and climate change, research covering a longer period is essential. This will inform how Ireland and other temperate regions can mitigate against future destructive wildfires.

***"This interdisciplinary project involved experts in satellite data analysis, air quality, and land cover from geography, chemistry, and physics backgrounds - such collaborative approaches are essential in doing research on issues that affect global***



Figure 13: UCC SDG 13 publications 2017 -2021

## sustainability and development."



## Climate Change Assessment: Realising the benefits of transition and transformation

**Dr. Róisín Moriarty, Environmental Research Institute**

### Impact: National

The purpose of this research is to provide an assessment and synthesis of key findings from Irish research programs and wider related research activities to inform policy making at national level. In particular, examining how best to capitalise on the benefits and opportunities associated with climate action. 'The Climate Change Assessment Report: Volume 4 Realising the benefits of transition and transformation' will be the primary planned output of this research. Policy makers are the target audience for the report, which will suggest how climate change measures can be integrated into national policy, strategy and planning so that Ireland can take advantage of the myriad benefits and opportunities that come with taking climate action so that the lives of people living in Ireland today, and in the future, can be healthier, safer, fairer, and happier. This would have a wider impact on the SDGs other than SDG 13. This cross-cutting work has sustainable development at heart, but particularly the SDGs related to wellbeing, equity, sustainability and resilience. Delivering Ireland's climate ambition will require transformative change in society and the systems that support society eg. energy, land, urban and infrastructure and industry. This work will highlight





research gaps related to how we enable climate action and achieve transformative change across these systems to help funders prioritise research topics and investment in this area.

***“This work is expected to inform the Climate Action Plan 2023 and the development of a long-term strategy around climate action in Ireland.”***



### **Anthropocene Austria**

**Department of German, School of Languages, Literatures and Cultures & Environmental Research Institute**

**Impact: National, International**

This work contributes to the urgent task of refocussing third- and fourth-level education, humanities scholarship and trans- and international cultural analysis on the challenges of climate change and ecological destabilisation. The purpose of this research is to discover the ways in which literary and cultural discourses and forms can deepen understanding and raise awareness of climate crisis and ecological breakdown; to localise these general findings within the context of contemporary Austrian culture and its historical antecedents since the late 19th century; and to probe the contradictions within the term 'Anthropocene' as a short-hand intended to refer to multiple interlocking crises of energy, biodiversity, climate, and global social justice.

Research impact includes the production and dissemination of original scholarship, analysis and discussion of the

aforementioned issues; closer collaboration between international researchers (UK, Germany, Austria, Ireland) to address these issues; development of approaches to teaching these issues in the context of German Studies, literary studies, cultural studies and environmental humanities programmes, at undergraduate and postgraduate levels. As a result, there will be closer international co-operation between researchers in the environmental humanities; and greater awareness and visibility of these issues within German studies, literary and cultural studies, and the humanities (through conference presentations, workshops, public lectures etc.)

***“In the effort to decarbonise our disciplines and research practices, it helps to focus thematically on the wider questions of climate breakdown and ecological crisis, to raise awareness of why transformation is necessary, and what it might look like. Coming from German Studies with a focus on Austrian literature and culture, I wanted to showcase new writing that tackles these themes head-on: in novels, poems, plays, films, but also in scholarship and research. The resulting volume will be a resource for teachers and researchers who want to give more space to these issues in their work, within German Studies and beyond.”***



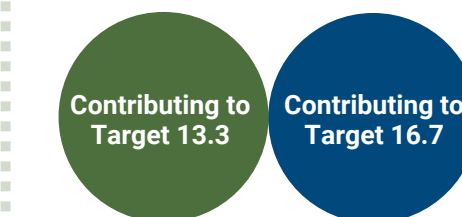
### **Co-developing pathways to a low carbon and climate resilient future**

**Imagining 2050 Project, Environmental Research Institute**

**Impact: Local, National**

Concerns and uncertainty about climate change disruption are

growing across the world. The Imagining 2050 project (Engaging, Envisioning, and Co-Producing Pathways for a Low Carbon Climate Resilient Ireland) is a transdisciplinary research consortium hosted by the Environmental Research Institute in partnership with Queen's University Belfast. The team draws from the disciplines of sociology, engineering, government, politics, geography and planning. The project looks at the importance of involving a wide range of communities and stakeholders to co-develop future visions of, and pathways to, a low carbon and climate resilient future. A toolkit has been developed to help guide engagement with members of the public about climate mitigation, climate adaptation and societal transitions, and will be used by local community organisations, social enterprise partnerships, environmental activists, local decision makers, and educators and researchers. The project was awarded the inaugural President's Award for Research Impacting the Sustainable Development Goals in the UCC Research Awards 2022 in recognition of its impact.



### **Climate Communication in Ireland**

**Dr. Kian Mintz-Woo, Department of Philosophy, School of Society, Politics and Ethics & Environmental Research Institute**

**Impact: National**

Ireland's nationally binding climate action plan requires support and action from citizens. This work helps to explain to the public how their actions can matter, especially in the context of the 26th Conference of Parties.





This work consisted of extensive media engagement (e.g. The Conversation, RTÉ, Irish Examiner, Irish Times, The Ryan Tubridy Show and The Last Word) aimed at explaining how to mitigate individual climate actions and to engage with groups trying to develop social solutions to climate change. This outreach was recognised with the 2021 Andrew Light Award for Public Philosophy. Much of the outreach was contributed from COP26 at Glasgow whilst engaging in official Observer status with UCC. This climate ethics research led to being invited to be part of a project on social and political threats from climate change, which was recently selected for funding from the Canadian national five-year Insight Grant. This team is already generating publications.

***“As researchers, our knowledge of how to live in accordance with the SDGs is something we owe to society. My view is that communicating this is amongst the most impactful things I can do for changing our behaviour.”***



Climate Communication in Ireland



Eco-Humanities Research Group

confronts communication around difficult emotions connected to environmental disruption, such as climate anxiety and ecological grief. The Group's work will strengthen activist networks and the coping strategies of activists to address activist burnout. This research will also build capacity for communication around the difficult emotional realities of ecological crisis and strengthen emotional responses and resilience in the face of climate breakdown.

Research on these topics will be showcased and disseminated through screening, publications, readings and teaching. This research is changing the research landscape by mainstreaming questions of climate breakdown and ecological anxiety into humanities research, particularly languages, literatures and cultural studies; strengthening researcher networks around these topics; and building partnerships between academic research and civil society organisations (in this case Friends of the Earth Ireland).

***“The horizon of climate breakdown and ecological disruption transforms the context of humanities research and teaching. The Eco-Humanities Research Group aims to strengthen the ability of humanities scholars to respond more effectively to this transformed context through their research and teaching.”***



**Eco-Humanities Research Group**  
**Professor Caitríona Ní Dhúill, Department of German, School of Languages, Literatures & Cultures**

**Impact: Local, National, International**

The Eco-Humanities Research Group's research aims to build resilient activist communities through dialogue and reflection, facilitated by shared reading and viewing on ecological destabilisation and climate breakdown. The research





## Enhancing the Integration of Disaster Risk and Climate Change Adaptation in Irish Emergency Planning

**Dr. Dug Cubie, MaREI SFI Research Centre for Energy, Climate and Marine, Environmental Research Institute & School of Law**

### Impact: Local, National

Climate research tells us that extreme weather events and disasters, which are a key focus of several targets within the SDGs, will become more frequent and severe in the coming years. In Ireland, there are a range of important policies, strategies and reports that address climate change and emergency planning. This research project, led by Dr. Martin Le Tissier and Dr. Dug Cubie, brought together academics and practitioners from across Ireland to examine current and future risks from extreme weather events, and to identify pathways to promote an integrated approach to climate and emergency risk management. This project aimed to help relevant institutions to further climate-proof the emergency planning and risk management systems in Ireland to the increasing risks of extreme events.

The research addressed the national policy and decision-making processes, as well as the local and regional planning and response mechanisms. Drawing on examples of European good practice set out in the Horizon2020 'ESPREsso' project, this research developed a roadmap for increasing resilience and reducing vulnerability to climate-related risks, alongside a series of guiding actions for Government, local authorities, first responders, and civil society.

***“Climate change adaptation policies focus on the chronic long-term impacts likely to occur across multiple sectors, such as transport, housing and communications; while emergency planning and disaster risk reduction primarily aim***

***to address the acute short-term impacts of emergencies. Reflecting Ireland’s commitments under the SDGs and the UN Sendai Framework for Disaster Risk Reduction, this research produced a roadmap and a series of guiding actions for key stakeholders in Ireland to more effectively integrate these two fields in a holistic manner.”***



# Conserve and sustainably use the oceans, seas and marine resources for sustainable development



## ECHOES (Effect of climate change on bird habitats around the Irish Sea)

*Dr. Walther Cámara, Department of Geography, School of the Human Environment & MaREI SFI Research Centre for Energy, Climate and Marine*

### Impact: National, International

The Irish Sea climate is changing, in line with global trends, presenting a threat to marine species whose conservation depends on the preservation of coastal habitats. As a response to those challenges, the ECHOES project, seeks to address how climate change will impact coastal bird habitats of the Irish Sea. ECHOES seeks to address how climate change will impact the behaviour and distribution of Greenland White-fronted goose and Eurasian Curlew over the Irish Sea, and what effect this could have on our society, economy, and shared ecosystems.

The outcomes of this project will promote climate change adaptation, associated risk prevention and management by providing tools for land users. This will stimulate and encourage environmental citizenship over the Irish Sea coastal areas. In addition, this project will increase the evidence-base needed for the protection of these coastal areas and the development of strategies required to manage them effectively for future generations. This project involved researchers from several fields, such as Earth Observation, ornithology, climate change, species distribution model and wetland habitats, integrating their knowledge in a novel approach aimed to increase the level of knowledge of adaptation to climate change amongst communities and stakeholders in the Irish Sea coastlines.



Ports, Past and Present



Figure 14: UCC SDG 14 publications 2017 -2021

## Ports, Past and Present

*Professor Claire Connolly, Department of English, School of English and Digital Humanities*

### Impact: Local, National

Ports, Past and Present (funded by the European Regional Development Fund via the Ireland Wales Programme) explores the cultural history of the ports in the Irish Sea basin Fund via the Ireland Wales Programme) explores the cultural history of the ports in the Irish Sea basin and contributes to economic well-being of the port communities via heritage activities. Ports, Past and Present promotes fuller engagement with a rich cultural heritage as a driver of economic growth.

Via its online heritage stories and Port Places app, the project encourages tourism within and around the port communities and reimagines ports as destinations rather than through places. In terms of ocean resilience, Ports, Past and Present produces new blue knowledge about the Irish sea basin, sharing stories that cross the water between Wales and Ireland while linking in to Europe and the world along coastal infrastructures. Ports, Past and Present advances new scholarly knowledge in blue humanities while adopting public humanities methods in order to achieve impact.





**Marine Bacteria as a Source of Novel Biocatalysts with Industrial Applications**

*Clodagh Carr, PhD student, School of Microbiology*

**Impact: International**

Marine bacteria survive the often harsh, low-nutrient conditions of their environment by producing resilient enzymes that can degrade complex molecules for energy. Our research aims to ensure sustainable consumption and production patterns (SDG12) by investigating the natural abilities of marine enzymes for use in bio-based processes that offer advantages over current industrial practices e.g., reduced energy consumption and waste). Our research aims to conserve and sustainably use the oceans, seas, and marine resources for sustainable development (SDG14) both by expanding our knowledge of marine life and by minimising the side effects of industrial processes, that can ultimately disrupt our marine ecosystems. This will be achieved by investigating marine bacteria and their enzymes for use in the biological catalysis of chemical reactions and the biological degradation of polyester plastic, with the overall aim of minimising the environmental and health implications associated with industrial processes and products. Our research highlights the untapped potential of marine bacteria and the enzymes they produce in the development of bio-based solutions to environmental problems, particularly those resulting from industrial activities.

***“Everything is connected to everything else. Everything must go somewhere. Nature knows best.”***

Contributing to  
SDG 14

Contributing to  
SDG 12

# Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss



Exploring the nature-technology-wellbeing nexus to support biodiversity and generate a sustainable city  
**Dr. Paul Holloway, Department of Geography, School of the Human Environment & Environmental Research Institute**

**Impact: Local, National**

This research aims to explore the role of urban green and blue spaces to support under-pressure biodiversity in cities, particularly the spatial configuration of these habitats. Furthermore, this research aims to link to vulnerable groups (i.e. older people) to engage with nature in their local area to support wellbeing through monitoring and mapping nature using technology. This research will lead to a better understanding of the role urban green and blue spaces play in supporting biodiversity. Another aim of this research is to co-develop a system where older people can participate in science and technology through engagement with nature, with an explicit linkage to subsequent wellbeing.

Therefore, success is found in various guises, including knowledge generation to support biodiversity loss, the development of a training and analytical phenology toolkit, participant benefits including education and mental health, community development that provides peer-support and the opportunity for intergenerational exchange. This is the first research group to explore how the spatial configuration of green and blue spaces impact biodiversity metrics within Cork City, where it was found that mixed and connected green and blue habitats support biodiversity better than isolated ones. Building on this, the group are now organizing citizen science workshops where older people are receiving training in nature, technology, and wellbeing to support education in STEM, as well as generate grassroot networks of individuals that will support the monitoring and maintenance of these ecosystems.



*"Urban areas are ranked as one of the primary causes of biodiversity loss, meaning research is needed to reverse this trend. When the importance of green and blue spaces to wellbeing are considered, the opportunity to marry research into SDG15 (life above land) and SDG11 (sustainable cities) will not only benefit nature and wellbeing on an individual level, their combined effect will generate a truly sustainable network of local communities that recognise the importance of urban green and blue spaces to a multitude of factors."*

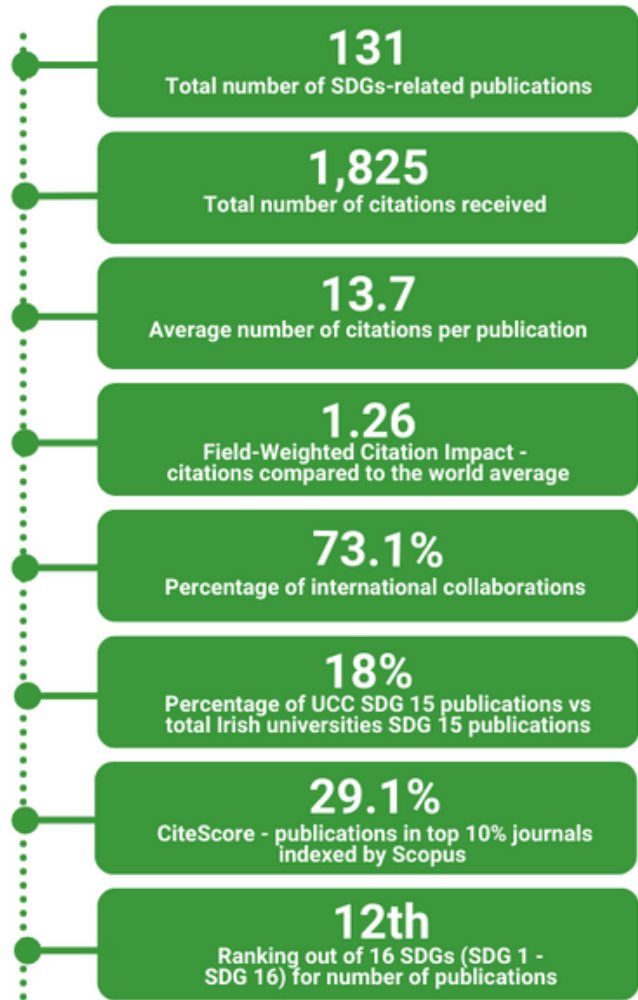


Figure 15: UCC SDG 15 publications 2017 -2021

Peatland rehabilitation, Climate Action and Sustainable Heritage  
**Dr. Benjamin Gearey, Department of Archaeology, School of the Human Environment**

**Impact: International**

This research consists of several strands which integrate in the context of international moves and policies for peatland rehabilitation for ecosystem service provision: especially in the context of climate change mitigation and carbon sequestration. A particular strand concerns peatland heritage (the archaeological record and related areas) - the role this can play in terms of promoting sustainable practices and also the importance of peatland rehabilitation for sustainability of tangible and intangible aspects of these landscapes as heritage. The research aims to contribute directly to SDGs via the interface with the United Nation Global Peatland Initiative and the forthcoming Global Peatland Assessment (as a contributing author), which will be launched at COP28.



This assessment looks to set international agendas for sustainable use of peatlands and to guide and influence policy agendas on this front. A submission arising from the European 'WetFutures' Project (JPIC funded/UCC strand) to the United Nations was referenced in the Commission on Human Rights Special Rapporteur in the Field of Cultural Rights 'Report on Climate Change, Culture and Cultural Rights (August 2020). An event was co-organised in 2021 called 'Peatlands, climate change and cultural heritage: global perspectives, problems and solutions' COP26, held in Glasgow.

Contributing to Target 15.1

Contributing to Target 15.9

Contributing to Target 12.2

Contributing to Target 12.7

Contributing to Target 13.3

**Talking to elephants about quantitative risk**  
*Professor Don Ross, School of Society, Politics, and Ethics*

**Impact: International**

This research aims to measure the structural risk preferences of African elephants through choice experiments with elephant subjects. In the course of this they learn a "little language" of acoustic signals that allows us to share information about risky reward prospects with them. This will allow elephant migrations to be influenced by communication of positive incentives, which will in turn allow management of elephant / farmer conflict without scaring or shooting elephants.

The team is working with a consortium of wildlife conservation interests in South Africa to design and implement a system of incentive-driven migration management. This will reduce elephant / farmer conflict, save elephant and human lives, and allow fences between reserves to be taken down so that elephants can range naturally and relieve disastrous pressure



Talking to elephants about quantiative risk

on biodiversity that results from overly dense concentrations of elephants. No one has ever previously estimated the quantitative structure of risk preferences in non-humans. This work thus opens a new door in comparative psychology. By comparing risky choices of individual elephants and herds, this research will also shed new light on elephant social dynamics. This work also pioneers inter-species communication about quantitative risk.

***"Elephants are highly intelligent, emotionally complex victims of the anthropocene. By communicating with them about quantitative risk, we are providing them with one of the tools that allows humans to adapt to consequences of our recurrent gambles with the environment."***

Contributing to SDG 15

**Otter Monitoring in rural and urban areas**  
*School of Biological, Earth and Environmental Sciences*

**Impact: Local**

Otters inhabit a variety of aquatic environments in Ireland, including coastal areas and freshwater rivers. The purpose of this research is to monitor the number of wild otters in Cork City and county, along with their microbiome. Research is communicated and published to increase awareness of our otter populations. This research will also progress otter monitoring techniques.

Contributing to SDG 15

Contributing to SDG 11



# Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable and inclusive institutions at all levels

16

PEACE, JUSTICE AND STRONG INSTITUTIONS

**Delivering Access to Justice in Environmental Matters**  
*Professor Áine Ryall, School of Law & Centre for Law and the Environment, Environmental Research Institute*

**Impact: Local, National, International**

Effective law enforcement is essential to support delivery of the right to a clean, healthy and sustainable environment. It is vital that concerned individuals and non-governmental organisations (NGOs) have access to courts and other appropriate redress mechanisms to ensure that environmental law is applied and enforced and that public authorities are held to account. ‘The Aarhus Convention’ is an international treaty that guarantees the right to information, participation in decision-making and access to justice in environmental matters (‘the Aarhus rights’). This research explains the significance of the rights guaranteed under that international agreement that links the environment and human rights. The Aarhus rights are examined critically – on an ongoing basis – particularly the right of access to justice in environmental matters and how the rights are applied in practice at the local, national and international level and to explore how implementation can be improved.

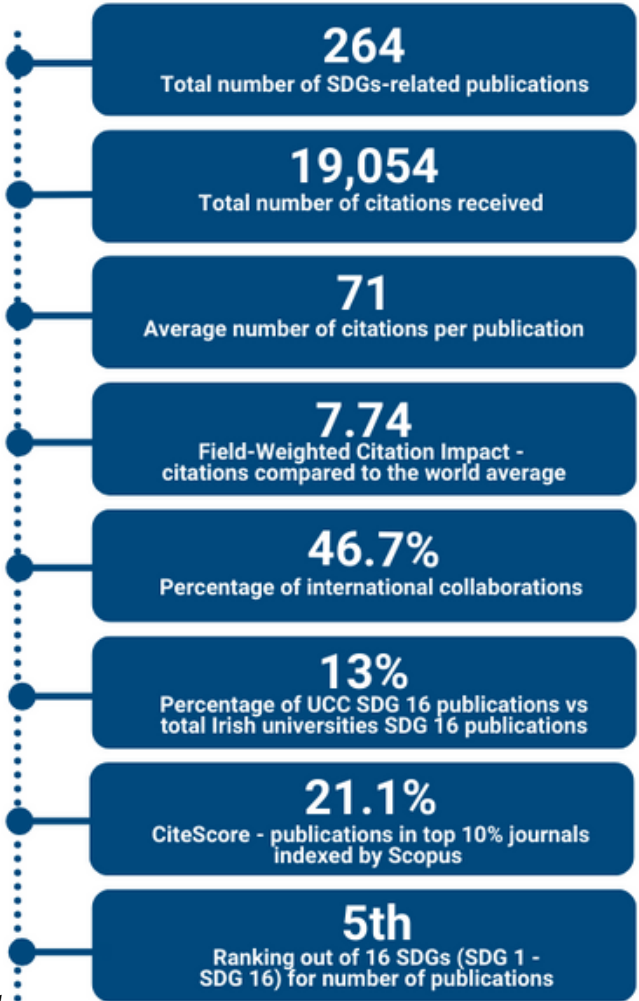
The research outputs provide authoritative, objective, critical analysis of the Aarhus rights in practice and demonstrate how their implementation can be improved. By way of example: in February 2022 an invited submission to the Joint Oireachtas Committee on Housing, Local Government and Heritage on the General Scheme of the Housing and Planning and Development Bill set out and explained how obligations on the State under international and EU law limit how far the Government can go in restricting the right to judicial review of planning and environmental decisions. Drawing on experience as a member (since 2015), and now Chair, of the Aarhus Convention Compliance Committee (the quasi-judicial body tasked with



Delivering Access to Justice in Environmental Matters



Figure 16: UCC SDG 16 publications 2017 -2021



overseeing the implementation of the Aarhus Convention across 46 States), this research offers unique, authoritative insights and analysis on how implementation of the Convention can be improved in practice.



**We, The Internet: Engaging citizens in policymaking**  
*Dr. Carolanne Mahony, Dr. Stephen McCarthy, Dr. Wendy Rowan, Zainab Hussain N Al Shabeeb, Dr. Patrick O’Sullivan, Department of Business Information Systems, Cork University Business School*

**Impact: National, International**

‘We, The Internet’ aims to influence policy on the future of the internet and reduce public scepticism in policymaking. Recommendations are produced based on engagement with citizens and experts in over 80 countries. The project includes global and national partners such as the UN and the Eitic research cluster in UCC. We, The Internet, aims to change the way digital policy is made through open, inclusive and global participative processes. It includes national partners, citizens and stakeholders from over 80 countries, with support from global partners such as the World Economic Forum, UN, Internet Society and Google. This ensures input and collaboration across the Global North and South.

Results have been included in the creation of the Roadmap on Digital Cooperation issued by the UN and have been presented to the Internet Governance Forum, German Government and European Commission. Thus, enabling global citizens to



impact policy at a global level. Our research investigates how open science practices influence sustainable and ethical technology policy and use. The project's insights have been published in local and international conferences, with further publications planned. Additionally, the project aims to conduct further citizen dialogues and to co-produce a citizens' roadmap for a better digital future.

**"Citizens are not only consumers and recipients of technology but also actors and political participants."**

- Michael Roth, German Minister of State for Europe at the German Federal Foreign Office



**Centre for Law and the Environment**  
**Professor Owen McIntyre; Professor Aine Ryall, Centre for Law and the Environment, Environmental Research Institute**

**Impact: Local, National, International**

Centre research explores how the law can be applied – and improved – to address societal challenges associated with environmental degradation, including the climate and biodiversity crisis. Drawing on our expertise and experience, the Centre provides an authoritative, objective voice in this complex and often controversial field of law and policy.

The diverse range of research pursued at the Centre contributes to the development of effective legal responses to contemporary environmental problems including promoting the right to a clean, healthy and sustainable environment. The

Centre's engagement at the international, transnational, regional national and local levels aims to support the transformational change required to deliver a sustainable future. Through our annual Law & the Environment conference, and other events, the Centre showcases and communicates frontier research in an accessible format, provides a forum to strengthen networks and engages in significant outreach and capacity building. Research-informed teaching, at undergraduate, postgraduate and professional development levels, is a fundamental element the Centre's activity. Through our research and teaching we aim to equip the next generation of lawyers, environmental professionals, and researchers to respond effectively to new and emerging challenges.

**"The Centre for Law and the Environment at UCC is a recognised international centre of excellence in research, teaching and policy work relating to environmental law, policy, regulation and governance."**



**Poetry, Politics and the Law in Modern Ireland**  
**Dr. Adam Hanna, Department of English, School of English and Digital Humanities**

**Impact: National**

Poetry, Politics and the Law in Modern Ireland is a recently completed monograph about how poets have spoken of laws and have made their effects knowable and memorable. It is also about the role literature can play in rendering laws questionable, challengeable, and changeable. This research has changed the research landscape by focusing on poets'

responses in their writing to such contentious legal issues as partition, censorship, paramilitarism, and the curtailment of women's reproductive and other rights. This is the first monograph in the growing field of law and literature to focus exclusively on modern Ireland.



**Children of Exile: Human Rights, Memory and Communities of Activists**  
**Dr. Cara Levey, Department of Spanish, Portuguese and Latin American Studies, School of Languages, Literatures and Cultures**

**Impact: International**

This research explores diasporic second-generation memory in Europe. Entitled "Children of Exile", the project builds on research to date on human rights organisations in Argentina and interrogates contemporary memory activism from a transnational perspective, comparing the memory work of 'next' generation activists in Argentine, Chilean and Uruguayan diasporas across Europe - in France, Spain, the Netherlands and Sweden - established during the wave of Southern Cone dictatorships in the 1970s. The project aims to promote inclusivity through revisiting the child-exile experience and its impact on the present, asking what we might learn from past immigration and refuge at the current time.

As well as dissemination through several articles and book chapters, and conference papers at national and international conferences, it is anticipated that interviews with second-generation exiles will be hosted in an online database that



may serve as a teaching and educational tool for learning about the experience of migration on children and promoted inclusivity and social justice (SDG 16) reflecting on the legacy of violence in the present. This also allows for reflection on how we might make migratory processes and host spaces safer and more welcoming for children and young people (SDG 11). Finally, a number of the outputs (a forthcoming book chapter and book project) consider the experience of migration on girls and thus engage with exile as a gendered experience (SDG 5).

In a pioneering approach which maps the shifting iterations of memory activism in both generational and technological terms, Children of Exile brings previously neglected diasporic voices in from the periphery, forty years after the first Southern Cone exiles arrived in Europe, to consider their multiple and overlapping identity and community formation, paying attention to the voices of women and girls in particular. In its approach, the project deepens understanding of memory activism as a multidirectional process that works towards a better future, whilst the focus on previously neglected exile voices possesses potential for increased social and cultural understanding during what are proving to be uncertain times in Europe. The research is changing the landscape by bringing in a neglected group (the children of exile) who have historically been overlooked from scholarly and media work on this period of history.



CHASM: Consenting Health Related Data through Social Media

### CHASM: Consenting Health Related Data through Social Media

*Dr. Yvonne O'Connor, Dr. Wendy Rowan, Laura Lynch, Professor Ciara Heavin, Department of Business Information Systems, Cork University Business School & Health Information Systems Research Centre (HISRC) – Research Cluster*

#### Impact: Local, National

This research investigates people's decision-making process with the electronic Consent (eConsent) process of Health Social Networks (HSN) through a User eXperience (UX) perspective. This involved identifying barriers to and facilitators of eConsent and designing an educational tool to better inform citizens who may not fully understand how/why their data will be utilised. This research highlights the rights of citizens when using online services by illustrating and educating on the mplications of text heavy presentations of Privacy Policy and Terms and Conditions statements.

In creating a user-friendly animation, our work ensured that the eConsent process was transparent to the user, while improving the efficiency and effectiveness of eConsent giving. This aligns with SDG 16, illustrating the values of justice for all, and building effective, accountable, and inclusive institutions. Through presentations and peer-reviewed publications we raised awareness of the principle of user rights in terms of choice at time of the eConsent process. A dedicated conference session (Crossing the CHASM to Digital Health, Cork 2017) attracted international scientists and the wider community which was a powerful activity towards shaping the future development of scientific explorations and raising public awareness. CHASM provided insights and an alternative option for education on eConsent thus, inspiring action. Wellcome Trust Grant funded CHASM Project Seed Award 201607/Z/16/Z.



***"A dedicated conference session (Crossing the CHASM to Digital Health, Cork 2017) attracted international scientists and the wider community which was a powerful activity towards shaping the future development of scientific explorations and raising public awareness. CHASM provided insights and an alternative option for education on eConsent thus, inspiring action."***



**Children and environmental justice**  
***Dr. Aoife Daly, School of Law***

**Impact: International**

This research aims to theorise and analyse youth climate activism, and environmental activism more broadly, both inside and outside legal contexts. Attention is drawn to the position of children’s rights in relation to environmental justice, and particularly how they can be powerful advocates for change.

Research outputs have been delivered for reading in academia, by lawyers, and by the general public. Since 2020, several high-quality journal articles on the topic of children’s rights and environmental justice and five blog posts have been written. There is also engagement in significant impact work, including drafting by the Committee on the Rights of the Child of a general comment on children and the right to a healthy environment, a youth biodiversity assembly in Ireland, and a report for the European Network of Ombudspersons for Children. The body of research produced will impact the

research world and the world more broadly by writing important analysis of where the rights of children sit in environmental justice, and drawing attention to the importance of their position in this space.

***“The right to a healthy environment is crucial for achieving children’s rights. Children are powerful actors for environmental and climate justice, and it is an honour for me to provide analysis of their rights, climate cases and other activities from a children’s rights perspective.”***







# Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development

## Enabling interdisciplinary structures to address complex sustainability challenges within our universities

**Dr. Paul Bolger, Environmental Research Institute**

**Impact: International**

Global responses to sustainability challenges over the last few decades have been too slow; more responsive modes of knowledge production to produce actionable and usable information are needed. This research explores how we can put in place more effective institutional structures within universities to enable interdisciplinary research collaboration along with the co-production of new knowledge with external stakeholders to address pressing environmental challenges. It has long been argued that solutions to inform better decisions on environmental challenges require research at the boundaries of scientific disciplines. Research institutes and centres at universities can be key vehicles for the convergence of scientists from multiple disciplines and the development of integrated, interdisciplinary knowledge.

This research provides a deeper understanding on how sustainability research institutes are enabling interdisciplinary research within their organisations. Some of the ways which research institutes are doing this include: (i) providing a large and valued network of faculty interested in a particular research issue (ii) trusted convenors and honest brokers (iii) a supportive community of scholars for interdisciplinary research (iv) a locus for big interdisciplinary ideas and questions and (v) acting as a voice and advocate for interdisciplinary scholarship within the university. This research provides robust evidence for the powerfully beneficial role that research institutes can play as enablers of interdisciplinary research, and will be of particular interest to university leadership who wish to cultivate a deeper culture of interdisciplinary research within their organisations and more widely.



*"SDG targets 17.16 and 17.17 call for new multi-stakeholder partnerships that mobilise knowledge and encourage and promote effective partnerships for addressing all SDGs. This includes partnerships within universities as well as outside. One quote from a participant in this study about her research institute was 'We are an academic Switzerland; a place where the disciplines and faculties can work together in a neutral non-threatening environment. Having this rich intellectual tapestry from which I could draw collaborators for proposals was just phenomenal.'"*

Contributing to  
Target 17.16

Contributing to  
Target 17.17

## Transitioning to sustainability and regeneration: the role of credit unions

**Dr. Olive McCarthy & Dr. Noreen Byrne, Centre for Co-operative Studies and Department of Food Business and Development, Cork University Business School**

**Impact: Local, National**

Credit unions, as deeply embedded local entities, are well placed to become regenerative organisations in communities and, in turn, wider society. In fact, 'climate leadership' is seen as an important role and opportunity for credit unions in the US (Hofheimer et al., 2022). This research profiles the role of credit unions in leading and supporting communities in transitioning to sustainability, restoration and regeneration. In doing so, it also explores opportunities for broader partnership by credit unions within and across communities and with wider stakeholder groups, including local, regional, and national agents, to drive climate leadership. This research will showcase the many activities credit unions undertake to support sustainability in their communities, including those



credit unions which engage in embedded practices in the community, partnering with others to engage in larger scale sustainability initiatives. It will demonstrate the ability of local actors to drive the sustainability agenda while highlighting the importance of widescale partnership within and across communities to move towards regeneration and restoration.

This is the first study of how credit unions are leading and supporting communities in the transition to sustainability, restoration and regeneration. It will help to inform wider policy on how civil society organisations, as important local community actors, and in wider partnerships, can both drive and support the implementation of the SDGs while broadening the impact to a deeper level of regeneration and restoration.



**The Sudabiome - venturing onto new land using microbiome science**  
*Amel Sami, PhD student, School of Microbiology & APC Microbiome Ireland*

**Impact: International**

This research aims for the first time to introduce and learn about the microbiome in the Sudanese population and their environment that includes culture and food. It aims to address historic traditions with new science and to understand existing disease susceptibilities with new entry points and partnerships. This research predominantly contributes to SDG 3 (good health and wellbeing), SDG 11 (sustainable cities and communities) and SDG 17 (partnerships for the goals), integrating microbiome science in the investment of optimised

Sudanese oral and gut health understanding. The research also includes learning about how traditional fermented foods enrich communities, as well as opening up new chances for partnership gains. These outcomes will help Sudan, a currently developing country, by utilising next generation sequencing techniques or new innovations to better the future for its people, food and landscape of scientific knowledge.

Ireland is a leading country in microbiome science and its aiding and partnering with a country such as Sudan, deepens profoundly the impact its researchers can bring at national scale. It is imperative that Ireland becomes a keystone in international science.

***“Integrating tradition and science - a key turning point in understanding life.”***



# **SECTION 6: RECOMMENDATIONS**



# Recommendations

Throughout the project, recommendations as to how to build on the SDGs mapping to further integrate the SDGs into research were made by the Research Support Officer, Action Group and the research community:

- A one-size fits all approach cannot be applied to map the SDGs in research. Some research areas find it more difficult to map to the SDGs than others e.g. the disciplines of arts, humanities, social sciences, and law. No research area should feel undervalued due to lack of connection to the SDGs.
- Build on this project to undertake a mapping of UCC patents/other commercialisation activity to the SDGs, expanding investigations to determine and demonstrate how UCC research and innovation maps to the SDGs.
- Include an SDGs section in the grant management administrative process to allow Principal Investigators to easily record how proposed research projects map to the SDGs.
- Leverage the SDGs Champions Network to progress interdisciplinary and transdisciplinary research partnerships with a focus on the SDGs.
- Replace or upgrade the current institutional research information system to one that places more emphasis on the SDGs and provides the ability to easily profile the achievements of researchers. This will provide researchers with the opportunity to maintain their own profiles and showcase their contribution to the SDGs.
- Initiate an annual *SDGs in Research Day* to maintain focus on the contributions of our research to the SDGs, including an annual callout for new case studies.
- Update SDGs mapping results annually, including SciVal publications analysis and new case studies to develop a short report, published and widely circulated.
- Maintain the *President's Award for Research Impacting the Sustainable Development Goals* at the UCC Research Awards on an annual basis.
- Regularly update *Resources for Researchers* area of the website to provide researchers with the necessary SDGs tools, including newly published country evaluation reports, UN updates, communications tools.
- Further highlight the SDGs as a common language to demonstrate research impact – researcher testimonials; monthly SDGs-themed update (email and website); quarterly SDGs awareness workshops.
- Evaluate the potential to provide internal research funding opportunities that specifically target research aligned with the SDGs, including PhD opportunities and with a focus on interdisciplinarity.
- Encourage School-level clusters to engage in research explicitly connected to SDGs.

- Encourage more staff to undertake SciVal training to access the function to map their own publications to the SDGs.
- Organise a seminar series focusing on each SDG and underpinned by case studies in that area.
- Offer one to one SDGs clinics for researchers to speak about their research and obtain advice as to the SDGs that their research contributes to.
- Encourage and provide the tools for postgraduate students to identify which SDGs they align to, ensuring integration of an SDG focus by early-stage researchers as they begin their careers.
- Encourage funders such as the IRC and SFI to further emphasise connections to the SDGs in their funding streams.
- Increase awareness of SDGs through communications materials.
- Encourage researchers when organising research symposia and conferences at UCC to link them explicitly to one or more of the SDGs.
- Include SDG logos in outgoing communications from the Office of the Vice President for Research and Innovation.
- Host workshops/awareness sessions on impact and the SDGs, to enhance inclusion of the impact of the SDGs in funding applications, communications, publications, etc.





# APPENDIX

# SDGs key



**1.1** Eradicate extreme poverty

**1.2** Reduce poverty by at least 50%

**1.3** Implement social protection systems

**1.4** Equal rights to ownership, basic services, technology and economic resources

**1.5** Build resilience to environmental, economic and social disasters

**1.a** Mobilise resources to implement policies to end poverty

**1.b** Create pro-poor and gender-sensitive policy frameworks



**2.1** Universal access to safe and nutritious food

**2.2** End all forms of malnutrition

**2.3** Double the productivity and incomes of small-scale food producers

**2.4** Sustainable food production and resilient agricultural practices

**2.5** Maintain the genetic diversity in food production

**2.a** Invest in rural infrastructure, agricultural research, technology and gene banks

**2.b** Prevent agricultural trade restrictions, market distortions and export subsidies

**2.c** Ensure stable food commodity markets and timely access to information



**3.1** Reduce maternal mortality

**3.2** End all preventable deaths under five years of age

**3.3** Fight communicable diseases

**3.4** Reduce mortality from non-communicable diseases and promote mental health

**3.5** Prevent and treat substance abuse

**3.6** Reduce road injuries and deaths

**3.7** Universal access to sexual and reproductive care, family planning and education

**3.8** Achieve universal health coverage

**3.9** Reduce illnesses and death from hazardous chemicals and pollution

**3.a** Implement the WHO Framework Convention on Tobacco Control

**3.b** Support research, development and universal access to affordable vaccines and medicine

**3.c** Increase health financing and support health workforce in developing countries



**3.d** Improve early warning systems for global health risks



**4.1** Free primary and secondary education

**4.2** Equal access to quality pre-primary education

**4.3** Equal access to affordable technical, vocational and higher education

**4.4** Increase the number of people with relevant skills for financial success

**4.5** Eliminate all discrimination in education

**4.6** Universal literacy and numeracy

**4.7** Education for sustainable development and global citizenship

**4.a** Build and upgrade inclusive and safe schools

**4.b** Expand higher education scholarships

**4.c** Increase the supply of qualified teachers in developing countries



**5.1** End discrimination against women and girls

**5.2** End all violence against and exploitation of women and girls

**5.3** Eliminate forced marriages and genital mutilation

**5.4** Value unpaid care and promote shared domestic responsibilities

**5.5** Ensure full participation in leadership and decision-making

**5.6** Universal access to reproductive health and rights

**5.a** Equal rights to economic resources, property ownership and financial services

**5.b** Promote empowerment of women through technology

**5.c** Adopt and strengthen policies and enforceable legislation for gender equality



**6.1** Safe and affordable drinking water

**6.2** End open defecation and provide access to sanitation and hygiene

**6.3** Improve water quality, wastewater treatment and safe reuse

**6.4** Increase water-use efficiency and ensure freshwater supplies

**6.5** Implement integrated water resources management


**6.6** Protect and restore water-related ecosystems

**6.a** Expand water and sanitation support to developing countries

6.b

Support local engagement in water and sanitation management

7 AFFORDABLE AND CLEAN ENERGY



7.1

Universal access to modern energy

7.2

Increase global percentage of renewable energy

7.3

Double the improvement in energy efficiency

7.a

Promote access to research, technology and investments in clean energy

7.b

Expand and upgrade energy services for developing countries

8 DECENT WORK AND ECONOMIC GROWTH



8.1

Sustainable economic growth

8.2

Diversify, innovate and upgrade for economic productivity

8.3

Promote policies to support job creation and growing enterprises

8.4

Improve resource efficiency in consumption and production

8.5

Full employment and decent work with equal pay

8.6

Promote youth employment, education and training

8.7

End modern slavery, trafficking and child labour

8.8

Protect labour rights and promote safe working environment

8.9

Promote beneficial and sustainable tourism

8.10

Universal access to banking, insurance and financial services

8.a

Increase aid for trade support

8.b

Develop a global youth employment strategy

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



9.1

Develop sustainable, resilient and inclusive infrastructures

9.2

Promote inclusive and sustainable industrialisation

9.3

Increase access to financial services and markets

9.4

Upgrade all industries and infrastructures for sustainability

9.5

Enhance research and upgrade industrial technologies

9.a

Facilitate sustainable infrastructure development for developing countries

9.b

Support domestic technology development and industrial diversification

9.c

Universal access to information and communications technology





- 10.1** Reduce income inequalities
- 10.2** Promote universal social, economic and political inclusion
- 10.3** Ensure equal opportunities and end discrimination
- 10.4** Adopt fiscal and social policies that promote equality
- 10.5** Improved regulation of global financial markets and institutions
- 10.6** Enhanced representation for developing countries in financial institutions
- 10.7** Responsible and well-managed migration policies
- 10.a** Special and differential treatment for developing countries
- 10.b** Encourage development assistance and investment in least developed countries



- 10.c** Reduce transaction costs for migrant remittances
- 11.1** Safe and affordable housing
- 11.2** Affordable and sustainable transport systems
- 11.3** Inclusive and sustainable urbanisation
- 11.4** Protect the world's cultural and natural heritage
- 11.5** Reduce the adverse effects of natural disasters
- 11.6** Reduce the environmental impact of cities
- 11.7** Provide access to safe and inclusive green and public spaces
- 11.a** Strong national and regional development planning



- 11.b** Implement policies for inclusion, resource efficiency and disaster risk reduction
- 11.c** Support least developed countries in sustainable and resilient building
- 12.1** Implement the 10-year sustainable consumption and production framework
- 12.2** Sustainable management and use of natural resources
- 12.3** Halve global per capita food waste
- 12.4** Responsible management of chemicals and waste
- 12.5** Substantially reduce waste generation
- 12.6** Encourage companies to adopt sustainable practices and sustainability reporting
- 12.7** Promote sustainable public procurement practices

- 12.8 Promote universal understanding of sustainable lifestyles
- 12.a Support developing countries' scientific and technological capacity for sustainable consumption and production
- 12.b Develop and implement tools to monitor sustainable tourism
- 12.c Remove market distortions that encourage wasteful consumption



- 13.1 Strengthen resilience and adaptive capacity to climate-related disasters
- 13.2 Integrate climate change measures into policies and planning
- 13.3 Build knowledge and capacity to meet climate change
- 13.a Implement the UN Framework on Climate Change
- 13.b Promote mechanisms to raise capacity for climate planning and management



- 14.1 Reduce marine pollution
- 14.2 Protect and restore ecosystems
- 14.3 Reduce ocean acidification
- 14.4 Sustainable fishing
- 14.5 Conserve coastal and marine areas
- 14.6 End subsidies contributing to overfishing
- 14.7 Increase the economic benefits from sustainable use of marine resources
- 14.a Increase scientific knowledge, research and technology for ocean health
- 14.b Support small scale fishers



- 14.c Implement and enforce international sea law
- 15.1 Conserve and restore terrestrial and freshwater ecosystems
- 15.2 End deforestation and restore degraded forests
- 15.3 End desertification and restore degraded land
- 15.4 Ensure conservation of mountain ecosystems
- 15.5 Protect biodiversity and natural habitats
- 15.6 Promote access to genetic resources and fair sharing of the benefits
- 15.7 Eliminate poaching and trafficking of protected species
- 15.8 Prevent invasive alien species on land and in water ecosystems



- 15.9 Integrate ecosystem and biodiversity in governmental planning
- 15.a Increase financial resources to conserve and sustainably use ecosystems and biodiversity
- 15.b Finance and incentivise sustainable forest management
- 15.c Combat global poaching and trafficking



- 16.1 Reduce violence everywhere
- 16.2 Protect children from abuse, exploitation, trafficking and violence
- 16.3 Promote the rule of law and ensure equal access to justice
- 16.4 Combat organised crime and illicit financial and arms flows
- 16.5 Substantially reduce corruption and bribery

- 16.6 Develop effective, accountable and transparent institutions
- 16.7 Ensure responsive, inclusive and representative decision-making
- 16.8 Strengthen the participation in global governance
- 16.9 Provide universal legal identity
- 16.10 Ensure public access to information and protect fundamental freedoms
- 16.a Strengthen national institutions to prevent violence and combat terrorism and crime
- 16.b Promote and enforce non-discriminatory laws and policies



- 17.1 Mobilise resources to improve domestic revenue collection
- 17.2 Implement all development assistance commitments

- 17.3 Mobilise financial resources for developing countries
- 17.4 Assist developing countries in attaining debt sustainability
- 17.5 Invest in least developed countries
- 17.6 Knowledge sharing and cooperation for access to science, technology and innovation
- 17.7 Promote sustainable technologies to developing countries
- 17.8 Strengthen the science, technology and innovation capacity for least developed countries
- 17.9 Enhance SDG capacity in developing countries
- 17.10 Promote a universal trading system under the WTO
- 17.11 Increase the exports of developing countries
- 17.12 Remove trade barriers for least developed countries

17.13

Enhance global macroeconomic stability

17.14

Enhance policy coherence for sustainable development

17.15

Respect national leadership to implement policies for the SDGs

17.16

Enhance the global partnership for sustainable development

17.17

Encourage effective partnerships

17.18

Enhance availability of reliable data

17.19

Implement the UN Framework on Climate Change