

# THE WELSH DOUGHNUT

## A framework for environmental sustainability and social justice

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**The world faces twin challenges: delivering a decent standard of living for everyone, while living within our environmental limits. These two interwoven concerns are captured in Oxfam's Doughnut model that offers a framework to create a safe and just space for humanity to exist.**

**At the national level, the Welsh Doughnut model suggests areas of life that might constitute a social floor below which no one in Wales should fall, and begins the process of identifying which environmental boundaries might be useful for incorporation into a Welsh national analysis. The report provides a snapshot of Wales' status by assessing its current position against this suggested set of domains and indicators.**

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# LIST OF ABBREVIATIONS

<b>AURN</b>	Automatic Urban and Rural Network (UK)
<b>BCS</b>	British Crime Survey
<b>BME</b>	Black and minority ethnic
<b>BOD</b>	Biochemical oxygen demand
<b>BSAS</b>	British Social Attitudes Survey
<b>CFC</b>	Chlorofluorocarbon
<b>CSE</b>	Centre for Sustainable Energy
<b>CSEW</b>	Crime Survey for England and Wales
<b>DEFRA</b>	Department for Environment, Food and Rural Affairs
<b>EHRC</b>	Equality and Human Rights Commission
<b>GDP</b>	Gross domestic product
<b>GHG</b>	Greenhouse gas
<b>GQA</b>	General Quality Assessment
<b>HBAI (AHC)</b>	Households below average income (after housing costs)
<b>HKI</b>	Humankind Index for Scotland, Oxfam
<b>HLE</b>	Healthy life expectancy
<b>ILO</b>	International Labour Organization
<b>JRF</b>	Joseph Rowntree Foundation
<b>MDGs</b>	Millennium Development Goals
<b>MIS</b>	Minimum income standard
<b>NGO</b>	Non governmental organisation
<b>NPI</b>	New Policy Institute
<b>OCPS</b>	Organochlorine pesticides
<b>ODS</b>	Ozone-depleting substances
<b>ONS</b>	Office for National Statistics
<b>PBDE</b>	Polybrominated diphenyl ethers
<b>PCB</b>	Polychlorinated biphenyls
<b>PHW</b>	Public Health Wales

<b>POP</b>	Persistent organic pollutants
<b>PSE:UK</b>	Poverty and Social Exclusion:UK
<b>SDGs</b>	Sustainable Development Goals
<b>SEI</b>	Stockholm Environmental Institute
<b>SRC</b>	Stockholm Resilience Centre
<b>TUC</b>	Trades Union Congress
<b>UKLHS</b>	UK Longitudinal Household Survey
<b>UKTAG</b>	UK Technical Advisory Group
<b>UNEP</b>	United Nations Environment Programme
<b>WEMWBS</b>	Warwick Edinburgh Mental Wellbeing Scale
<b>WERS</b>	Workplace Employment Relations Study
<b>WFD</b>	Water Framework Directive
<b>WHO</b>	World Health Organization
<b>WIMD</b>	Welsh Index of Multiple Deprivation
<b>WORS</b>	Welsh Outdoors Recreation Survey

# EXECUTIVE SUMMARY

Our planet is shared by over seven billion people. While a small number of people use the majority of resources and enjoy unfettered access to public services, too many face extraordinary challenges in building dignified lives, free of poverty, powerlessness and fear, where they have access to essential services including education, healthcare and clean water. Our fragile planet is also under increasing stress to the extent that we are transgressing a number of planetary boundaries.<sup>1</sup>

The world faces twin challenges: delivering a decent standard of living for everyone, while living within our environmental limits. The Oxfam Doughnut model brings these dynamics together visually to demonstrate that, just as beyond the environmental ceiling lies unacceptable environmental stress, beneath the social floor lies unacceptable human deprivation.

This research report outlines the concept of the Doughnut model and presents the results produced when applying the concept to Wales. The model visualizes a space between planetary boundaries and a social floor where it is environmentally safe and socially just for humanity to exist; it highlights the main social and environmental issues that we face today, and where possible shows how Wales performs in relation to these.<sup>2</sup>

It is hoped that this report can feed into ongoing policy debates and help spark new ones. The wealthy nations of the world are the winners in our current socio-economic model; while the poorest people, both globally and within wealthy nations, pay the price. By bringing social and environmental considerations together, a broader dialogue can be initiated between those working for social justice and those working for environmental justice – two inter-linked areas of policy and practice.

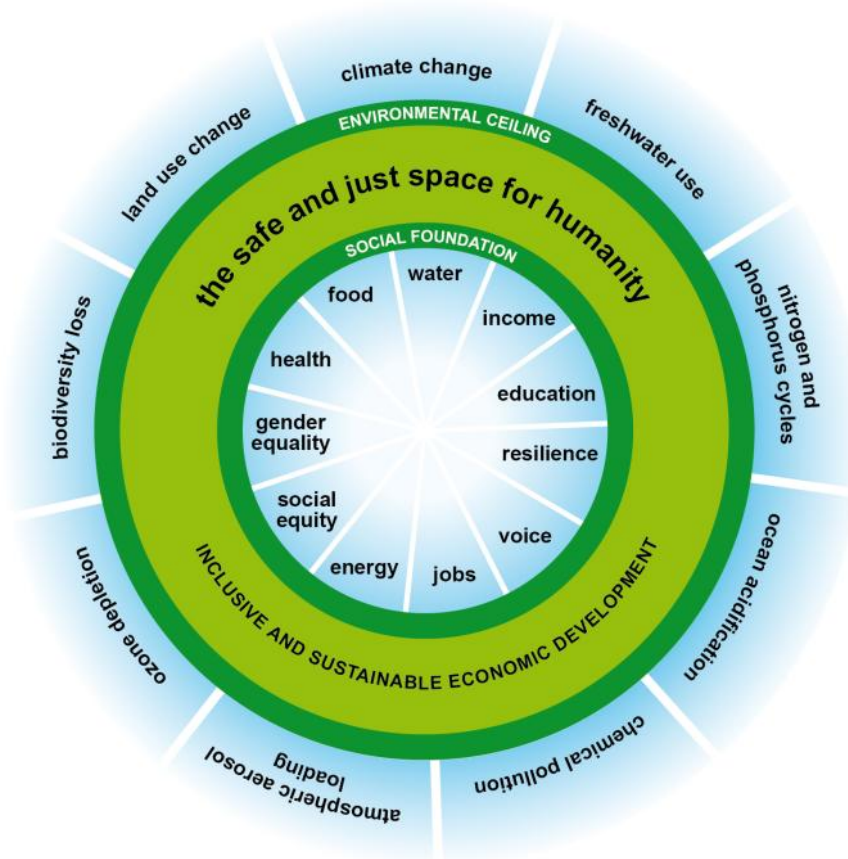
The environmental elements of the Doughnut flow largely from the work of a team of leading Earth system scientists, including Johan Rockström, Will Steffen, the Stockholm Resilience Centre (SRC), and the Stockholm Environmental Institute (SEI).

In 2009, Rockström and others published a paper entitled *Planetary Boundaries: Exploring the Safe Operating Space for Humanity*, which highlighted the risk of crossing critical thresholds in the Earth's biophysical processes.<sup>3</sup> They sought to identify planetary boundaries - environmental tipping points - within these processes, beyond which vital Earth systems would become unpredictable and/or unsafe. Though not without its critics, the planetary boundary approach has been used by the United Nations and European Commission, and many civil society organisations. In 2013, the SRC and SEI sought to develop a methodology to apply this approach at a national level, using Sweden as an example.<sup>4</sup> 2015 saw the Planetary Boundaries updated by Will Steffen *et al.*<sup>5</sup>

Changes within these processes, driven by human activity, are already causing severe adverse impacts on weather systems as well as our ability to produce food and the availability of fresh water. Planetary biodiversity loss and the nitrogen cycle boundaries have already been breached, while the climate change boundary is dangerously close to being breached. The updated report from Steffen *et al* shows that the safe limit has also now been breached in regards to the phosphorus cycle.<sup>6</sup>

In 2012 Oxfam published a discussion paper, which sought to combine this environmental ceiling beyond which Earth systems may become irreversibly unstable, based on the planetary boundary approach, with a social foundation below which it is unjust for people to fall.<sup>7</sup> The social foundation (which we call a 'social floor' in this report) includes domains relating to access to food, income, energy and security. This combination of environmental ceiling (outer ring) and social floor (inner ring) is presented in what has become known as the Oxfam Doughnut model (see Figure A). The area between the outer and inner rings therefore represents a safe and just space within which to exist. Sections 1 and 2 of this report provide further details of this concept and approach.

Figure A: The Oxfam Doughnut Model



Source: K. Raworth (2012)

The Doughnut model demonstrates performance against a wide range of social and environmental indicators. This allows for a more comprehensive understanding of the impacts of our approaches to socio-economic development and highlights the areas in which we are failing both current and future generations.

The concept has gained traction internationally as a growing number of academics, governments and NGOs develop their own national analyses, while the UN has shown an interest in using the framework to feed into the Sustainable Development Goals. Oxfam is conducting similar studies in South Africa and Brazil, and has completed separate ones for Scotland and the UK.<sup>8</sup>

## THE WELSH DOUGHNUT REPORT

The Welsh Doughnut provides a snapshot of the current situation by assessing performance across a wide range of indicators. While the original Doughnut model, developed by economist Kate Raworth while she was a researcher with Oxfam, suggested possible social floor domains and indicators, it was recognized that these would need to be adapted for different national contexts. We have therefore selected domains that fit the Welsh context; however, these selections remain open to debate and revision. In sections 3 – 5 of this report, the rationale behind the choice of social domains, indicators and thresholds is given, along with the results. The selection processes for domains and results regarding the environmental ceiling<sup>9</sup> are detailed in sections 6 - 8. These follow, where possible, the work of SRC and SEI, but take a different approach when necessary. Section 9 summarizes findings and highlights some conclusions.

It should be noted that the results provide a description of where Wales is now and do not capture either historical developments or the direction of travel within each domain.

The picture painted by the Welsh Doughnut is stark (see Figure B). Wales significantly outstrips proposed boundaries in nearly all of the environmental domains identified:

- By 55 percent in terms of biodiversity loss (measured via decline in farmland birds);
- By 64 percent in terms of ocean health (measured via the percentage of UK fish harvested sustainably);
- By 250 percent in terms of land use change;
- By 410 percent in terms of climate change (measured by emission of MtCO<sub>2</sub>/year).

While there is some good news in terms of phasing out of ozone depleting substances, Wales' impact upon planetary boundaries is far beyond what its population size can justify. We recognise the various steps taken to make Wales more sustainable and in particular look forward to the development and implementation of the Welsh Government's *Well-Being of Future Generations Bill*.<sup>10</sup> However, the fact remains that Wales significantly outstrips proposed boundaries in nearly all of the environmental domains identified (Figure 4, Table 2). At the same time, inequalities in the distribution of Wales' wealth are causing deprivation across many indicators as people find themselves out of work, unable to afford to heat their homes and forced to visit food banks or simply go without enough food (Figure 3, Table 1).

The Welsh Doughnut demonstrates that our current economic model is, in many ways, both environmentally unsafe and socially unjust. The report shows that:

- 26 percent of the adult population lack any formal qualification;
- 40 percent of households are in fuel poverty;
- 51 percent of people feel they have no say in what the government does;
- 16 percent of people access the natural environment less than once per week.

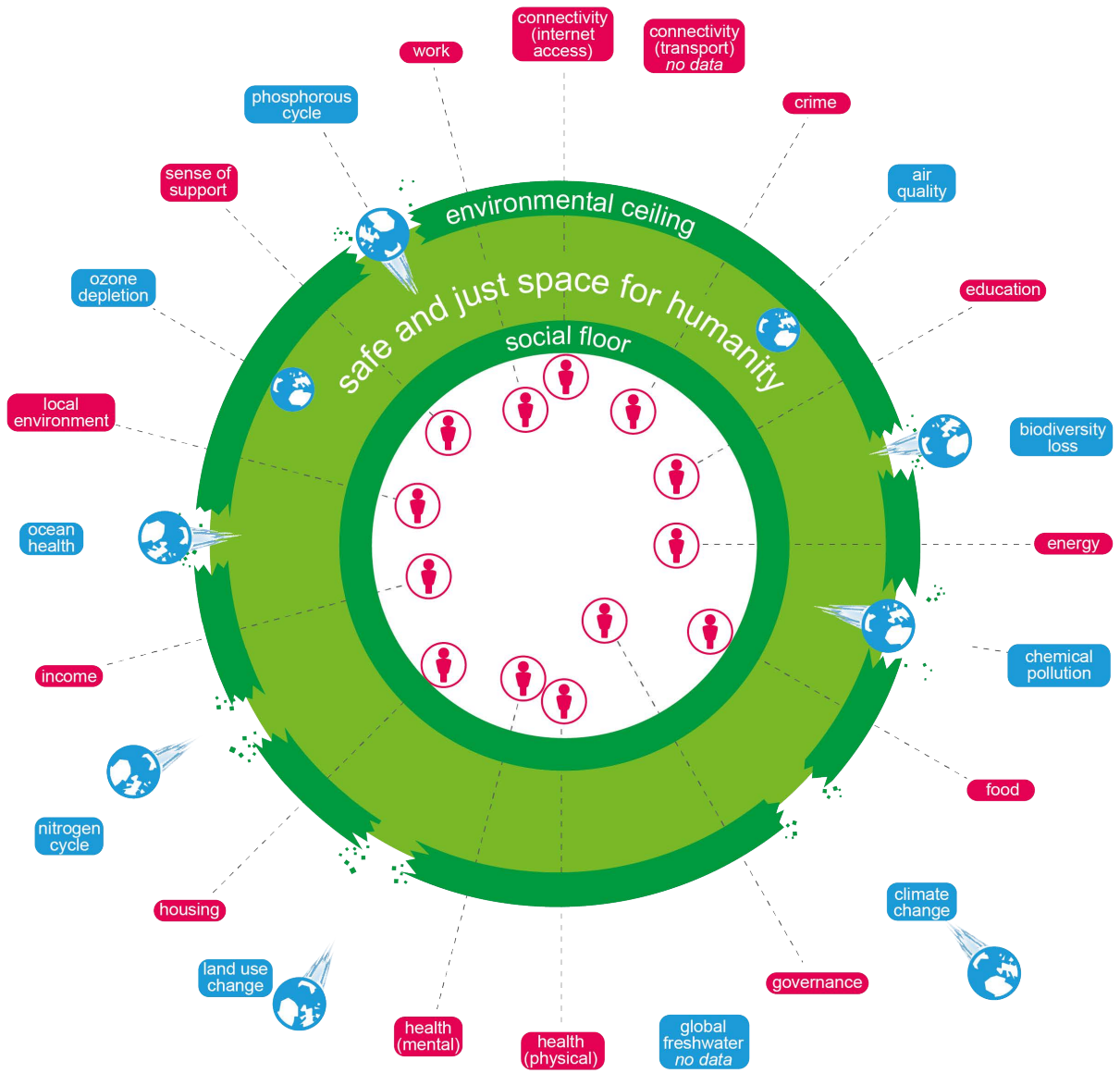
The report provides a visual representation of Wales' performance, while substantiating the need for significant change in the way we produce, consume and distribute resources if we are to develop an environmentally and socially safe and just space within which to exist.

However, the environmental and social realities outlined in the Doughnut are not set in stone. Choices can be made to develop a more environmentally sustainable future. Debates surrounding potential solutions are ongoing and are focussed on changes to industrial and agricultural production, consumption patterns and broader mechanisms to tackle resource demand. We now require the political will to implement policies designed to shape such decisions and tackle the detrimental impacts created by our production and consumption patterns.

Nor are the social failures described inevitable. They are the result of the way we currently organize our society. They are the result of successive governments' policy choices on how we use the tax system and public spending, as well as how we regulate and deliver services and provide support for our citizens. A more equal distribution of the wealth could create a social floor where all citizens enjoy what we define as the minimum acceptable standards for all.

The report makes no claim to have uncovered the definitive safe and just operating space for society. However, the Doughnut model does provide a set of goals or objectives, which – if delivered – would make for a much more sustainable society, organized in a way that delivers a good quality of life for all, without compromising the ability of others either here or abroad, now or in the future, to attain an acceptable quality of life.

**Figure B: The Welsh Doughnut (Wales 2014)**



# 1 INTRODUCTION

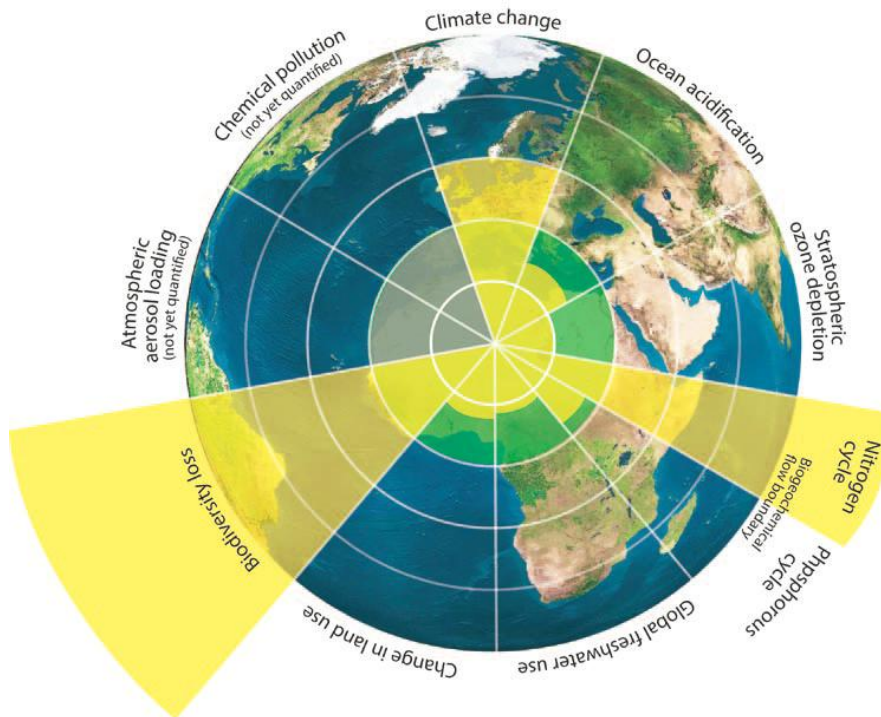
Wales faces multiple and interlocking social challenges: deep inequalities in wealth and power, rising levels of in-work poverty and growing stigmatization of people living in poverty. Alongside these are environmental challenges on many fronts, not least the disproportionate size of the country's contribution to global climate change.

Gains from growth in the economy have not been shared equitably enough.<sup>11</sup> Around one in four of the Welsh population live in relative income poverty, according to the Office for National Statistics (ONS)<sup>12</sup> and the High Pay Commission reports that inequality in the UK is heading towards levels last seen in Victorian times.<sup>13</sup> Only 12p in every £1 of UK gross domestic product (GDP) goes to wages in the bottom half of the labour market.<sup>14</sup> If the national minimum wage had risen in line with directors' pay since its introduction in 1999, it would now stand at more than £19 per hour rather than the current level of £6.50.<sup>15</sup>

Such poverty and inequalities are created by a complex web of root causes, with structural economic changes being a major driver. Over the last four decades economic change has been marked by the continued decline of skilled and semi-skilled jobs and the relative growth of low-skilled service sector jobs, leading to increasingly insecure work.<sup>16</sup> Such shifts have contributed to the sustained or deepening disparities in areas such as education, income and life expectancy. At the same time, Wales contributes significantly to the pressures brought to bear on the planet's bio-physical capacities.

A set of nine critical planetary processes were proposed in 2009 by J. Rockström *et al* as vital for the continued safe functioning of our planet; these include climate change, fresh water use, ocean acidification and biodiversity (Figure 1).<sup>17</sup> In this report we use the 10 planetary boundaries which were subsequently proposed by the Stockholm Resilience Centre (SRC) and the Stockholm Environmental Institute (SEI) when downscaling the planetary boundaries to a national level.<sup>18</sup> The initial 2009 report from the team of Earth system scientists led by Rockström put forward safe operating boundaries - planetary boundaries - for some of these processes and argued that two (biodiversity loss and nitrogen cycle) had already been breached, while for another (climate change) a tipping point was dangerously close.<sup>19</sup> An updated report on the planetary boundaries in 2015 found that the proposed boundary for the phosphorus cycle has also now been breached.<sup>20</sup> As is demonstrated below, Wales adds to many such pressures on a scale that is well beyond what its population size might justify.

**Figure 1: SRC Planetary Boundaries model**



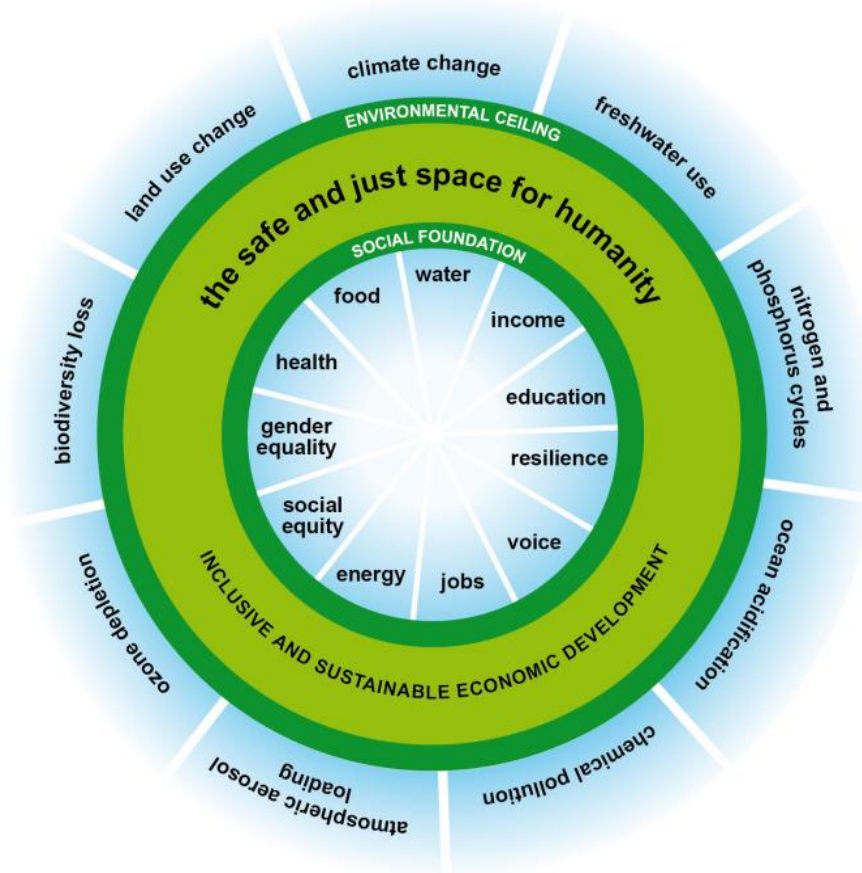
Source: Reproduced from SRC (2013)

Methods and patterns of production and consumption are the drivers behind these changes, from our energy consumption to our food production. These will have long-term and, in some instances, irreversible negative impacts which may limit our ability to live safely on this planet, as extreme weather events become both more common and more severe, while fresh water and food supplies come under growing pressure.<sup>21</sup>

Therefore we need to look to a model of sustainable economic development that both tackles inequalities in the distribution of resources and which operates within environmental limits in production and consumption. Our economy needs to deliver a decent standard of living for all while respecting planetary boundaries.

It is within this context that Oxfam seeks to display visually the current state of play in relation to planetary boundaries and socio-economic standards. These two interwoven concerns are depicted in the Oxfam Doughnut model, which depicts a space between planetary boundaries (the outer edge) and a social floor (the inner edge) – see Figure 2. This space is where it is environmentally and socially safe and just for humanity to exist.

Figure 2: The Oxfam Doughnut model



Source: K. Raworth (2012)

This paper is an initial step in the development of this snapshot assessment for Wales. It should be noted, however, that the results provide a description of where Wales is at present and do not capture either historical contribution or the direction of travel within each domain – or the area of life.

First, the paper suggests domains that might constitute a social floor, below which no one in Wales should fall. In suggesting potential domains, the paper draws on existing research regarding what people in Wales and the UK deem to be important outcomes in today's society. A variety of sources, including many reporting consensus-based notions of minimum standards, along with discussions with subject experts, have been used to identify these domains (connectivity, crime, education, energy, food, governance, health, housing, income, local environment, sense of support, and work). The paper goes on to suggest possible indicators and thresholds that might be used to assess Wales' performance in relation to such a social floor.

Second, the paper begins the process of identifying which of the planetary boundaries put forward by Rockström and the SRC/SEI might be useful for incorporation into a national Welsh Doughnut. Air quality, biodiversity loss, chemical pollution, climate change, land use change, nitrogen cycle, ocean health, ozone depletion, and the phosphorous cycle have been suggested, following an assessment as to whether they can be meaningfully measured at a national level.

The methodology also leans heavily on the SRC's work on down-scaling the global planetary boundaries to apply at a national level for Sweden.<sup>22</sup> As with the social floor, the paper goes on to suggest indicators and, where possible, thresholds for the selected domains. Further discussions will be required to test whether these social and environmental domains are indeed the most relevant for Wales, and to investigate the most informative indicators and thresholds that can usefully be employed.

Both data sets follow where possible the selection within the Scottish and UK reports. However, it should be noted that for several domains a lack of Welsh data has required us to depend upon England and Wales, GB or UK results. The lack of data has been particularly problematic for the environmental section of this report which sees results in central areas, such as Wales' carbon footprint and nitrogen use, being based on GB data. If Wales is to move towards a more sustainable future as laid out in the Well-Being of Future Generations Bill,<sup>23</sup> it is vital that such gaps in data are addressed in order to allow for a fuller assessment of our present situation and the impacts of current and future policy interventions.

The assessment is a starting point from which to engage experts and activists from intrinsically related, but often segregated fields, to raise awareness of the issues among a wider audience and to focus minds on creating new perspectives and more radical policy debates aimed at delivering a truly sustainable economic model.

## 2 THE DOUGHNUT MODEL: A 'SAFE' AND 'JUST' OPERATING SPACE FOR HUMANITY

***This section gives a brief overview of how the Doughnut model has been developed and what it is intended to achieve.***

The paper produced by Johan Rockström *et al* in 2009, *Planetary Boundaries: Exploring the Safe Operating Space for Humanity*,<sup>24</sup> highlighted the risk of crossing critical thresholds in nine of the Earth's biophysical processes. These *planetary boundaries* represent their estimate of where a *safe operating space* is located within each of those processes. This work was updated in a paper published in January 2015 by Will Steffen *et al*.<sup>25</sup>

Building on the 2009 work, in February 2012 Oxfam published a discussion paper by Kate Raworth entitled *A Safe and Just Space for Humanity: Can we live within the doughnut?*<sup>26</sup> This paper added a social dimension to the planetary boundaries concept, highlighting global poverty and injustice and proposing a safe and just space for humanity. This space – which has become known as the Oxfam Doughnut – offers a powerful visualization of where our economy needs to deliver change.

Oxfam's Doughnut has gained strong international interest and traction as an approach to understanding global development paths, informed by both social and environmental factors. The UN has shown interest in using it to feed into the post-2015 Sustainable Development Goals (SDGs) and a growing number of academics, NGOs, think tanks and governments are proposing to collect data on planetary boundaries and social floors in their own countries, creating a national 'Doughnut analysis' for each.

The appeal of such a visualisation is strong: nations rarely bring together such diverse information about their environmental impacts and socio-economic conditions in such an integrated and visually engaging way. In Wales, doing so will help highlight questions such as:

- What has been the impact of Wales' economic model in terms of tackling poverty?
- How will Wales equitably manage its national natural resources and economic growth when taking account of planetary boundaries?
- What is Wales' 'natural resource budget' and are we living beyond it?
- How can Wales ensure food, water, energy and jobs for all in the future without degrading the resources on which our global and national wellbeing depends?

The Doughnut model is a useful representation of what just and sustainable development might look like. It brings into one conceptual framework, the concerns of environmental sustainability and social justice, which are too often portrayed as competing rather than inter-related, aims. In short it acts as a barometer, measuring the sustainability of our development.

In this sense there are obvious links to the Welsh Government's Well-Being of Future Generations Bill.<sup>27</sup> We hope to see some of the issues highlighted within the Welsh Doughnut, and the approach used, incorporated into such legislation and its implementation.

Rather than aiming to provide all the answers, the value of the Doughnut model lies in provoking public discussion and opening up new questions and solutions. Oxfam hopes that mapping out the extent to which Wales lies within the Doughnut – or is operating above or below the boundaries and social floor – is a first step. Subsequent steps will be required to implement change across the whole range of policy areas in order to bring us into that safe and just space. Oxfam would welcome collaborative working partnerships to progress this agenda.

The Doughnut model has three main components: domains, indicators and thresholds:

- The domains are the broad areas we wish to explore: for example, biodiversity loss and land use change within the planetary boundaries, and adequate income, food and shelter within the social floor.
- Within those domains we have selected indicators to measure our current status. For several of the environmental domains we have leaned heavily on the work of the SRC and SEI, while for others we have developed alternative approaches.
- We also propose thresholds for the social domains, based upon analysis of an extensive body of evidence (described in the Appendix), and build up a picture of what a social floor might look like.

Together these datasets are used to indicate an environmentally and socially safe and just space.

The methodologies for selecting the range of domains for this study have been shaped fundamentally by the main objective: to inform and shape public policy debate. As a result the domains used within the Welsh Doughnut were chosen because they are relevant to such debate in Wales and the UK. An explanation of the rationale for selecting domains is laid out below (and in the Appendix), along with the reasons for choosing each indicator and threshold.

However, it should be noted that this study is a suggestion, based on extensive policy research, for a set of criteria that will enable us to demonstrate the impact of Wales' economic model on social and environmental development, both nationally and globally. The project will remain organic, recognizing that there will be other, extremely valid, criteria that might also be considered. We welcome suggestions and ideas as to how to improve the assessment we have presented here.

# 3 METHODOLOGY FOR DEVELOPING A SOCIAL FLOOR

***This section explains the thinking behind the selection of the domains for the social floor and explains some of the limitations of the project and the data. More detailed discussion on how the domains were selected can be found in the Appendix.***

In selecting the range of domains, indicators and thresholds to incorporate into a social floor, our efforts were shaped by Oxfam's understanding of poverty as being much wider than income alone. Oxfam's work around the world and in the UK shows that understanding poverty needs to be underpinned by examination of power, politics and relationships.<sup>28</sup> Thus our social floor must encompass a range of areas – including social, economic and political.

## DEVELOPMENT OF OUR DOMAINS

The 11 domains of the original social foundation in Oxfam's Doughnut model (water, income, education, resilience, voice, jobs, energy, social equity, gender equality, health and food) were drawn from governments' submissions to the Rio+20 conference on the replacement for the Millennium Development Goals (MDGs) after they expire in 2015.<sup>29</sup> The selection criterion was that a minimum of 50 percent of the submissions from governments included the priority area. Relevant indicators and data were then obtained from global databases and reports.<sup>30</sup> The indicators focus on deprivation thresholds (such as the percentage of people below the poverty line) rather than nationwide outcomes (such as GDP per capita).

In applying the Doughnut concept at the national level, a number of key questions needed to be asked:

- What are the most relevant domains for each country and how do we agree what is relevant?
- How should the indicators and thresholds within these domains be selected?
- How many domains would be useful and practicable?
- Are there sufficient data sets for the selected metrics?

A workshop attended by representatives from civil society and academic institutions from a range of countries, hosted by Oxfam in November 2012, explored these questions further. The workshop concluded that while the original global domains related to the MDGs remain important, they do not address human rights very comprehensively. Nor do they address issues such as housing or personal security.

Other domains put forward for consideration included:<sup>31</sup>

- Housing and land;
- Safety and security;
- Communication and mobility;
- Access to finance and information;
- Governance;
- Community and citizenship (to replace 'voice');
- Water and sanitation (which could possibly be separated into two domains).

The workshop further concluded that a core set of around 12 social domains was needed for comparison, and that these should be proposed by Oxfam, given its experience of development around the world and of working with some of the poorest communities in the UK.

This Welsh Doughnut report is built on the premise that domains, thresholds and indicators for the national social floors should reflect as much as possible the reality of life in that country, and should be derived from public dialogue, discussion and participation. This echoes the view of the Welsh and UK public that minimum living standards should reflect contemporary aspirations.<sup>32</sup> However, rather than undertaking a dedicated consultation of the sort that informed Oxfam Scotland's Humankind Index (HKI),<sup>33</sup> which was precluded by resource constraints, this report draws on secondary analysis of participatory research in our proposed domains in Wales, Scotland and the UK. We also note work undertaken by the Welsh Government related to the aims of the Well-Being of Future Generations Bill.<sup>34</sup> In particular the Interim report from the pilot National Conversation on 'The Wales We Want'.<sup>35</sup>

The main sources used for this report include:

- *The Impoverishment of the UK* (Poverty and Social Exclusion: UK (PSE:UK) led by the University of Bristol);<sup>36</sup>
- *Monitoring Poverty and Social Exclusion* (Joseph Rowntree Foundation (JRF) and the New Policy Institute (NPI));<sup>37</sup>
- The Minimum Income Standard (MIS) (University of Loughborough and JRF);<sup>38</sup>
- The Office for National Statistics (ONS) Wellbeing Consultation;<sup>39</sup>
- The Equalities Measurement Framework (The Equalities and Human Rights Commission);<sup>40</sup>
- The Oxfam Humankind Index for Scotland (HKI) (Oxfam).<sup>41</sup>

(See Appendix for more detail regarding these sources.)

Much of the literature reviewed was based upon research into what people felt to be important aspects of their lives or life in general. For example, the HKI consulted with 3,000 people in Scotland to establish their priorities, while the PSE: UK report was built upon a survey which sampled 12,100 people in 5,200 UK households. This was added to by analysis of more theoretical literature. Finally, we spoke to a series of stakeholders with knowledge of aspects of poverty and social exclusion. The full range of the literature review can be found in the Appendix.

Based on the review of government input into Rio+20, the Oxfam workshop, the literature review and discussions with stakeholders and experts, a range of 12 domains is suggested here which reflect people's priorities in Wales and the wider UK today.

- Connectivity;
- Crime;
- Education;
- Energy;
- Food;
- Governance;
- Health;
- Housing;
- Income;
- Local environment;
- Sense of support;
- Work.

Further discussion on the selection of these domains is presented later in this paper.

# INDICATORS AND THRESHOLDS: CHALLENGES AND LIMITATIONS

Indicators and thresholds have been suggested in order to assess the experiences of Wales' population within each proposed domain. However, the setting of thresholds beyond which it is *unjust* for people to fall clearly presents some difficulties.

For example, in relation to income poverty the usual metric used is the 60 percent of median household income (HBAI). There are, of course, practical policy rationales for a threshold based on relative income: it is well understood, comparable across countries and time, simple and recognizable, and linked to existing government targets. However, it is also rather arbitrary. It implies that people one point below the threshold are poor, while those one point above it are not. Moreover, it is only a relative measure and does not measure income adequacy. Similarly, as it measures income alone, it does not reflect the different financial stocks and resources or support that people have to help them cope. Nor does it necessarily account for varying need among different groups – for example, pensioners have different requirements to households with young children. The task of selecting indicators and thresholds does therefore create a range of challenges. Section 5 explores these challenges and explains our approach to each selection.

It is important to acknowledge these challenges, as well as the threshold limitations. These have been the subject of a great deal of debate among academics, practitioners and policy makers for many years. Our objective here is not to ignore them, nor necessarily overcome them, but to explore and use the best available solutions in order to create a national Doughnut model that can act as a barometer of Wales' socio-economic model.

## DISAGGREGATING THE FINDINGS

The experience and prevalence of poverty varies along many lines:

- Oxfam's experience leads to the view that poverty is a gendered issue. Incidences, experiences and routes into and out of poverty vary according to gender.
- Additionally, there is a clear need to consider the causes and consequences of economic inequality across all social domains.
- The work Oxfam does in communities around the UK shows us that *relative* circumstances matter: they shape how people participate in society. For example, even when subsistence needs are taken care of, how much you have compared with others has a profound impact.<sup>42</sup>
- Moreover, in terms of mental health, some recent reports show that anxiety and the prevalence of mental illness are twice as high in the lowest-income communities as they are in the general population.<sup>43</sup>

For these reasons it was agreed that, as different groups experience poverty and social exclusion differently, some level of data disaggregation would be required. Resource constraints limited the extent to which this could be carried out, but disaggregation across gender and levels of deprivation within the chosen domains is presented where possible.

It is important to acknowledge that there are other distinctive experiences of poverty requiring tailored solutions across other social groups, defined in terms of factors such as ethnicity, age and physical and mental abilities, and in sub-national geographic areas. Disaggregation is therefore highlighted here as an important area requiring further research.

# 4 SOCIAL FLOOR RESULTS

*This section details suggested domains for the social floor along with indicators and thresholds where identified.*

Table 1 gives an overview of the domains, indicators and thresholds and results while the following Figure 3 shows the results displayed in the Doughnut model. Section 5 then goes on to explain the rationale for these choices and explores some of the data issues encountered.

**Table 1: Social floor results (Wales 2014)**

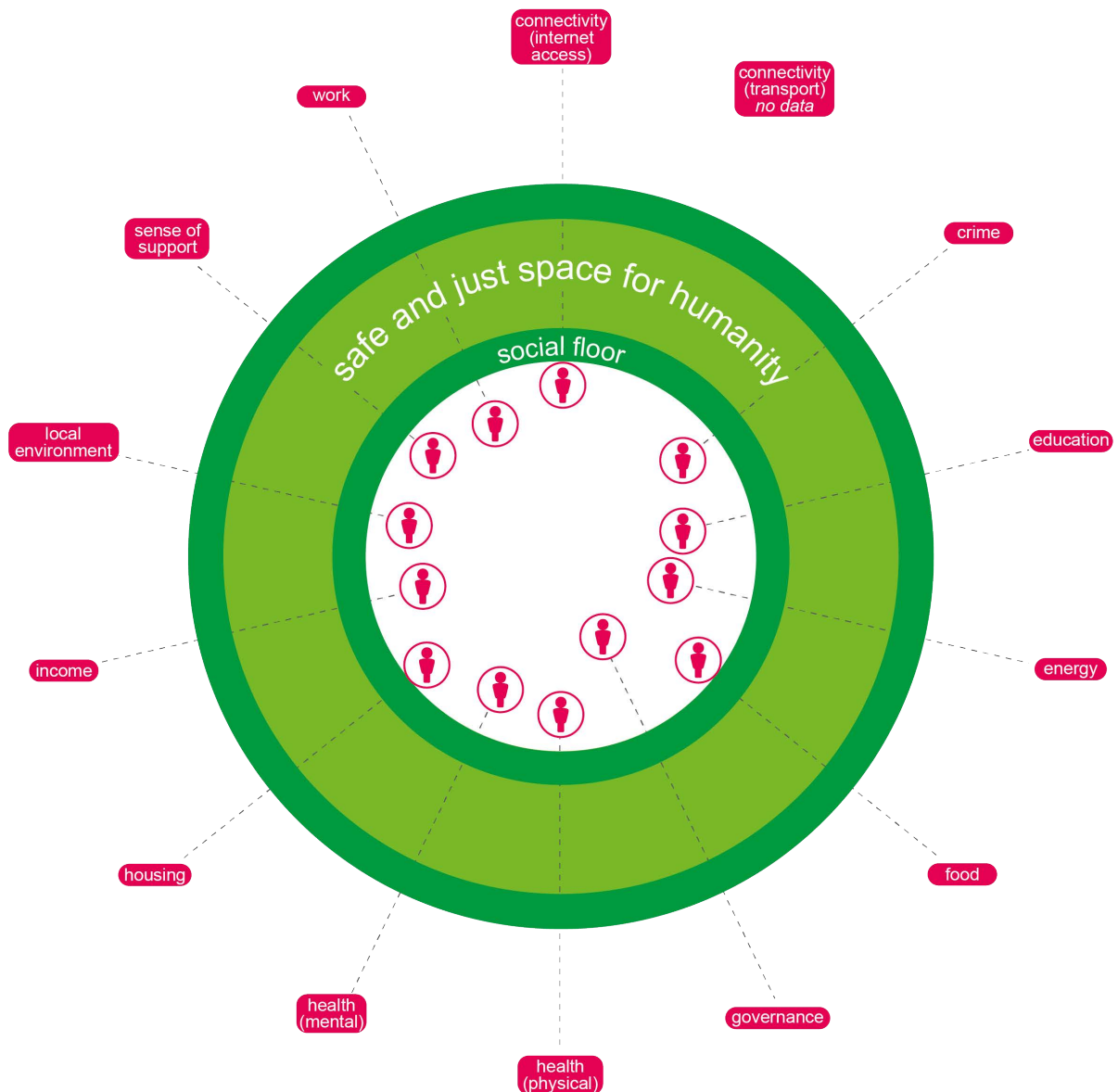
<b>Domain</b>	<b>Sub-domain</b>	<b>Indicator</b>	<b>Result</b>
<b>Connectivity</b>	Internet access	People who have no internet connection due to barriers such as affordability and complexity	<b>8% of households lack an internet connection due to barriers (Wales 2013-2014).</b>
	Transport	No indicator identified	
<b>Crime</b>		Risk of victimization	<b>16% of adults were victims of crime within the past 12 months (Wales 2013-14).</b>
<b>Education</b>		Adults lacking any formal qualifications	<b>26% of adult population lack any formal qualifications (Women 28 percent, men = 24 percent) (Wales 2011).</b>
<b>Energy</b>		Fuel poverty – 10% or more of income required to be spent on all energy	<b>40% of households are in fuel poverty (Wales 2013).</b>
<b>Food</b>		Adequate diet as defined by Poverty and Social Exclusion: UK (PSE:UK)	<b>7% of people cannot afford an adequate diet (UK 2012).*</b>
<b>Governance</b>		Sense of personal political efficacy	<b>51% of people feel they have no say over what government does (Wales 2012).</b>
<b>Health</b>	Physical	Years of healthy life expectancy (HLE)	<b>People in the most deprived areas in Wales have 13.5% less than the average number of years of healthy life expectancy (Women = 13%, Men = 14%) (Wales 2009).</b>
	Mental	Anxiety or depression	<b>21% of adults recently experienced a high level of anxiety (Wales 2014).</b>
<b>Housing</b>		Overcrowding	<b>3% of households are overcrowded (Wales 2011).</b>

<b>Income</b>		Households below 60% average income – after housing costs (HBAI-AHC)	<b>24% of households in relative poverty (Wales 2013).</b>
<b>Local environment</b>		Access the natural environment once per week	<b>16% of people access the natural environment less than once a week (Women = 17%, Men = 15%) (Wales 2011). **</b>
<b>Sense of support</b>		Support from family, friends and others	<b>10% of people have little or no support in times of need (UK 2012).*</b>
<b>Work</b>		People lacking satisfying work	<b>19% (0.28m) of people lack satisfying work (Wales 2014).</b>

\* For these domains there were insufficient Welsh data sets available and we have been forced to rely upon UK results. See specific sections for details.

\*\* This result is not directly comparable with results for the UK or Scotland. See specific section for details.

**Figure 3: The Wales Doughnut - Social floor (Wales 2014)**



# 5 RATIONALE FOR SOCIAL FLOOR RESULTS

***This section explains the rationale behind the choices for each domain, indicator and threshold, along with the methods used to derive the results.***

While gender inequality was drawn into the original Doughnut model as a specific domain, it has been treated slightly differently here. In the original, it was suggested as a separate domain but no agreed method for highlighting it was developed. Two illustrations were used in the original showing what it might look like if disparities in income and political representation were adopted as metrics. Using these, or a limited number of alternatives, would, however, mask the complexities of inequality.

This report has therefore sought to draw out gender inequalities within each social domain to the extent that data allow. While this approach comes with its own problems, such as the use of household-level data masking gendered experiences, we felt that this was more useful than selecting and focusing on one or two indicators. It may be possible to develop a methodology for a composite indicator across all the domains thought to be most relevant, and for which data are available in a format which is compatible. However, such a methodology is outside the scope of this current project.

## 5.1 CONNECTIVITY

Comprising sub-domains of *Internet access* and *Transport*

### 5.1.1 Internet access

**8 percent of households lack an internet connection due to barriers (Wales 2013-2014).**

#### Domain

A recent report from the Carnegie Trust<sup>44</sup> and ONS data<sup>45</sup> provide evidence that internet access is related to educational achievement, job prospects, contact with family and friends and democratic and civic participation, along with access to public and private goods and services, advice, information and knowledge. As an enabling factor, it is therefore relevant to many aspects of the social floor within this report.

In terms of a social norm, around 75 percent of those surveyed for the latest PSE: UK report stated that children need a computer and Internet access at home for homework.<sup>46</sup> The Carnegie Trust report argues that, as the scope of what can be done over the internet increases, so will the inequalities and exclusions for those who have no access ‘...to such an extent that [the] lack will be both the symptom and cause of poverty’.

We therefore chose to include *Internet access* as a sub-domain within the social floor under *Connectivity*.

#### Indicator

The indicator chosen is the percentage of households without an internet connection who are prevented from having one due to barriers such as cost, availability and perceived complexity. While beyond this figure there are a number of households who have no Internet connection,

many state that they do not want one. Some of that portion will see no reason to go online because they are unaware of the Internet's capacities. Additionally, many choose to remain offline for reasons such as a distrust of the technology involved.<sup>47</sup> This may also clearly be a barrier. However, we have chosen not to include this portion as at least some will be making an informed choice, and we have as yet been unable to identify data to distinguish this particular group.

### **Threshold**

Households without an internet connection due to barriers (such as lack of skills or access/equipment costs) rather than personal choice.

### **Result**

8 percent of households lack internet access due to barriers rather than personal choice (Wales 2013-2014).

### **Method**

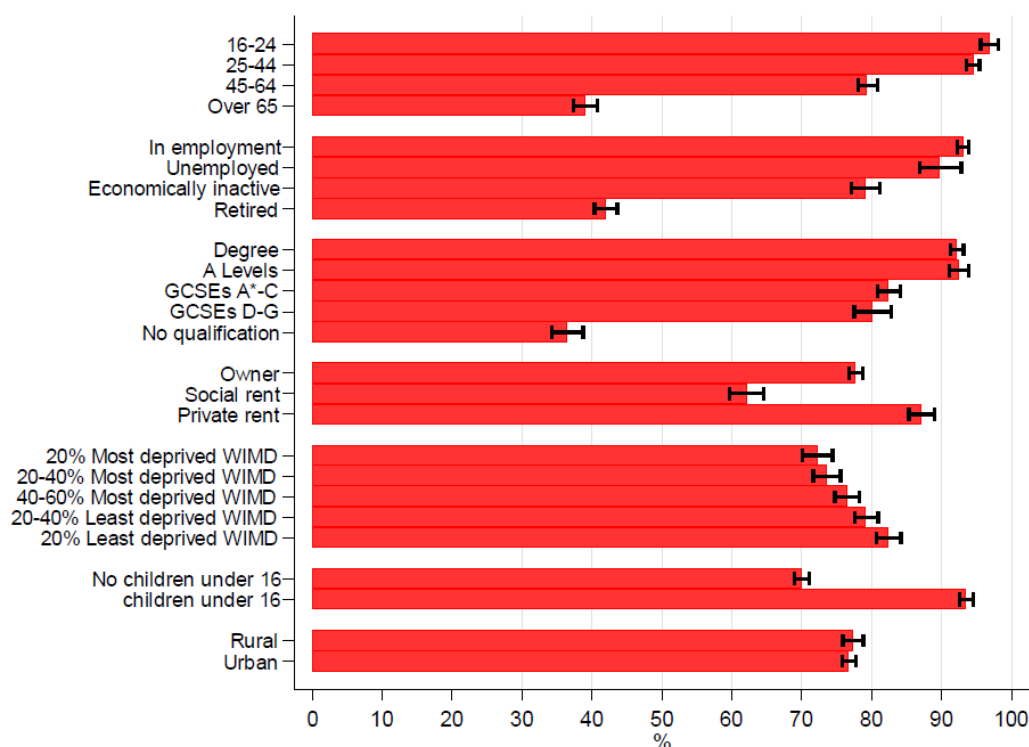
- 25 percent of households in Wales do not have internet access.<sup>48</sup>
- Around 67 percent of adults who had never accessed the internet stated this was due to choice or because they saw no reason for it.<sup>49</sup>
- The remaining 33 percent of adults cited reasons such as access and equipment costs along with lack of computer skills.

Applying the proportion of adults who had never accessed the internet due to barriers to the number of households without an internet connection gives an approximation of how many households do not have a connection because of constraints such as cost and skills.

Therefore 33 percent of the 25 percent of households did not have an internet connection due to barriers which gives around 8.25 percent of all households in Wales. This is slightly higher than the GB figure of around 7 percent.

The data used for the results in this section are household-based and we have no direct gender breakdown. However, data on a slightly different (and therefore not directly comparable) metric suggests women are less likely than men to use the Internet; 82 percent of men report being current users compared to 76 percent of females.<sup>50</sup> Internet use in Wales also varied according to other factors. Those over 65 years old, not in employment, in manual employment, with long-term physical conditions, with lower levels of qualifications and in the most deprived areas are identified as being least likely to be internet users (Figure 4).<sup>51</sup>

**Figure 4: Levels of digital engagement across key characteristics (% who access Internet Wales 2012/13)**



Source: Reproduced from Welsh Government (2014), 'National Survey for Wales, 2012-13 Digital Inclusion'<sup>62</sup>

## 5.1.2 Transport

### Domain

The other major sub-domain within Connectivity is transport. Since at least 2003, transport has been widely understood to play a central role in social exclusion and people's experiences of poverty.<sup>53</sup> Accessible transport, in terms of both availability and price, was identified as a critical issue highlighted in *The Wales We Want*,<sup>54</sup>. It was also a significant factor in the work undertaken for the Oxfam HKI<sup>55</sup> and clearly impacts upon various aspects of life, such as people's access to the labour market and to goods and services (including health services), and heavily shapes their ability to form and maintain social networks.<sup>56</sup>

### Indicator

However, measurement of transport connectivity is complex and problematic. Dr Karen Lucas, a research associate at the Transport Studies Unit at Oxford University, talks of person- and context-specific experiences of transport-related exclusion, noting that while income and place are drivers for such exclusion, the impact varies across different socially excluded groups even within the same context.<sup>57</sup>

She also notes the lack of available data:

*There is a general consensus amongst those with an interest in seeing this agenda more widely promoted that better social evaluation and appraisal tools are needed at every level of governance. Metrics are needed to establish the minimum level and standards of public transport which are necessary for social inclusion given certain distances, densities, levels of services, etc. and local targets set to achieve these within given timeframes.*<sup>58</sup>

Indeed, the most commonly used indicator in relation to public transport depends upon self-reported satisfaction levels. These levels have seen an increase in recent years, with around 90

percent of bus passengers now being satisfied with their journey.<sup>59</sup> However, in the decade to 2012 public transport costs across the UK rose by around 90 percent.<sup>60</sup> Therefore, reported satisfaction levels do not seem to capture the impacts of rising prices and perhaps have little to add to our understanding of the experiences of low-income groups.

Other datasets look at journey times to specified services and work.<sup>61</sup> However, the collection and presentation methodologies of these are not easily applied to the Doughnut approach and would require restructuring before being useful for this project. Even with such restructuring, it is not clear that these datasets would be helpful in exploring the links between transport and social exclusion.

Given these complexities, the difficulties in tracking down data that focus on links with social exclusion, and the conflicting findings on satisfaction and rising costs, we have opted to omit a transport indicator from the Welsh Doughnut social floor for the time being.

## 5.2 CRIME

### **16 percent of adults were victims of crime within the past 12 months (Wales 2013-2014).**

#### **Domain**

Feelings of personal security have been raised across many of the surveys assessed for this project, including The Wales We Want and the HKI (one participant warned that '*if you are always watching your back, it saps your energy, you're not living your life as you're that busy worrying*'). It was cited by the Equality and Human Rights Commission (EHRC)'s Equality Monitoring Framework, as well as during the Oxfam Doughnut workshop. This issue was also identified in the initial scoping based on government submissions to Rio+20.

#### **Indicator**

The range of indicators that could be used includes fear of crime, police-reported crime rates and risk of becoming a victim of crime.

Fear of crime can be significantly shaped by political or media portrayal of certain groups, for example young people or immigrants.<sup>62</sup> Changes in these figures may therefore be more reflective of a shifting political and media context rather than of any real variation in the risk of becoming a victim. This may be particularly true when comparing data over time. We have therefore rejected this indicator, but acknowledge that fear of crime acts to constrain people's opportunities in other respects.

Police-reported crime rates also reflect factors beyond the mere incidence of crime. They are shaped by various factors, such as how likely any person, or any group of people, is to report a crime. In turn this can be shaped by factors such as whether a person believes they, or the crime experienced, will be taken seriously. Additionally, they may reflect the resources put into tackling general or specific crime. Again, therefore, these are not the best indicators to assess the risk of falling victim to crime.

The Crime Survey for England and Wales (CSEW),<sup>63</sup> formerly the British Crime Survey (BCS), however, does collect information on people's experiences of crime through a continuous and representative survey of over 40,000 households in England and Wales. It records crime as reported via the survey and therefore includes crime that may not be reported to the police. Because of its focus on victim experience of crime rather than prosecutions or police-reported crime, it avoids some of the pitfalls outlined above. It has also measured crime consistently since 1981 (the Notifiable Offences List<sup>64</sup>). The datasets also have the advantage of being broken down by a variety of factors including gender and area of deprivation.

The CSEW has some of its own limitations, for example, it records only crime where there has been an identifiable household victim and therefore misses crime where only the police have been involved, such as drug possession, or crime against businesses. However, as we are looking here at how safe people are these issues are not central for the purpose of this report.

### Threshold

The threshold we have chosen is having been a victim of CSEW crime over the previous 12 months. While it may be unrealistic to hope to reach a point where no one experiences such crime, it is useful in giving a snapshot of the current level of crime being experienced.

### Result

16.4 percent of adults in Wales reported being victims of crime within the past 12 months (March 2014).<sup>65</sup>

While analysis of Welsh only data is limited, that available for England and Wales combined show men are slightly more likely than women to be victims of crime, while English only data show those in the poorest areas are at greatest risk (Table 2).

**Table 2: Percentage of adults reporting having been victims of CSEW crime in previous 12 months (Wales and England March 2014)**

<b>All adults (Wales)</b>	16.4%
<b>Men (E&amp;W)</b>	17.4%
<b>Women (E&amp;W)</b>	16.7%
<b>20% most deprived output areas (England/Employment)</b>	20.3%
<b>20% least deprived output areas (England/Employment)</b>	14.6%

Source: CSEW<sup>66</sup>

## 5.3 EDUCATION

### **26 percent of adults have no formal qualifications (Wales 2011).**

Women = 28 percent

Men = 24 percent

#### Domain

The domain of education was clearly identified through the analysis of responses to Rio+20, the literature review, the Oxfam workshop, the HKI and discussion with stakeholders. It is viewed as being fundamental in its own right as well as a factor in attainment of many of the other domains which together form the social floor. In *The Wales We Want*, one respondent stated that, *'Educated and Skilled people are essential for our country to thrive. Our people are our most valuable and useful resource, without them we won't achieve anything'*.<sup>67</sup>

#### Indicator

There is a serious point of contention as to which indicator is the most appropriate. Enrolment in primary or secondary schools is used in countries in the economic south. As enrolment is almost universal in Wales we have looked for something more relevant. As with other indicators, the mere quantity of education is clearly not sufficient. So we have instead sought an indicator of

quality and achievement, while recognising that this in no way is the sole, or even the overriding purpose of our educational systems. So it is with these caveats in mind that we have chosen the main metric used in this domain as *educational qualification*.

This relates to either the number of, or highest, educational qualifications attained; or to the number of working age adults at any one time who have no formal qualifications. The latter number is comparable across the UK and Europe.

Due to the stark nature of the '*no formal qualifications*' metric, as well as its standardization across the UK and comparability across Europe, we have chosen this as an indicator. It also comes with its own threshold. However, it should be noted that we have chosen to measure all adults over 16 years old, rather than only the working-age population. This means that those of pensionable age are also included in our analysis, as we felt that education is in itself of value to people rather than being relevant only during their working lives.

### Threshold

Proportion of adults found to have no formal qualifications.

### Result

26 percent of adults in Wales in 2011 had no qualifications at all.<sup>68</sup>

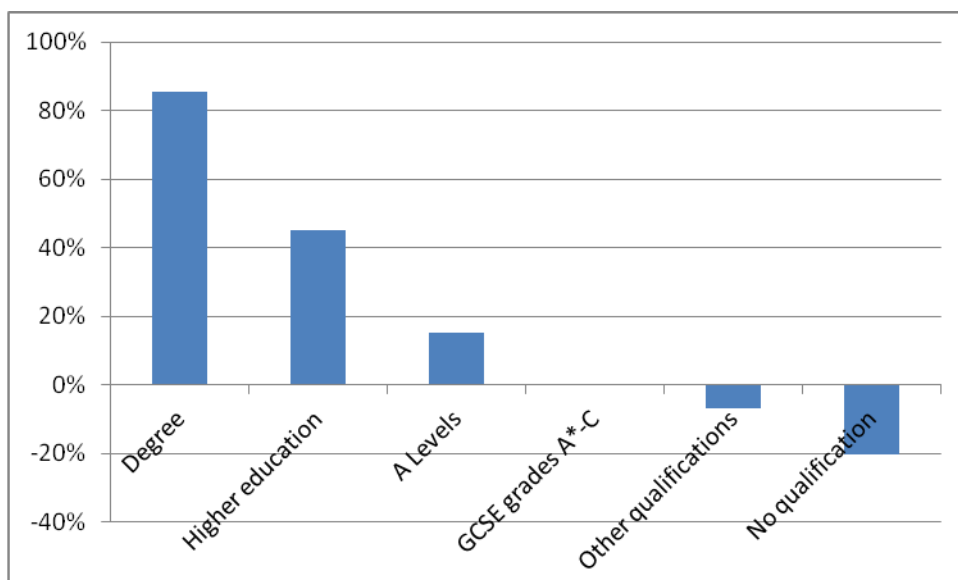
Women = 28 percent.

Men = 24 percent.<sup>69</sup>

This compares unfavourably to the UK result of 23 percent.<sup>70</sup>

In terms of gender, data show a significant gap between men and women in Wales (women = 28% and men = 24%). UK data show that older cohorts of women are more likely to lack any formal qualifications than males or their younger female counterparts.<sup>71</sup> The link between formal qualifications and earning capacity, and therefore poverty, can be seen in the GB data presented in Figure 5. This figure demonstrates the correlation between educational attainment and pay and that working-age adults with no formal qualifications earn 20 percent less than those with five GCSEs.

**Figure 5: Average pay differentials, adults with no formal qualifications compared to those with five GCSEs (% GB 2010, working age)**



Source: Labour Force Survey, October-December 2010<sup>72</sup>

## 5.4 ENERGY

### 40 percent of households are in fuel poverty (Wales 2013).

#### Domain

Access to energy for heating, lighting and cooking was seen as fundamental in the participatory research projects reviewed. Inadequate heating is linked to respiratory and cardiac illness, early mortality and other health detriments.<sup>73</sup> The inclusion of energy is therefore essential.

#### Indicator

*Affordable warmth* is a term often used in relation to energy, but is inadequate for our purposes as it does not necessarily relate to cooking and lighting. Therefore *fuel poverty* is the indicator used here.

Since Brenda Boardman's work in the 1990s,<sup>74</sup> the term *fuel poverty* has been used to define a situation whereby a household would need to spend 10 percent or more of its income on all energy costs while maintaining a *standard heating regime*.<sup>75</sup>

Wales continues to use this original definition of fuel poverty while changes are being introduced in England following the 2012 Hills Review into the definition of fuel poverty.<sup>76</sup> Northern Ireland also continues with the original definition, as does Scotland, although the Scottish Government is now carrying out a review. There are also variations across the nations on whether income is defined as before or after housing costs.

As part of the Doughnut's value is comparing performance across the UK, there is a need to apply a consistent definition. Therefore during this period of changing definitions we will continue to apply the traditional definition as explained above.

#### Threshold

The proportion of households that meet the traditional definition of fuel poverty, i.e. those that would need to spend 10 percent or more of their household income on all energy costs while maintaining a standard heating regime.

#### Result

40 percent (0.52m) of households are in fuel poverty (Wales 2013).<sup>77</sup>

We depend upon the estimates made by the Centre for Sustainable Energy (CSE) which include the impact of price rises up to October 2013.

As Table 3 below demonstrates, Wales has a far higher incidence of fuel poverty than the GB as a whole, with almost double the rate experienced in England (26%), although it is slightly lower than Scotland (47%). An exploration of the reasons behind such geographical divergence is beyond the scope of this report. However, variables such as energy efficiency programmes, house condition, weather, relative energy prices and the portion of houses being off the main gas network all play a part. For further discussion regarding fuel poverty see the National Energy Action/Energy Action Scotland UK Fuel Poverty Monitor 2013–14.<sup>78</sup>

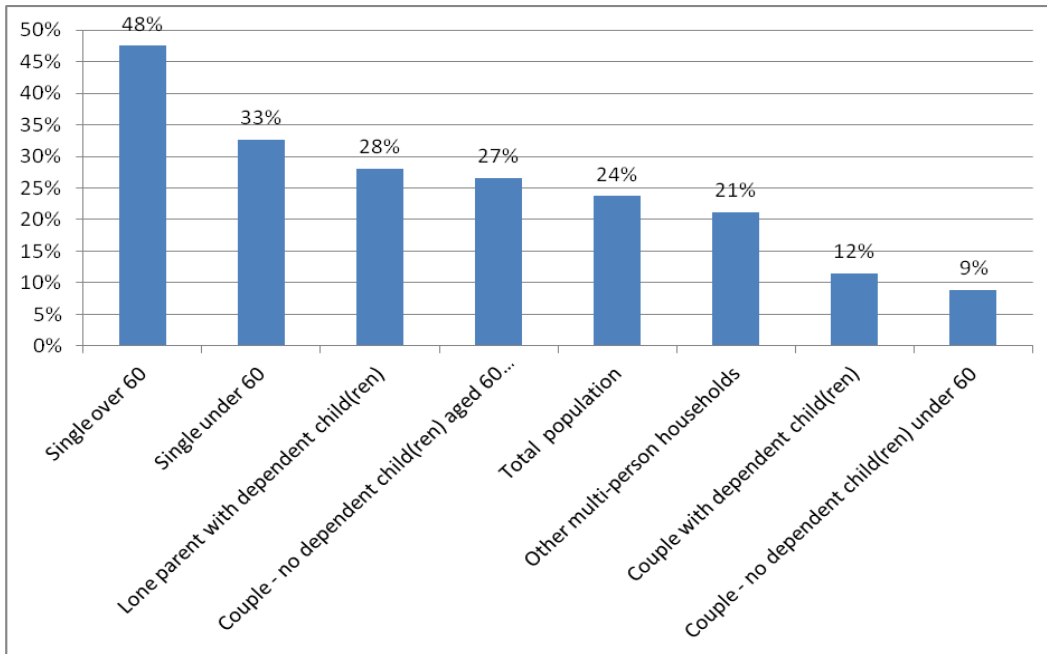
**Table 3: Fuel poverty rates**

	2010	2013	% rate (based on 2012 household numbers)
<b>Wales</b>	331,983	520,500	40%
<b>England</b>	3,535,932	5,109,312	23%
<b>Scotland</b>	751,940	1,111,161	47%
<b>Great Britain</b>	4,619,855	6,740,973	26%

Source: CSE Nowcast (2013)<sup>79</sup>

We have been unable to source data specifically on gender given that the experience of fuel poverty is likely to be shared by household occupants. Up-to-date disaggregated statistics on fuel poverty in Wales are lacking, we therefore depend upon GB and Scottish data to drill down further into its nature. Figure 6 below uses GB data to show the variation in incidence of fuel poverty across household types and that pensioners, single adults and lone parents are at greatest risk of fuel poverty.

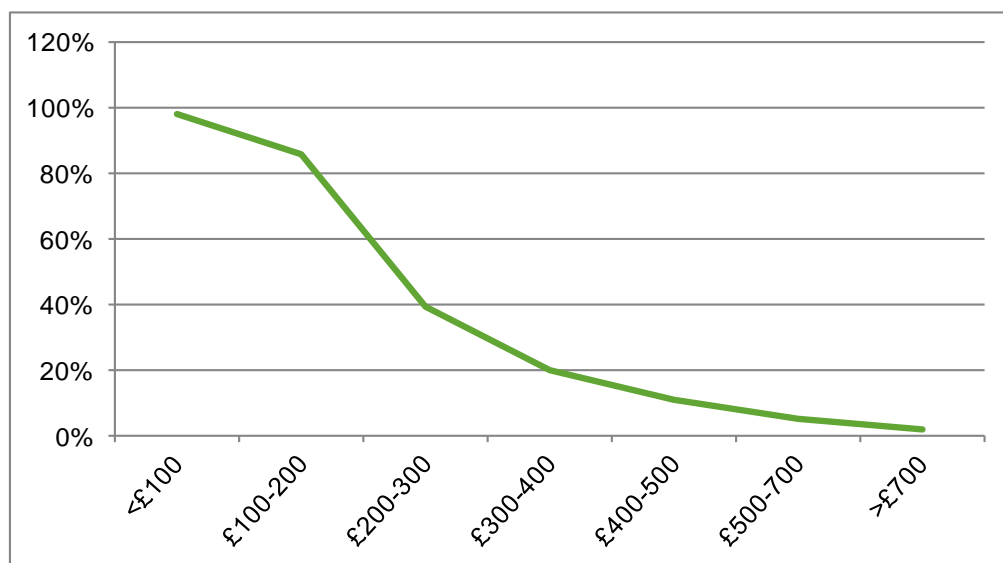
**Figure 6: Incidence of fuel poverty by household type (% GB 2013)**



Source: CSE Nowcast (2013)<sup>80</sup>

Figure 7, based on Scottish data, demonstrates the fundamental role that income plays: experience of fuel poverty is heavily concentrated among the lowest income groups, with almost all households with a weekly income of less than £100 being fuel-poor, and the highest-earning category having a risk of around 2 percent.

**Figure 7: Percentage in fuel poverty by weekly household income (Scotland 2012)**



Source: Scottish House Conditions Survey 2012, Key Findings Table 33.

## 5.5 FOOD

### 7 percent of people cannot afford to feed themselves properly (UK 2012).

#### Domain

Access to food is clearly a fundamental part of life and therefore integral to the social floor; it was also identified through analysis of the responses to Rio+20 and the Oxfam workshop, and through secondary sources. It is also clear that access to food is increasingly challenging for many people in the UK, with 20 million meals being distributed across the UK by the three largest food aid providers in 2013–14.<sup>81</sup> In Wales, the Trussell Trust distributed food parcels to 79,991 people in the same period through the 32 foodbanks that were operational at this time. This represents a fivefold increase on 2011-12 when only 14 foodbanks were operational.<sup>82</sup>

#### Indicator

Arguably, the best measure we have of what is acceptable in terms of food in the UK today comes from the PSE: UK report, *The Impoverishment of the UK* (2013).<sup>83</sup> This report identifies what people think are reasonable standards to expect across a variety of social policy areas and assesses who is falling below these standards. The findings show broad agreement on what it means to be able to feed oneself properly: two meals per day for adults, three meals per day for children. This should include fresh fruit and vegetables every day, along with meat, fish or a vegetarian equivalent every other day.

Unfortunately, we have no specific Welsh data on this indicator. There are data sets from PSE:UK broken down for Scotland and Northern Ireland as those Governments supported a sample boost to make it statistically possible to provide an analysis in those countries. However, this has not been done by the Welsh Government and so insufficient data is currently available. We have therefore been forced to rely upon UK data.

#### Threshold

Proportion of people whose food intake falls below the minimally acceptable diet defined above.

#### Result

6.6 percent of people (children and adults) cannot afford to feed themselves properly (UK 2012).<sup>84</sup>

#### Method

Extrapolated data based on responses to the PSE: UK survey show that in 2012, 4.2 million people – 6.6 percent of the UK population – did not feed themselves adequately by this definition because they could not afford to.

As yet we have no breakdown by gender, but hope to be able to update this in the near future as data becomes available.

## 5.6 GOVERNANCE

### 51 percent of people feel they have no say over what government does (Wales 2012)

#### Domain

Based upon government submissions to the Rio+20 process, *Voice* was proposed by Kate Raworth (2012) as a domain in the original Global Doughnut. This was focused upon measuring freedom of political expression and participation. *Citizenship* and *Community* were suggested as alternatives during the Oxfam workshop in November 2012, alongside the inclusion of

*Governance*. We propose here to draw out a common element of all these domains that seeks to assess the impact that citizens can have on their political systems and the decisions made within them. For the sake of consistent terminology, we have labelled this domain *Governance*.

### **Indicator**

Within the governance domain lie a variety of potential indicators; voter turnout being the most commonly used. However, the mere incidence of voting does not necessarily reflect its effectiveness. The impacts that people have – or feel they can have – within a political system are of more interest. While this may be indirectly measurable through voter turnout, more direct measures do exist. The British Social Attitudes Survey (BSAS) has collected detailed data on this area over the past 30 years, providing a range of indicators. Two areas of interest here are referred to as *system efficacy* and *personal political efficacy*.<sup>85</sup>

Both are measures of how people feel about the political system and their role within it. System efficacy refers to how responsive the political system is and is assessed through responses to statements such as *'parties are only interested in votes'* or *'MPs quickly lose touch'*. This shows how people feel about whether a political system is able or willing to respond to their needs.

Personal political efficacy refers to people's feelings regarding their *own* level of influence in shaping political decisions and how they are governed. This is assessed through responses to statements such as *'people like me have no say in what government does'*, and other attitudinal statements listed in Table 4.

It is difficult to choose between these, as one is about how responsive the system can be and the other is about how empowered individuals feel within it. However, given the original focus on expression and participation, we have chosen personal political efficacy here, as this reflects an individual's feelings about their own ability to shape decisions.

### **Threshold**

Individuals who agree with the statement *'people like me have no say in what government does'*.

### **Result**

51 percent of people feel that people like them have no say over what government does (Wales 2012).

In 2012, 51 percent of adults in Wales *agreed* or *strongly agreed* with the statement *'people like me have no say in what government does'* (Table 4). That is, they felt they had no influence over how they are governed or the policies that impact upon them. It should be noted that the indicator is moving in a positive direction as the proportion agreeing with the statement is falling. This statistic compared to 59 percent at GB level and 60 percent in Scotland.

As yet we have no breakdown for Wales by gender. However, at GB level women are more likely to report a lack of personal political efficacy than men (F=61%, M=56%). Table 5 shows that poorer people in GB are more likely to feel disempowered; 65 percent in the lowest earning quartile felt they had no say in what government does compared to 47 percent of the highest earning quartile. It is also interesting to note GB data that show feelings of disempowerment are much greater among those with lower educational qualifications; 71 percent of those with no qualifications report feeling that they have no say compared to 39 percent with a degree (Table 6).

**Table 4: Personal political efficacy (Wales 2012)**

	Percentage who agree / agree strongly				
	1986	1994	2003	2012	Change 1986–2012
People like me have no say in what government does	71	73	65	51	-20
Politics is too complicated to understand	84	66	60	64	20
Voting is the only way to have any say	n/a	75	64	70	-5

Source: BSAS (2013)<sup>86</sup>

**Table 5: People like me have no say in what government does (Income quartile, GB 2012)**

	Lowest quartile	2 <sup>nd</sup> quartile	3 <sup>rd</sup> quartile	Highest quartile
% agree/agree strongly	65	68	59	47

Source: BSAS (2013)<sup>87</sup>

**Table 6: Disengagement in politics by educational qualification (GB 2012)**

<b>All</b>	<b>59%</b>
<b>Educational qualification</b>	
<i>Degree</i>	39%
<i>Higher education below degree/A-level</i>	54%
<i>O level or equivalent/CSE</i>	68%
<i>No qualification</i>	71%

Source: BSAS (2013)<sup>88</sup>

## 5.7 HEALTH

Comprising sub-domains of *Physical health* and *Mental health*

### 5.7.1 Physical health

**Women in the most deprived areas (the most deprived quintile) in Wales have 13 percent less than the average number of years of healthy life expectancy (2009).**

**Men in the most deprived areas in Wales have 14 percent less than the average number of years of healthy life expectancy (2009).**

#### Domain

Physical health and well-being are among the most crucial indicators of a decent social floor. Eighty-one percent of respondents ranked health as a high priority goal in *The Wales We Want*. As one said: 'If you haven't got your health none of the others means anything'.<sup>89</sup>

## Indicator

The relationship between poverty, ill health and early mortality is well documented.<sup>90</sup> Yet early mortality remains a crude indicator. Illness can severely curtail quality of life at any point, though most commonly in the years immediately preceding death. A preferable measure is therefore one that encompasses both illness and mortality, giving an indication of quality of life as well as quantity. This is known as healthy life expectancy (HLE). It is an estimate of how long the average person might be expected to live in a healthy state and combines statistical prediction of life expectancy with self-reported health status. Data for this are routinely collected across the UK by ONS and by Public Health Wales, they are also collected across the EU, allowing for international comparison.<sup>91</sup>

## Threshold

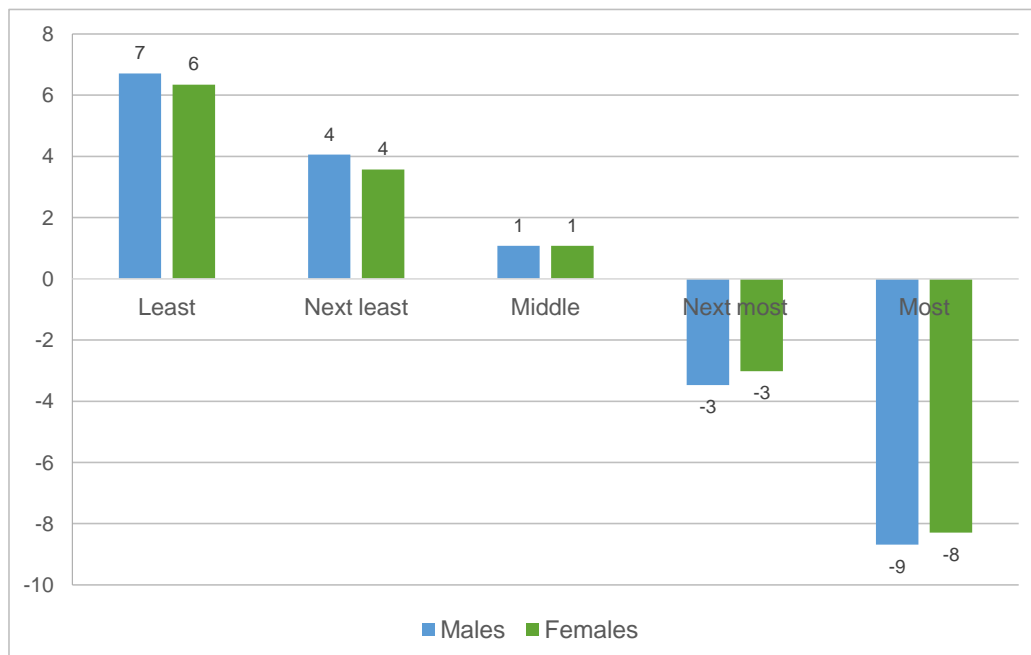
The problem for the purposes of the Doughnut model is how to establish what a minimum acceptable HLE might be. One approach would be for an end to the correlation between deprivation and lower HLE – so there is no socio-economic gradient in this aspect of health. This would mean that HLE would be consistent at a population level across different areas as measured by the Welsh Index of Deprivation (WIMD).

The WIMD measures deprivation across a wide range of areas including housing, income and education. These are geographically based indicators which group output areas into deciles or quintiles ranging from *most deprived* to *least deprived*.<sup>92</sup>

Data are available for HLE broken down by quintiles of deprivation, based on the WIMD.

Figure 8 shows the differences between the Welsh average HLE (63.5 years for men, and 65.3 years for women),<sup>93</sup> and the average HLE within geographic areas as defined by the IMD. It is these disparities that are relevant for the Doughnut. The most deprived areas in Wales see males with 9 years less HLE than their average male counterparts, and females with 8 years less than their average counterparts.<sup>94</sup>

**Figure 8: Number of years above or below average healthy life expectancy by deprivation quintiles (Wales 2005–2009)**



Source: PHW<sup>95</sup>

The problem is how to capture these disparities in a way that is useful for the Doughnut model. We have therefore chosen to express the indicator as a percentage: calculated from the difference between the Welsh average for years of HLE (male and female) and the most deprived quintile, thus capturing disparities correlated to deprivation. The threshold is therefore the average number of years of HLE.

### Result

Men in the most deprived areas in Wales (the most deprived quintile) have 14% less than the average number of years of healthy life expectancy (average 2005-2009).

Women in the most deprived areas in Wales (the most deprived quintile) have 13% less than the average number of years of healthy life expectancy (average 2005-2009).

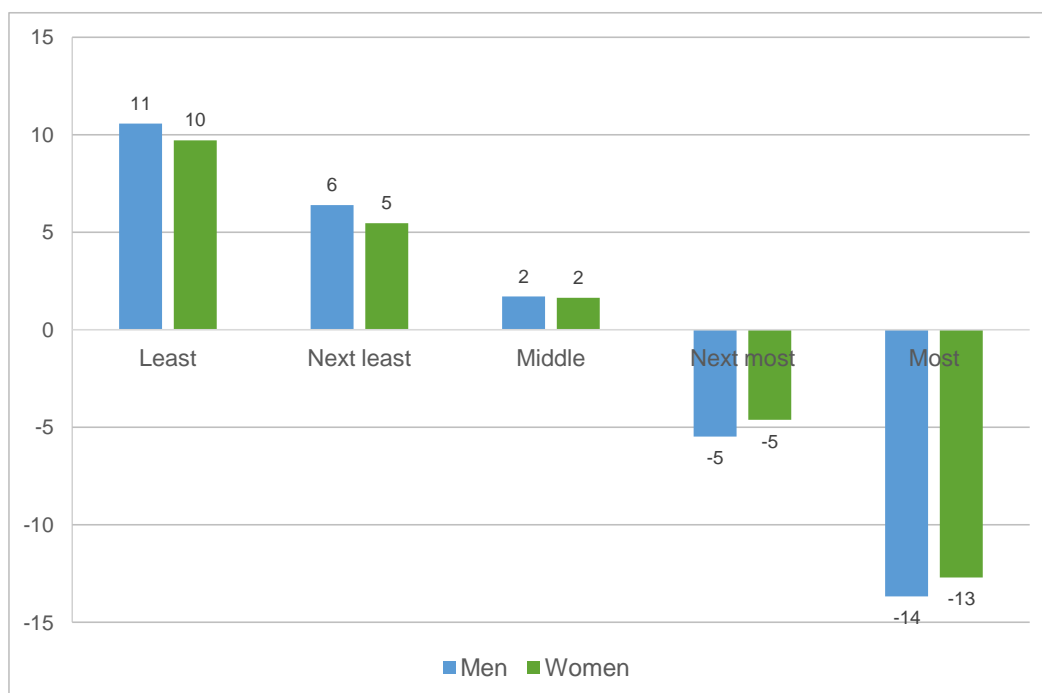
### Method

- Male HLE in most deprived quintile is 9 years below Welsh male average of 63.5 years ( $9/63.5 \times 100 = 14$  percent)

Female HLE in most deprived quintile is 8 years below Welsh female average of 65.3 years ( $8/65.3 \times 100 = 13$  percent)

Figure 9 shows this disparity as a percentage of Welsh averages.

**Figure 9: Number of HLE years compared as percentage of male and female Welsh average by IMD quintile (0 = Welsh averages, 2005–2009)**



Source: Based on data from PHW<sup>96</sup>

There is a wide range of literature exploring the links between deprivation and HLE and possible policy responses. However, this discussion is beyond the scope of this project.

## 5.7.2 Mental health

**21 percent of adults reported having recently experienced a high level of anxiety (Wales 2013–14).**

### Domain

Mental health is a significant policy area that is crucial to the overall well-being of individuals, societies and countries.<sup>97</sup> Mental health in some form was mentioned in much of the literature reviewed for this project, including Oxfam's Humankind Index for Scotland, the EHRC's Equality Monitoring Framework and the ONS Well-being Consultation. It was also prominent in submissions to Rio+20. Therefore it is included here as a sub-set of the *Health* domain.

### Indicator

Mental health is a complex area of health policy, especially given that mental health problems can be both a significant cause of physical health problems and a consequence of them.<sup>98</sup> The three most commonly used indicators of mental illness are: prescriptions for, or self-reported experiences of, anxiety and or depression (since anxiety and depression are the most common forms of mental illness), hospitalization for mental health problems though chronic underfunding and an emphasis on care in the community mean that only people with severe problems are hospitalised), and rates of suicide. The disadvantage of using any of these as a headline indicator is that they indicate disease rather than wellbeing. Mental wellbeing is crucial to health and is not merely the absence of significant mental illness.

In 2006, NHS Scotland funded the development of the Warwick Edinburgh Mental Wellbeing Scale (WEMWBS) based on responses to 14 questions, covering psychological functioning (autonomy, competence, self-acceptance, personal growth) and interpersonal relationships.<sup>99</sup> It is used in Scotland and Northern Ireland<sup>100</sup> to measure subjective mental wellbeing and has recently been adopted by ONS for use in England and Wales.<sup>101</sup> While this would be a better indicator to measure wellbeing, as opposed to self-reported anxiety it is problematic for use within the Doughnut as it is specifically recommended that a cut-off point is not established to differentiate well-being or illness. Such data issues may be overcome in the future. In the meantime, however, we rely upon data on self-reported anxiety.

There is concern that self-reported health data are unreliable and do not accurately reflect conditions due to underreporting. We have, however, found no suitable alternative and must therefore accept the data limitations if we are to include mental health as a domain.

### Threshold

In terms of a cut-off point we have chosen to use the most recent ONS question on self-reported levels of anxiety asked in its *Annual Population Survey*. This asks respondents to rate the level of anxiety they felt the previous day through applying a score of 1 to 10, with 10 being the highest.<sup>102</sup> A score of 6 to 10 is rated by the ONS as a 'high' level of anxiety and it is this level of anxiety we use here as a threshold.<sup>103</sup>

### Result

**21 percent of adults reported having recently experienced a high level of anxiety (Wales 2013–14).**<sup>104</sup>

Results from the Welsh Health Survey, while using a different definition from the ONS, show clear variations between male and female experiences.<sup>105</sup> Data on those stating they are currently being treated for mental illness show that 14 percent of women report themselves to be currently receiving treatment compared to 9 percent of men.<sup>106</sup> The Welsh Health Survey also demonstrates significant correlations between mental illness and deprivation. This survey shows that while only 9 percent of 'Managerial & Professional' occupations reported mental illness, over 28 percent of the long-term unemployed did so. Moreover, in the most deprived areas 18 percent reported mental illness while only 9 percent did so in the least deprived areas.<sup>107</sup>

## 5.8 HOUSING

### 3 percent of households are overcrowded (Wales 2011).

#### Domain

While lacking as an issue in many of the submissions to Rio+20, housing was clearly identified through the Oxfam workshop, the consultation for the Oxfam Humankind Index for Scotland, secondary sources and discussions with stakeholders as being fundamental in its own right and in relation to so many other domains of the social floor. As a respondent to the Oxfam Humankind Index for Scotland reported: *'[A home is important as] a secure place that people can call their own, control access to and build a life from.'*

#### Indicator

There are a range of housing indicators that might be considered for this project, including housing quality, affordability, overcrowding and homelessness. Indicators of housing quality tend to be basic, or not comparable across areas of the UK, while some issues such as dampness are to a degree dealt with by the fuel poverty indicator within the domain of *Energy*, and affordability is in part dealt with in the domain of *Income*.

Homelessness is the most basic of measures and, as recent reports show, it is increasing in England and Wales.<sup>108</sup> However, data suitable for the purposes of the Doughnut model are difficult to establish as rough sleeping, hidden homelessness, applications to be considered homeless, and numbers in temporary accommodation are measured in a variety of ways and over different time periods.

We have therefore focused on overcrowding, as figures for this are available and comparable across the UK although we recognise the limitations of this as a proxy measure for housing overall. We would prefer to combine this with some measure of homelessness, but have as yet to uncover or develop a suitable method for doing so.

Overcrowding here is measured by an *occupancy rating* based upon the *bedroom standard*, which requires a set number of bedrooms according to the number, age, gender and relationship of the occupants.<sup>109</sup>

#### Threshold

The lack of one or more bedrooms for the number, age and gender of inhabitants living in the property.

#### Result

3 percent (38,000) of households in Wales were overcrowded in 2011 (see Table 7)

While data exist for England<sup>110</sup> and Scotland<sup>111</sup> on overcrowding through national household surveys, we have no comparable up-to-date data from Wales, the latest being contained within the *Living in Wales 2008* report.<sup>112</sup> Therefore, we have been forced to depend upon ONS Census data, which gives slightly higher results than the more specialised national household surveys used in the other national reports.

**Table 7: Overcrowding in England and Wales 2011**

England and Wales	4.5%	1.1m
Wales	2.9%	38,000

Source: ONS<sup>113</sup>

Data from England suggests a link between ethnicity and overcrowding, with over 12 percent of the black and minority ethnic (BME) population in England experiencing overcrowding compared with around 2 percent of the white population.<sup>114</sup> Similarly, differentials can be seen in the nature

of tenure with 8.7 percent of households in England and Wales who are renting being overcrowded, compared to 2.3 percent of owner occupiers (2011).<sup>115</sup>

We have been unable to source any gender-related data but results show that over two thirds of overcrowded households in England and Wales contain dependent children.<sup>116</sup>

## 5.9 INCOME

### 24 percent of households are in relative poverty (Wales 2010/11 – 2012/13)

#### Domain

Monetary income is vital in a developed market economy where access to various aspects of life is largely determined by financial resources (either directly or indirectly). This was clearly identified as fundamental through the Oxfam workshop, secondary sources and discussions with stakeholders.

#### Indicator

The statistic most commonly used in relation to income poverty is a relative measure set at 60 percent below the median household income (HBAI). This is usually calculated after housing costs have been deducted to allow for a truer assessment of disposable income (HBAI, AHC). Oxfam believes that relative poverty must remain at the core of any poverty measurement,<sup>117</sup> but a range of complexities arises in using this as an indicator for the purposes of this report. The main concern is that, while it shows income inequality (vital in itself), it is not a measure of income adequacy.

For income adequacy, a better measure is the Minimum Income Standard (MIS) from the Joseph Rowntree Foundation (JRF) and the Centre for Research in Social Policy at Loughborough University.<sup>118</sup>

The MIS is defined as “...‘*The Minimum Income Standard (MIS) is what is considered to be the ‘minimum acceptable standard of living in Britain today that includes, but is more than just, food, clothes and shelter. It is about having what you need in order to have the opportunities and choices necessary to participate in society.*”<sup>119</sup>

However, the MIS only covers a limited number of household types and does not include those with more than one unrelated adult (such as students sharing a property). Thus around 25 percent of households are not tracked using this metric. Because of this, the JRF notes that it cannot be used to show the risk of falling below the MIS across the whole population: rather, it shows that risk among specific household types.

Therefore, despite its limitations, the HBAI metric is more comprehensive, longer-term and comparable over time and countries, and it forms the basis of many government targets. As such it is the preferred metric for our purposes. The HBAI results used here are based upon three-year averages as they smooth out annual variations.

#### Threshold

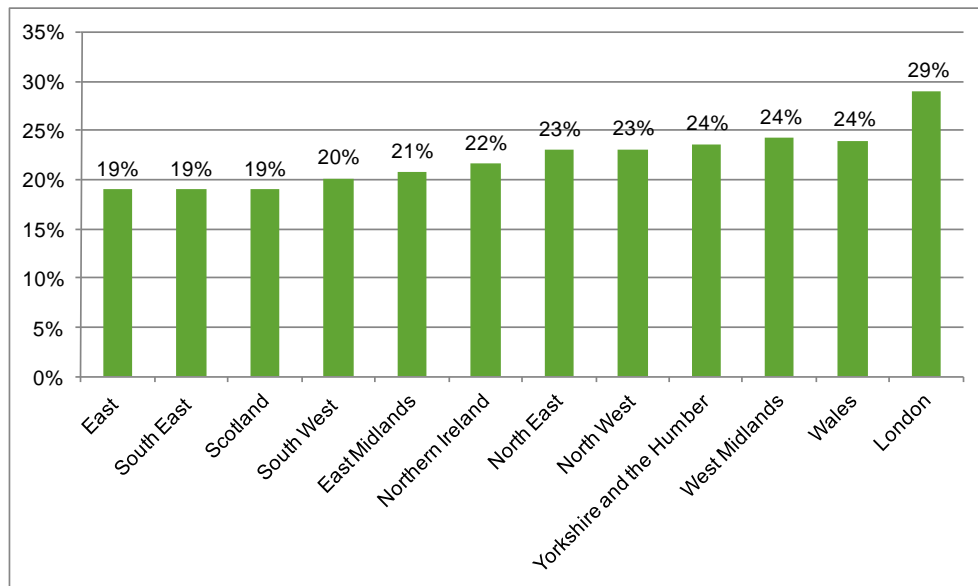
Proportion of households with incomes falling below 60 percent of HBAI, AHC.

#### Result

24 percent of people in Wales live in households whose income is below 60 percent of median income (HBAI, AHC, three-year average 2010–11 to 2012–13).<sup>120</sup>

The average level of poverty across the UK based on the HBAI three-year average is 22 percent. Thus Wales compares relatively badly on this metric of income having the second highest incidence within the UK (Figure 10).

**Figure 10: Percentage in relative poverty (60 percent below HBAI AHC, 3 year average for 2010/11 – 2012/13)**



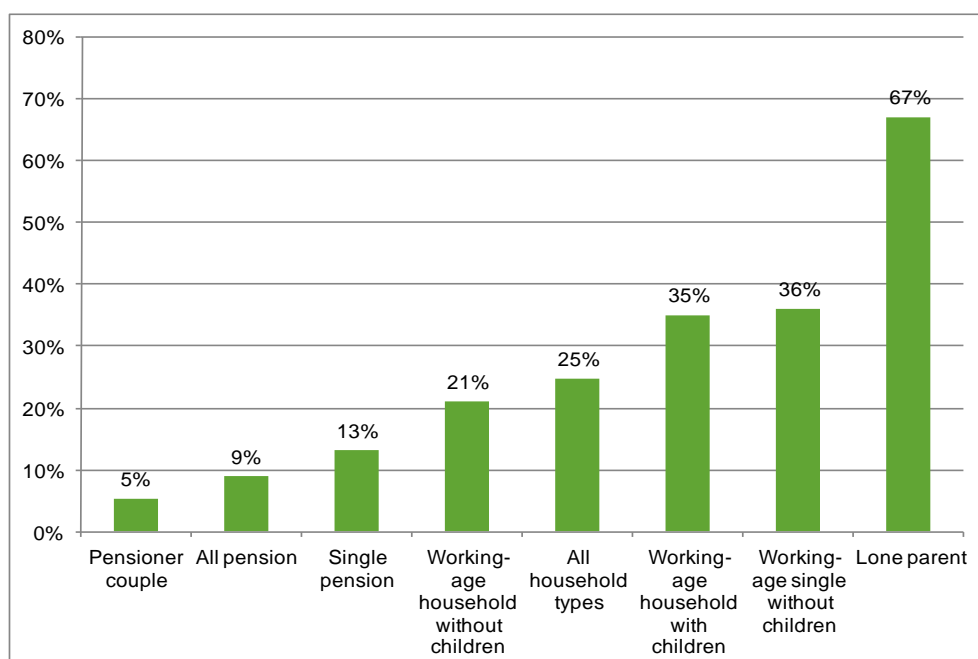
Source: HBAI July 2014 Table 3.19ts<sup>121</sup>

Additionally, 23.5 percent of households in Wales fell below the MIS in 2011–12, compared to around 25 percent at UK level.<sup>122</sup>

The two main data sets used here for measuring poverty, HBAI and MIS, tell a similar story at a UK level: that lone parents, single working-age households and couples with children are most likely to be in relative poverty (Figure 11). Over 90 percent of lone parents are women<sup>123</sup> and lone parent status carries the highest risk of poverty on both measures. Gender differences using HBAI data at UK level can be seen among single-adult households. Single female pensioners are more likely than single male pensioners to be in relative poverty (17 versus 15 percent), while single working-age males are more likely than their female counterparts to be in poverty (29 versus 25 percent).<sup>124</sup>

However, both datasets are based upon household measurements of income. Therefore, neither analyses how women and men might benefit differently from the distribution of the benefits of such income within a couple household. Any inequalities which may exist within couple households are therefore masked and cannot be drawn out in this report.

**Figure 11: Percentage of individuals below MIS by household type (UK 2012)**



Source: Padley & Hirsch (2014) Table 1 and Figure 2<sup>125</sup>

## 5.10 NATURAL ENVIRONMENT

**16 percent of people access the natural environment less than once a week (Wales 2011).**

**Women = 17 percent**

**Men = 15 percent**

### Domain

This domain has been chosen due to a growing body of evidence showing the positive impact on people from being outside in a natural environment.<sup>126</sup> It also builds on work done by Oxfam for its Humankind Index for Scotland.

The definition of having visited the outdoors here is based on the Welsh Outdoors Recreation Survey (WORS) which asks respondents whether they have participated in a defined list of activities in an outdoors setting.<sup>127</sup>

### Indicator

Frequency of access was chosen as an indicator as it relates to various factors such as proximity, transport/access, safety and perceptions. The more accessible and safe the natural environment is, and the greater people's perceptions are that it is a 'good' thing to visit it, the more frequently people will access it.

The data used here is from the WORS 2011. Separate data is available for England<sup>128</sup> and Scotland,<sup>129</sup> but due to variations in methodologies these are not directly comparable.

### Threshold

The WORS collect data on the numbers of people who access the natural environment at least once per week and, we have selected this frequency as a reasonable threshold.

### Result

16 percent of people access the natural environment less than once a week (summer months – Wales 2011).<sup>130</sup>

The WORS groups responses into summer and winter months. Winter access is more limited with 30 percent of people saying they access the outdoors less than once per week during those months. Based on the summer data there is a notable gender difference with 17 percent of women reporting themselves to have accessed the outdoors less than once per week compared to 15 percent men.<sup>131</sup> There is also considerable variation according to areas of deprivation with 22 percent of those within the most deprived communities reporting not accessing the outdoors at least once per week, compared to 14 percent in the least deprived communities.<sup>132</sup>

## 5.11 SENSE OF SUPPORT

**10 percent of people in the UK have little or no support from family, friends or others in times of need (UK, 2012).**

### Domain

*'There is evidence from other studies of a "buffering" effect of having positive social support in the face of shocks such as divorce, ill-health, bereavement, or losing your job. Having positive and strong social support has also been associated with better psychological and physical health as well as positive health and other behaviours.'* (McFall, 2012)<sup>133</sup>

The level of support that people can access is widely accepted as having a major impact on their resilience to shock and their mental and physical well-being. It is posited in some form in all of the

works analysed in the Appendix and is included as a domain here due to this wider role and its potential to reflect the changing nature of relationships and levels of connections between people.

*'Wales as a small nation needs to be more connected within communities... [and where] ...we can support each other.'* *The Wales We Want (2014)*<sup>134</sup>

### Indicator

A range of indicators are used in the various surveys that explore aspects of social support, including community support and participation, support from family and friends, and engagement with society more widely. What is central for this paper is what support people can call upon in times of need. As McFall highlights above, both practical and emotional support is relevant in helping people through difficult times or events.

We have therefore used data from the PSE: UK survey<sup>135</sup> of people's perceptions of the quality of support they could depend upon from family, friends or other sources in times of need: such as being ill, loss of work, bereavement or dealing with relationship problems. However, as with the food indicator from PSE:UK there is a lack of data for Wales as the Welsh Government has chosen not to support a boost in sample size to make it sufficient for a country breakdown.

This indicator is based upon seven questions asked by the PSE: UK survey covering a range of situations. People were asked to describe the level of support they could access in specific situations as 'a lot', 'some', 'not much' or 'none at all'.<sup>136</sup> The situations included 'relationship problems', 'serious personal crisis' and 'a lift in an emergency' (see below). To make the data compatible with the format of the Doughnut model, we have compiled the responses to each question to calculate an overall mean score for each level of support.

### Threshold

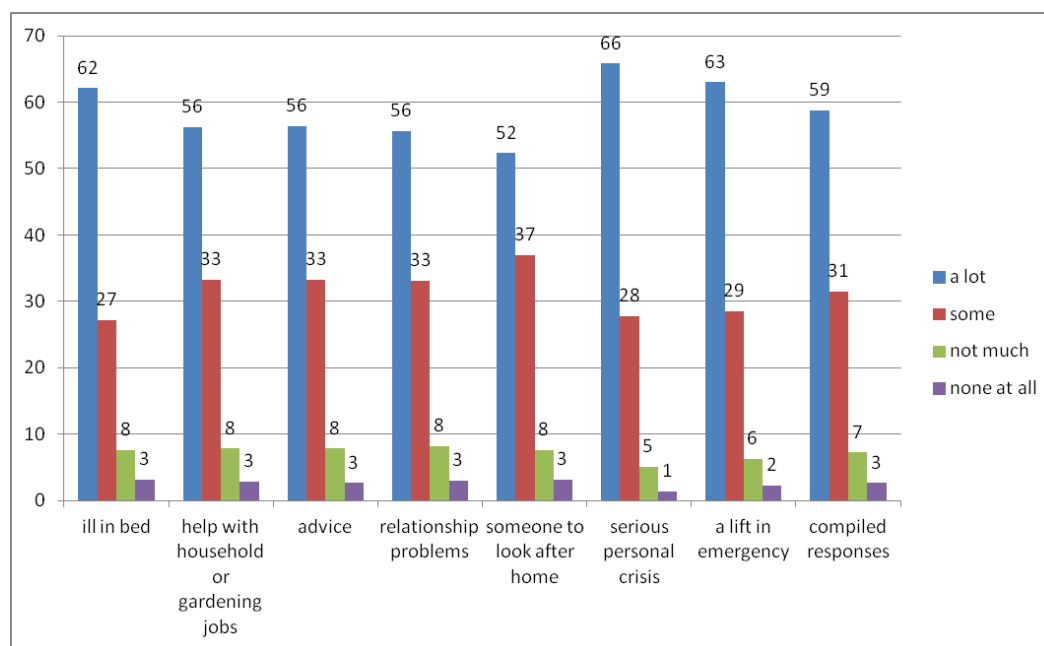
Individuals who have little or no access to support from family and friends in times of need.

### Result

10 percent of people have little or no support from family, friends or others in times of need (UK 2012).

The final set of the columns in Figure 12 compile the responses to the seven questions to give an overall mean of 10 percent of people reporting having little or no access to support in times of need.

**Figure 12: Level of social support (%) respondents reported being able to depend upon in each situation (UK 2012)**

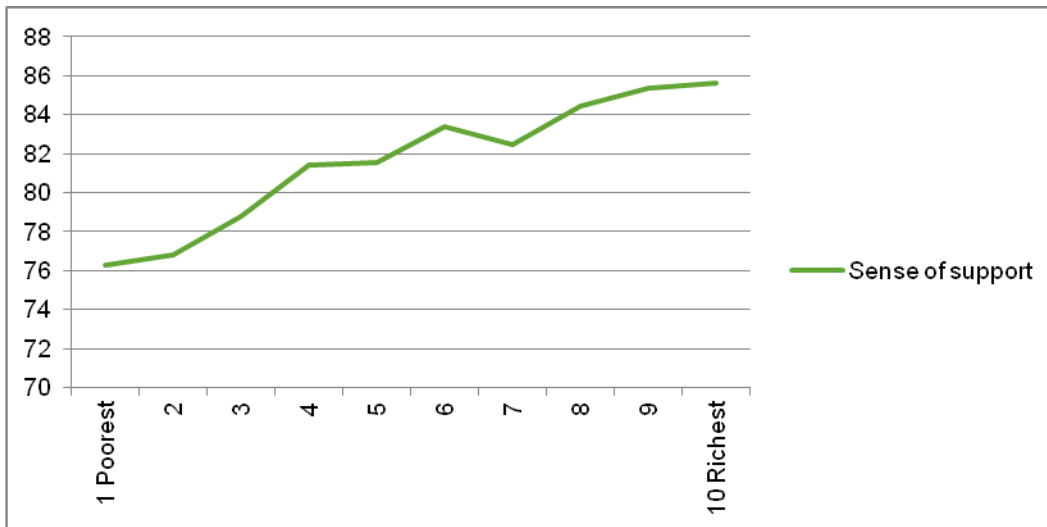


Source: PSE:UK<sup>137</sup>

The results do not vary between men and women.

Figures 13 and 14 below are based on PSE:UK data which demonstrate the correlation between deprivation and sense of support. The left-hand axis on both figures is based on an index developed by PSE: UK. The index combines people's responses across the seven questions and applies a score from 0–100, with the upper scores indicating greater levels of perceived support. The x-axis on the figures shows deprivation by household income (Figure 13) and by deprivation on a neighbourhood basis (Figure 14). It is clear in these figures that sense of support increases with household income and declines in deprived areas.

**Figure 13: Sense of support by household income deciles (UK 2012)**



Source: Based on figures from PSE:UK<sup>138</sup>

**Figure 14: Sense of support by neighbourhood deprivation (IMD, UK 2012)**



Source: Based on figures from PSE:UK<sup>139</sup>

## 5.12 WORK

**19 percent (0.28m) of economically active adults lack satisfying work (Wales 2014).**

### Domain

As well as providing some level of income, there is significant evidence that work is central to people's physical, emotional and mental health, and should therefore be included in the Doughnut model. The quality of work – not just remuneration – impacts on people's ability to maintain good mental health, engage in non-work activities in the community and family, and so on. This is made clear by the Oxfam Humankind Index for Scotland, which identifies as central satisfying, secure and suitable work that pays an adequate income: one respondent said what was important to living well was '*[h]aving not just a secure job, but one that feels worthwhile - not drudgery*'.

### Indicator

The mere fact of work may not, in itself, necessarily have a positive impact. If wages and job security are low, hours insufficient and other, more qualitative factors, such as influence, representation, personal development and meaningfulness of work are lacking, then negative impacts may ensue.

Therefore, in terms of developing an indicator with a threshold below which no one should fall, the *quality* of work is considered alongside the quantity of jobs. However, indicators for *quality work* are limited.

A Trades Union Congress (TUC) index measuring work *quality* relates only to hours and pay. A more advanced tool from the International Labour Organization (ILO) on *decent work* is being developed which will cover a wide variety of indicators relevant to each country. However, at the time of writing this tool was not available.

Additionally, there are ample data on wages, under-employment and the growth of in-work poverty. However, as wages are included under the domain of *Income*, it was felt unnecessary to make this the main focus here; it was also felt to be insufficient as an indicator of quality.

We have therefore focused on self-reported *satisfaction* levels. This has the advantage of capturing how people feel about their pay and hours alongside more qualitative factors. The data are collected through two sources – the UK Household Longitudinal Survey (UKHLS), which is updated regularly, and the Workplace Employment Relations Study (WERS), which relates to influence, representation, pay and relations at work. Further work is required to drill down into the methodologies for each of these studies in order to select the most appropriate one. For the moment we use the UKLHS, as the presentation of the data easily allows for a threshold to be identified.

There are difficulties in using this data, as reported satisfaction may reflect harsh economic times as people become more easily satisfied with the mere fact of having a job rather than its quality. However, the UKHLS, as used by the ONS, is currently the best fit for this project, at least until the ILO tool has been developed and applied to the UK.

Alongside the numbers of those reporting dissatisfaction with their work, we also have to consider those who are unemployed. We have therefore added people actively seeking employment to those reporting dissatisfaction at work, as they too lack satisfying work. Taken together, these groups are compared to the entire *economically active* population.<sup>140</sup>

## Threshold

Proportion of working-age adults who are economically active without satisfying work.

## Result

19 percent (0.28m) of economically active adults lack satisfying work (Wales 2014)

## Method

- 13.6 percent of employed people in the UK are *somewhat, mostly or completely dissatisfied* with their work.<sup>141</sup>
- = 0.18m in work in Wales who are ‘... *dissatisfied*’ (13.6 percent of 1.35 in work<sup>142</sup>)
- + 0.1m unemployed who are actively seeking work<sup>143</sup>
- = 0.28m lacking satisfying work

## Denominator

Economically active (employed + unemployed but seeking work) = 1.45m<sup>144</sup>

Percentage lacking satisfying work

- $0.28/1.45m * 100 = 19.3$  percent of economically active in Wales lacking somewhat satisfying work.

Unfortunately we do not have the data on work satisfaction broken down by gender. However, British Social Attitudes Survey (BSAS) data suggest that men are more likely than women to report being dissatisfied.<sup>145</sup> Combined with higher male unemployment rates this is likely to mean that men are more likely to lack satisfying work. Of course the work that we are talking about here is paid work in the market place. It does not take into account the broader understanding of work which encompasses unpaid care and housework etc. and the gender inequalities within these.

# 6 METHODOLOGY FOR DEVELOPING AN ENVIRONMENTAL CEILING

***This section details our current proposals for the domains of an environmental ceiling along with indicators and thresholds where these have been identified.***

Several of these cannot as yet be separated into Welsh results due to data limitations, these are highlighted below.

We have identified nine domains from the ten proposed by the Stockholm Resilience Centre (SRC), which can be applied in some form to Wales or the UK. However, it should be noted that we have changed the terminology from *planetary boundaries* to *environmental ceiling*. We have done this in order to include a wider range of environmental domains than if we focussed only on those for which planetary boundaries have been recommended, and for which we have national data sets. In doing so we follow the logic of Steffen *et al* who, while pointing out that the planetary boundaries framework is not designed to be downscaled to a local level, state that “*there are strong arguments for an integrated approach ... to enable the application of ‘planetary boundary thinking’ at levels (nations... ) where policy action most commonly occurs*”.<sup>146</sup>

Thus we look at national impacts in some areas, such as chemical pollution, where no planetary boundary has been proposed or where there is no method for measuring proximity to any such boundary. Where we have used metrics in relation to planetary boundaries, these are based mainly upon the work of the SRC, which notes that its efforts are a ‘*...first attempt to develop scientifically grounded approaches that attribute the contributions of individuals to global environmental problems*’.<sup>147</sup> It should also be noted that Steffen *et al*’s updated work on planetary boundaries has proposed some changes to the approach. These include developing regional boundaries in several domains and developing a two-tier approach to account for the interaction of regional and global results; identifying two core planetary boundaries (CO<sup>2</sup> and Biosphere Integrity, formerly Biodiversity), which in themselves are capable of potentially irreversibly changing the Earth system; and updating quantification of some boundaries. However, this updated work does not impact upon the results in this report which were derived where possible from the SRC work.

Thus the methodologies used for developing the environmental domains vary; these are explained in Section 8. We view these domains as organic and envisage them evolving further over time through discussions with stakeholders. We again stress that this report is a starting point to consider and present major environmental concerns, and to combine these with social datasets in order to inform and stimulate policy debate.

An additional issue with the Welsh Doughnut report, as compared to the UK and Scottish versions, has been a lack of available environmental data. This lack of data means that the situation in Wales is less clear than it is elsewhere in the UK. We would hope this situation can be rectified to some degree by the publication of data which appears, in the case of carbon footprint results at least, to already exist. We detail these data limitations in each relevant section below.

The domains selected have been derived by four broad processes. First, for three domains, climate change, nitrogen cycle and land use change, data has been used that shows Wales’ or the UK’s impact upon planetary boundaries based on national-level consumption of the Earth’s resources. This has been made possible by the work of the SRC on downscaling proposals for planetary boundaries to a per capita level. It should be noted, however, that this approach does

not take into account the relative impacts of a nation's consumption over time. Thus the historical contribution of countries to climate change, or 'climate debt', for example, is not assessed. Nor does it take account of who is specifically responsible for breaches of environmental limits – although we know that a growing body of evidence shows that powerful companies and wealthy individuals are disproportionately responsible for environmental impact.<sup>148</sup> For example, Gough *et al.* found that 'emissions rise in line with income'.<sup>149</sup> This confirms similar research by Preston *et al.* for the JRF which concluded that, '*Household carbon emissions in Great Britain are strongly related to income: the richest 10 percent of households emit three times that of the poorest 10 percent from energy use in the home and personal travel.*'<sup>150</sup>

Second, in three domains where this approach has not been possible due to lack of data or difficulties in relating national circumstances to global effects, we have sought to develop alternative measures showing national impacts. We have taken this approach for the domains of *Phosphorous cycle*, *Chemical pollution* and *Biodiversity loss*.

Third, we have developed alternatives for two domains. We have dropped *Ocean acidification* because the main driver of ocean acidification is the rising level of carbon dioxide, which is dealt with in the domain of *Climate change*. Instead we have focused upon *Ocean harvesting* as an alternative indicator of ocean health. The impact of *Atmospheric aerosol loading* is most apparent in local and regional weather systems, in particular in high-population zones where biomass is used as a major fuel source. Global impacts are not well understood and no planetary boundary has been set. We have therefore selected one of the wide range of particulate pollutants associated with aerosol loading, PM10s. We have chosen this because of proven localized health impacts, and use the term *Air quality* for this domain.

Additionally, we have inserted data on *Stratospheric ozone depletion*, which is potentially problematic, as there is no method for downscaling the planetary boundary to a national level. However, as the UK currently neither produces nor consumes ozone-depleting substances, beyond the most negligible levels, it is relatively simple to show current impact.

Finally, the *Global fresh water use* domain has been altogether omitted for a range of reasons, including data availability and doubts around the causal links between Wales' consumption of national supply and global impact.

# 7 ENVIRONMENTAL CEILING RESULTS

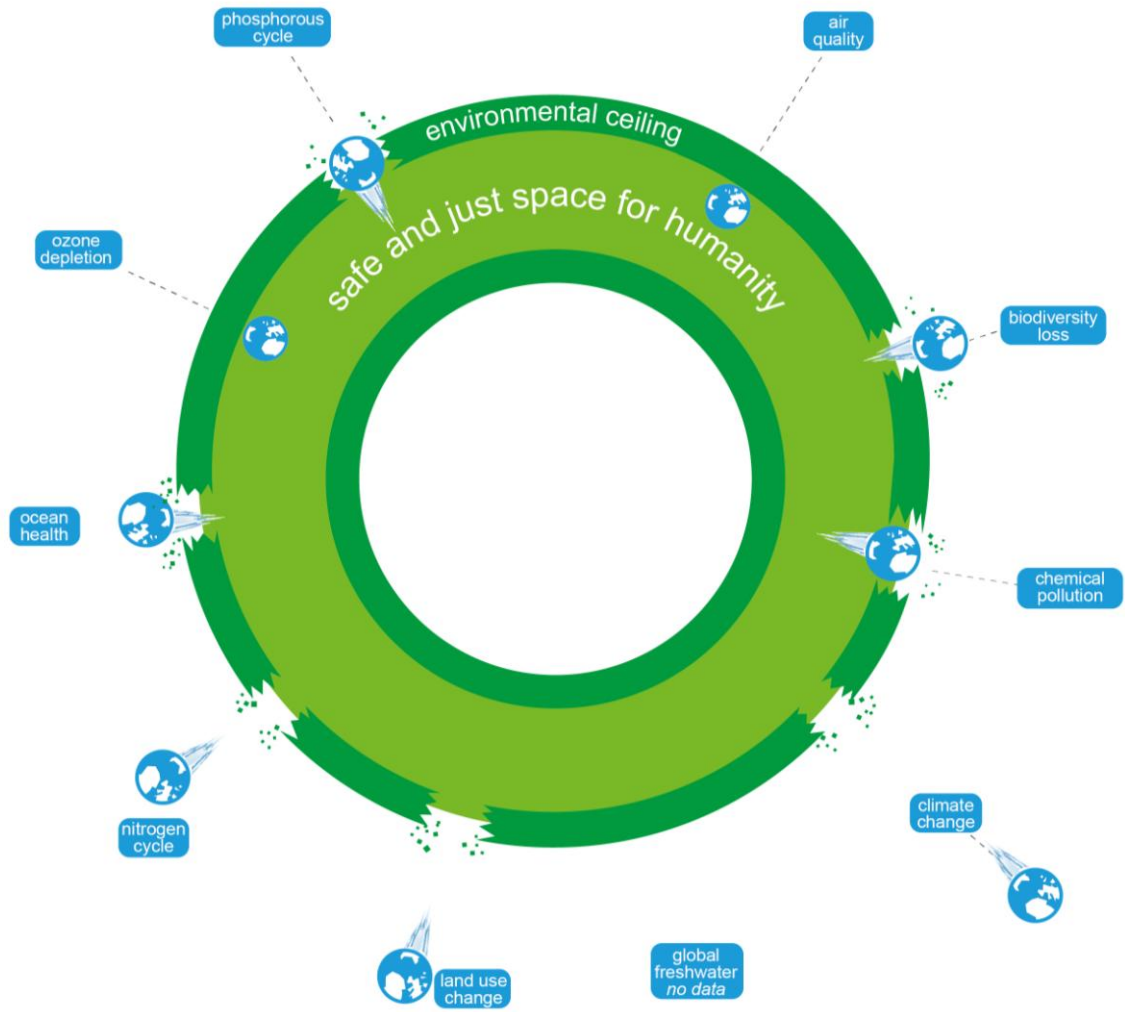
Figure 15 presents headline results while Table 8 gives an overview of the choices made. Section 8 gives the rationale behind these choices and explores some of the issues that arise surrounding the measurement of Wales' performance in these areas.

**Table 8: Environmental ceiling results (Wales 2014)**

Domain	Indicator	Boundary	Result
<b>Air quality</b>	Particulate concentration (PM10)	World Health Organization (WHO) recommend upper limit of 20 $\mu\text{gm}^3$ annual mean.	<b>Annual mean is 18<math>\mu\text{gm}^3</math></b>  <b>Average annual PM10 levels at roadside testing sites are 10% lower than WHO upper limit (Wales 2014).</b> <b>Boundary not exceeded</b>
<b>Biodiversity loss</b>	UK Farmland Birds Index	The 1970 baseline index	<b>55% of farmland bird species have declined since 1970 (UK 2013).*</b>
<b>Chemical pollution</b>	Chemical quality of Welsh rivers.	Failure to achieve classification of <i>good</i> chemical quality.	<b>1% of rivers fail to achieve good chemical quality (Wales 2009).</b>
<b>Climate change</b>	Consumption of CO <sub>2</sub> (MtCO <sub>2</sub> )	SRC-based UK boundary: 127.4 MtCO <sub>2</sub> /year	<b>650 MtCO<sub>2</sub>/year</b> <b>Exceeded boundary by 410% (UK 2011).*</b>
<b>Global fresh water</b>	No data		
<b>Land-use change</b>	Land use change (hectares per capita)	United Nations Environment Programme (UNEP)-based per capita UK boundary: 0.2 ha/capita	<b>0.7 ha/capita</b>  <b>Exceeded boundary by 250% (UK 2007).*</b>
<b>Nitrogen cycle</b>	Imports of manufactured nitrogen (MtN)	SRC-based UK boundary: 0.3185 MtN/year	<b>1 MtN/year</b> <b>Exceeded boundary by 214% (UK 2012).*</b>
<b>Ocean health</b>	% of fish stocks harvested sustainably by UK vessels	100% of fishing classified as sustainably harvested	<b>64% of UK fish harvested unsustainably (UK 2012).*</b>
<b>Ozone depletion</b>	Ozone-depleting Substances (ODS)	Consumptive use of ODS	<b>Zero emissions of ODS</b> <b>Boundary not exceeded</b>
<b>Phosphorous cycle</b>	Phosphorous loads in Welsh rivers	<i>Poor/bad</i> loads of phosphorous in rivers.	<b>3% of Welsh river testing sites have poor or bad loads of phosphorus (Wales 2013).</b>

\* For these domains there were insufficient Welsh data sets available and we have been forced to rely upon UK results. See specific sections for details.

Figure 15: Environmental ceiling (Wales 2014)



# 8 RATIONALE FOR SELECTION OF ENVIRONMENTAL DATA

*This section explains the process behind the development of each domain, indicator and threshold, and the method for working out the results.*

## 8.1 AIR QUALITY

**Annual average PM10 levels at urban traffic testing sites are 10 percent lower than WHO recommended upper limit (Wales 2013)**

### Domain

Atmospheric aerosol loading is included in the SRC's planetary boundaries due to its impact on the Earth's climate and on human health. It occurs when particulate pollutants are given off into the atmosphere through both naturally occurring processes and through human activity such as the burning of coal, forests and crops, or the diesel fumes emitted and dust thrown up by vehicles. The SRC points out that particulate pollution can already be seen to have affected local climates and weather systems in highly polluted areas. It also highlights the fact that inhalation of polluted air causes the premature deaths of around 800,000 people per year globally.<sup>151</sup>

### Indicator

The impact of aerosol loading on weather systems is significant. However, a method for understanding or measuring its impacts has, as yet, proved elusive. The SRC/SEI report points out that, *'Complexity in terms of the variety of particles, sources, impacts, and spatial and temporal distribution make it currently impossible to discuss a critical boundary for the Earth as a whole.'*<sup>152</sup>

The absence of a planetary boundary, therefore, has led us to explore an alternative indicator of national relevance.

### Alternative domain- particulate pollution

*'The air we breathe can be contaminated by emissions from motor vehicles, industry, heating and commercial sources (outdoor), as well as tobacco smoke and household fuels (indoor)... In the WHO European Region alone, exposure to particulate matter (PM) decreases the life expectancy of every person by an average of almost 1 year...'* (WHO)<sup>153</sup>

Particulate matter in the atmosphere (in the form of PM10s) is associated with respiratory tract health problems, cancer, damage to lung tissue, asthma and heart attacks. Older people, children and people with chronic lung disease, influenza or asthma are particularly sensitive to particulate air pollution. Therefore, while levels are not serious enough to disturb weather patterns in Wales or the UK, they may pose a significant, if localized, risk to health and it is this risk we focus on.

Major sources of PM10s are diesel fumes and dust thrown up by traffic, and there are regularly collected, long-term and accurate data available. The UK Automatic Urban and Rural Network (AURN) monitors air quality in sites in rural and urban areas across Wales.<sup>154</sup> The average number of days per site with 'moderate' or higher PM10s was considered as an indicator. However, because of changes in methodology, it was considered more useful to use annual mean concentrations of PM10s as the indicator. The highest levels tend to be found at roadside/kerbside sites and it these that we focus on here.

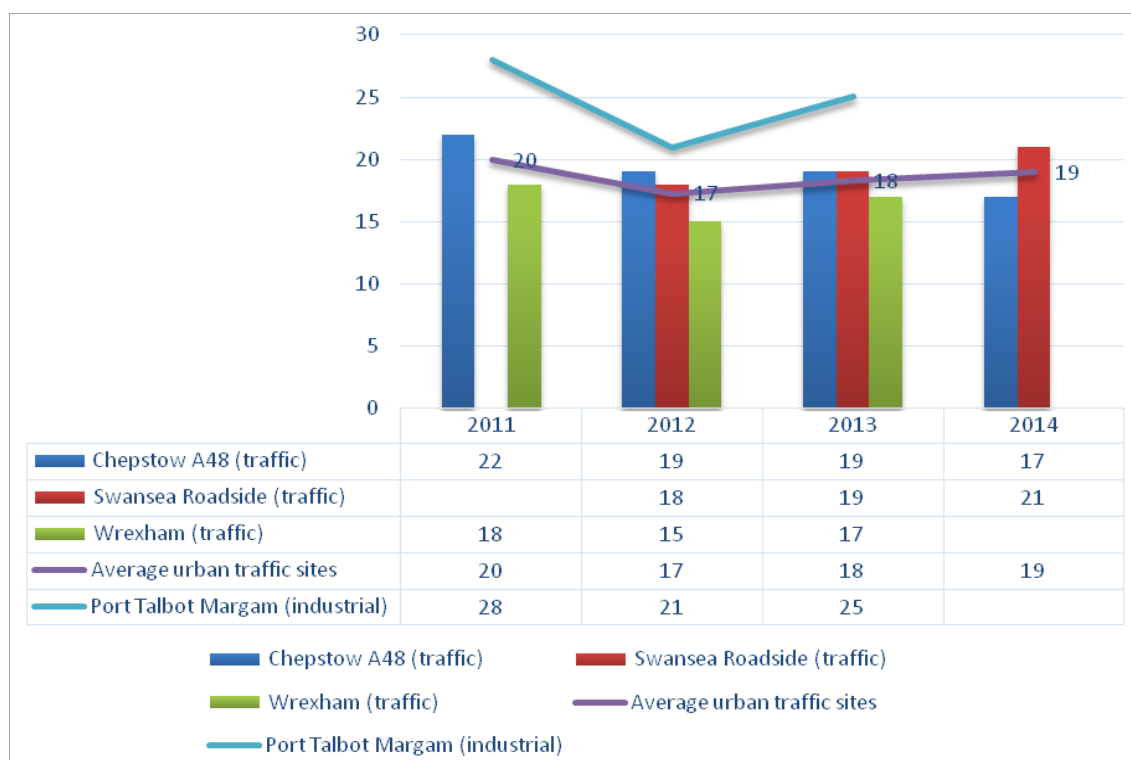
## Boundary

The WHO-recommended upper limit for PM10s is an annual mean of 20  $\mu\text{g}\text{m}^3$ . WHO states that ‘...by reducing particulate matter (PM10) pollution from 70 to 20 micrograms per cubic metre, we can cut air quality related deaths by around 15 percent’.<sup>155</sup> It should be noted though that WHO does not suggest that this is a safe level, merely an aspirational one.

## Result

Annual national mean PM10 levels at roadside testing sites are 10 percent lower than WHO recommended upper limit (Wales 2014).<sup>156</sup>

**Figure 16: Mean annual PM10 levels ( $\mu\text{g}\text{m}^3$ ) across three Welsh urban traffic testing sites and one urban industrial site (2011–2014)**



Source: DEFRA<sup>157</sup>

As can be seen in Figure 16 in the last year for which we have results for all three urban traffic sites, 2013, the average level of PM10 pollution was 2  $\mu\text{g}\text{m}^3$  (or 10 percent) below the WHO recommended levels. Results available in November 2014 show that in one roadside site, Swansea, the 20  $\mu\text{g}\text{m}^3$  mean limit was breached, this follows an upwards trend since 2012. It should further be noted that in the one urban industrial testing site in Wales, Port Talbot Margam, the 20  $\mu\text{g}\text{m}^3$  limit has been consistently breached since records began in 2010.

The mean urban background results for 2013 were 16  $\mu\text{g}\text{m}^3$  across the two sites in Cardiff Centre and Newport.

## 8.2 BIODIVERSITY LOSS

**55% of UK farmland bird species have declined since 1970 (by 2013).**

### Domain

*‘Biodiversity is the variety of all life on Earth. It includes all species of animals and plants, and the natural systems that support them. Biodiversity matters because it supports the vital benefits we*

get from the natural environment. It contributes to our economy, our health and wellbeing, and it enriches our lives.’ (Defra)<sup>158</sup>

Biodiversity loss is important nationally and globally as it increases ‘...the risks of abrupt and irreversible changes to ecosystems’.<sup>159</sup> Beyond that, biodiversity clearly has intrinsic value.

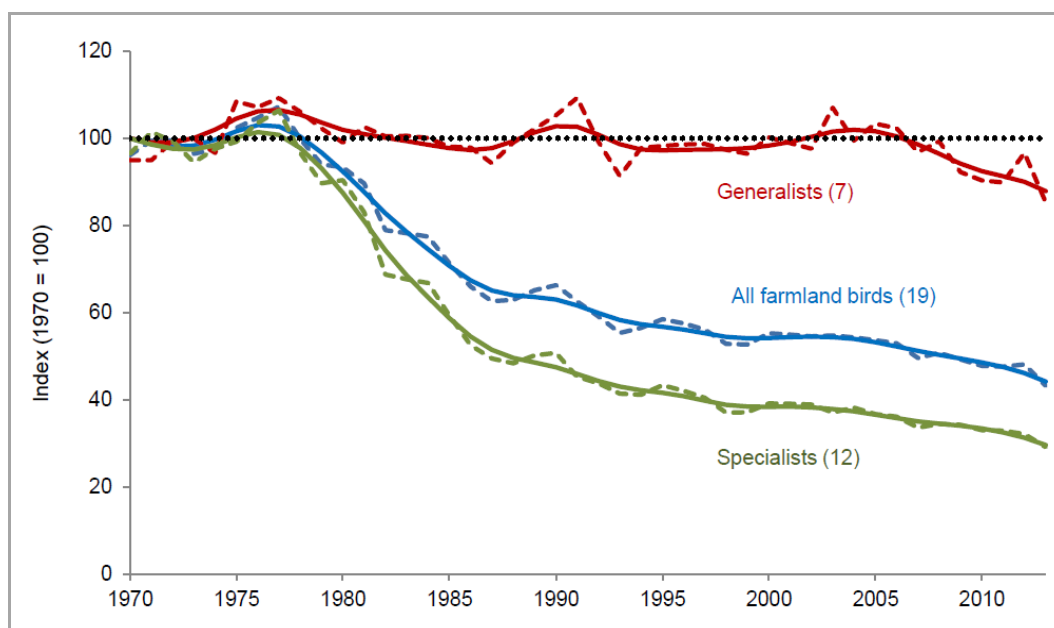
### Indicator

Data covering many species and habitats provide a wide range of potential indicators. It was initially important to consider basing the indicator on other biodiversity indicators, for example those developed for the UK’s Biodiversity Action Plan or the Welsh Assembly Government’s Environment Strategy Action Plan.<sup>160</sup> There are extensive and long-term data on a range of animals, plants, habitats and sites across the UK. Following searches of such data a single indicator index was selected – the UK Farmland Bird Index. Birds tend to be at, or near to, the top of the food chain, so bird health is seen by scientists as providing a good indicator of the health of other animals, plants and a wide range of habitats. This indicator was chosen in particular because of the severe decline in that category, which was most apparent from the 1970s and 1980s. It also reflects to some degree changes in farmland management systems and use of pesticides and fertilizers.

Data is collected for 19 species of farmland birds for the index (12 specialist and seven generalist species)<sup>161</sup> (Figure 17).<sup>162</sup> While annual data is available, longer-term variations are seen as more informative as they smooth out short-term fluctuations caused by annual weather variations or data collection. The baseline index is therefore set at 100 in 1970 when the index in its current form begins, and changes compared against this.

However, data ranging from the 1970s at UK level showing a decline of around 56 percent in the Farmland Birds Index from 1970–2013 is not directly applicable to Wales.<sup>163</sup> Data for the Farmland Birds Index in Wales<sup>164</sup> was not recorded in sufficient quantities until 1994. While some data do exist<sup>165</sup> from which population declines in farmland birds in Wales from the 1970s to the 1990s can be inferred, we have as yet been unable to combine this with post-1994 data to make an overall assessment of the decline since 1970. We remain open to suggestions on how to overcome these data issues and in the meantime depend upon UK results.

**Figure 17: Populations of breeding farmland birds (UK 1970–2013)**



Source: Reproduced from Defra, *Wild bird populations in the UK, 1970 to 2013*<sup>166</sup>

## Boundary

We propose here to set the boundary as the 1970 baseline population. We realise that this is somewhat arbitrary, but choose it as it overcomes concerns about short-term changes; it is also when this series of records began, and allows for negative and positive changes to be presented. We therefore measure loss or gain against the 1970 baseline, but as with all of the domains we remain open to suggestions.

## Result

55 percent of UK farmland bird species have declined since 1970 (by 2013).<sup>167</sup>

This result is the worst on record and follows a trend which is most marked among specialist farmland bird species which have seen a 75 percent decline from 1970 to 2013, while the generalist population has declined by 29 percent.<sup>168</sup>

# 8.3 CHEMICAL POLLUTION

## 1 percent of rivers fail to achieve *good* chemical quality (Wales 2009)

### Domain

Chemical pollution includes radioactive compounds, organic compounds and heavy metals such as mercury or lead generated by industrial processes and waste production. Of particular concern for the planetary boundary are persistent pollutants that have the potential to build up in the environment and bio-accumulate, creating lethal and non-lethal impacts such as reduced fertility, genetic damage and severe damage to ecosystems. Because there are so many manufactured chemicals and their effects may be manifest at very low levels (requiring expensive and specialist techniques to measure), producing a useful index is a major challenge and there is, as yet, no suggested planetary boundary proposed by the SRC.

### Indicators

The absence of a planetary boundary has led us once again to consider national impacts.

Several indicators were considered for this domain. They included pesticides within the food chain and organochlorine pesticides (OCPS), polybrominated diphenyl ethers (PBDEs) and polychlorinated biphenyls (PCBs). The Basel Convention<sup>169</sup> was also considered, as was a recent report from the European Environment Agency on the use of neonicotinoid pesticides posing a risk to honeybees. Monitoring for the suite of persistent organic pollutants (POPs) controlled under the Stockholm Convention was also an option. However, since most of these chemicals were outlawed in the UK many years ago, recording their continuing decline in concentration might lead to complacency about new risks.<sup>170</sup>

Given the current absence of any comprehensive index this is clearly one area that needs revisiting in the future.

In the meantime, an appropriate and useful proxy indicator is the percentage of total river length of *good* chemical quality. Chemical river quality in Wales and England was historically measured using the General Quality Assessment (GQA) Scheme. Previously this constituted three indicators: dissolved oxygen, biochemical oxygen demand (BOD) and ammoniacal nitrogen. The BOD indicator was dropped at the majority of sites from 2008. Hence this index does not directly measure POPs, but it will still correlate with their presence.

However, the GQA reporting system for river quality ended in 2009 for England and Wales, and new indicators are being developed to measure progress towards the requirements of the Water Framework Directive (WFD) by 2015.<sup>171</sup> Until these indicators are available, the 2009 GQA data are the best we have, and we propose this as an interim metric.

## Boundary

The percentage of rivers classified as failing to achieve good chemical quality was selected as the boundary. This also provides an insight into the surrounding land use.

## Result

1 percent of rivers fail to achieve *good* chemical quality (Wales 2009).<sup>172</sup>

# 8.4 CLIMATE CHANGE

## Planetary boundary exceeded by 410 percent (UK 2011).

### Domain

'Climate change needs to be top of the agenda and politicians have to take it seriously.' (The Wales We Want)<sup>173</sup>

Climate change is highly relevant to Wales due both to our contribution to it and its well-documented impact nationally and globally. In *The Wales We Want* this was the issue noted as being the greatest concern for future generations (70 percent).<sup>174</sup>

### Indicator

Man-made climate change is driven by greenhouse gas (GHG) emissions. The 'million tonnes' of carbon dioxide equivalent (MtCO<sub>2</sub>e) is one of the best composite measures of greenhouse gas emissions as this includes a range of greenhouse gases. The SRC's proposed planetary boundary was considered as an indicator, but it is based on a measure of CO<sub>2</sub> alone and so, for comparability, we have chosen to use MtCO<sub>2</sub>. Carbon has by far the largest and most important impact on climate change, so it is considered a suitable indicator for use here.

There are two methods for measuring our consumption of CO<sub>2</sub>. Emissions can be measured on either a territorial or consumptive (footprint) basis. Territorial emissions are those relating only to the CO<sub>2</sub> produced within Wales.

Consumptive emissions take a broader approach and include estimates of CO<sub>2</sub> embedded in our imports of goods and services. There are difficulties in accurately estimating consumptive emissions and it should be noted that results tend to be more dated than territorial data due to a more complex methodology. However, in order to measure national impact upon the planetary boundary it is vital that consumptive emissions are used and we have opted for this as an indicator.

Unfortunately, while we have sourced carbon footprint data for the UK (see below) and for Scotland,<sup>175</sup> Welsh data remains unpublished.<sup>176</sup>

Again then due to a lack of access to data we have been forced to depend upon UK figures until Welsh results are released. Annual UK data on CO<sub>2</sub> produced in the UK (territorial emissions) are updated in March each year.<sup>177</sup>

## Boundary

The planetary boundary proposed by the SRC is two tonnes CO<sub>2</sub>/year/capita on a consumptive basis.<sup>178</sup>

## Results

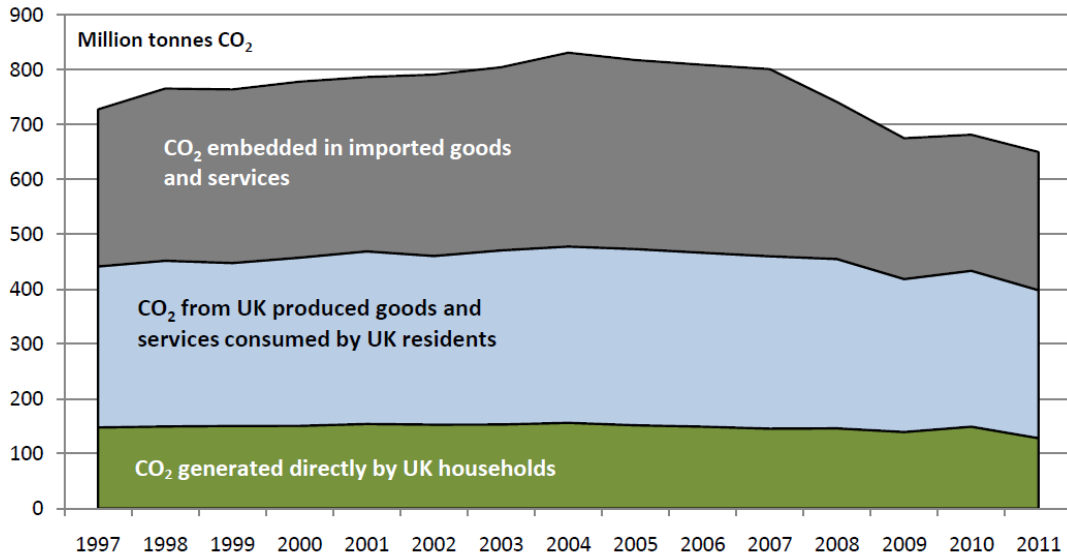
Boundary exceeded by 410 percent (UK 2011).

**Method**

- UK's boundary = 127.4 MtCO<sub>2</sub>/year (based on 2tCO<sub>2</sub>/year/capita x 63.7 million population)
- Actual emissions = 650 MtCO<sub>2</sub>/year (2011)<sup>179</sup>
- Exceedance = 522.6 MtCO<sub>2</sub>/year
- Percentage exceedance: 522.6/127.4\*100 = 410 percent.

Figure 18 shows GHG emissions by source - territorially produced and imports.

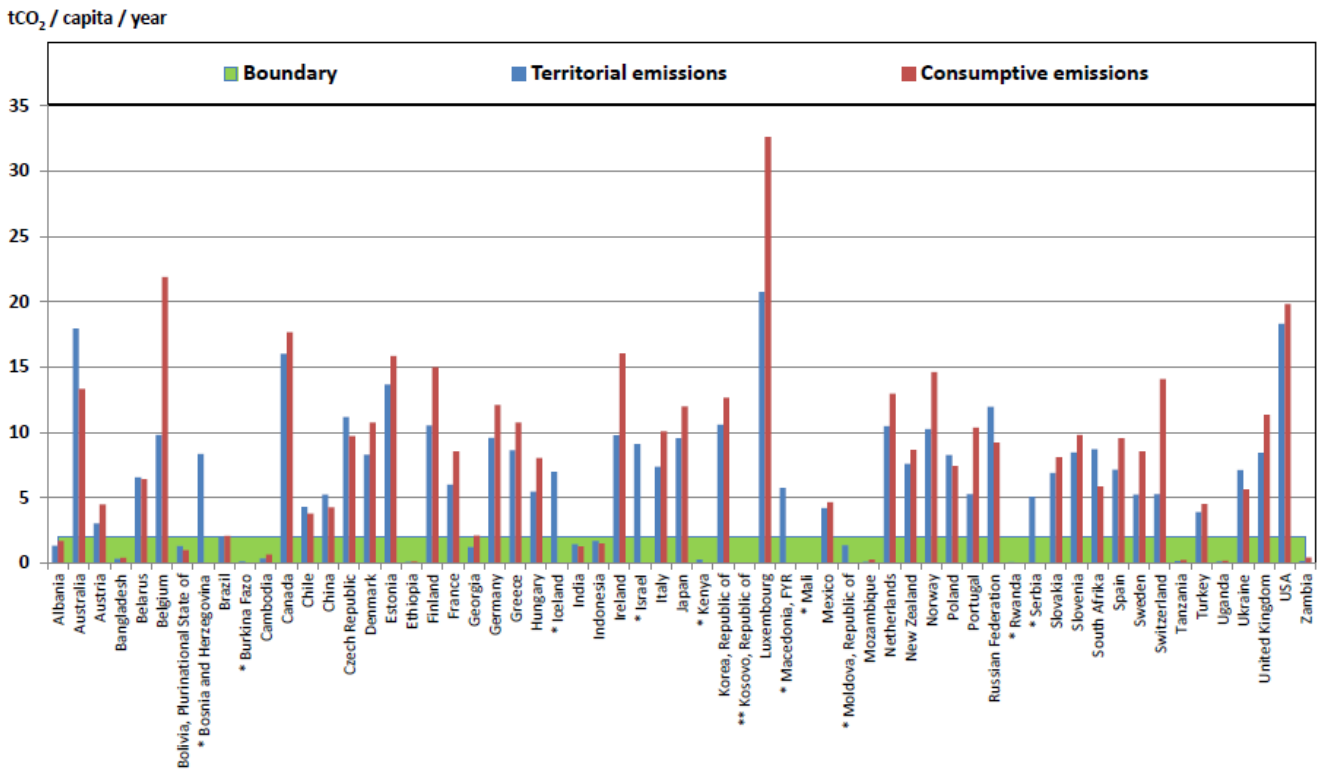
**Figure 18: GHG emissions associated with UK consumption (1997–2011)**



Source: Reproduced from Defra (2013)<sup>180</sup>

Figure 19 demonstrates each country's relative per capita performance as calculated by the SRC.

**Figure 19: Carbon emissions (selected nations 2008)**



Source: Reproduced from Stockholm Resilience Centre (2013)<sup>181</sup>

## 8.5 GLOBAL FRESH WATER

### No data

#### Domain

The Stockholm Resilience Centre argues that humans are now the main driving force behind hydrological cycles. The disruption of these cycles is seen in impacts on river flows, groundwater supply, soil moisture, vapour feedback and water and soil salinization. Fresh water is becoming increasingly scarce and water stress is becoming more common across the globe. This stress is driven not only by climate change, but also by human use of fresh water supplies.

#### Indicator

Global fresh water is contained mainly in groundwater, and to a much lesser degree on the surface and in the air. The original planetary boundary on fresh water use was set as a result of observations that when the use of locally available renewable fresh water went beyond 40 percent, critical thresholds were crossed.

SRC calculates that 40 percent of the world's renewable fresh water amounts to 4,000km<sup>3</sup> per year. This gives a per capita/year figure of 585m<sup>3</sup>. However, the SRC cautions against applying this figure on a territorial basis as it takes no account of local availability of water, nor the demand for it.

An alternative approach is to apply the 40 percent boundary to a nation's renewable water resource and measure national performance against this. However, while this may be useful in showing water use in relation to national resources, it gives no indication of the impact of national use on planetary boundaries. Unlike CO<sub>2</sub>, reducing territorial use of domestic supply of water in Wales will have little impact elsewhere.

The SRC has proposed using a consumption-based indicator and relating that to national per capita use. This figure, also known as *virtual water*, measures water embedded in imports of goods and services from across the globe.<sup>182</sup> Unfortunately, the SRC has been unable to calculate this for the UK or Wales due to a lack of data. Estimates do exist of the UK's virtual water consumption, but the methodologies used for calculating these differ from the SRC's and are therefore not comparable, nor are they suitable for inclusion in the Doughnut. It is beyond the scope of this paper to construct a methodology that would allow for a comparison – therefore this domain is omitted from this report for the time being.

For further discussion of the UK's consumption of virtual water, see WWF's UK Water Footprint work.<sup>183</sup>

## 8.6 LAND-USE CHANGE

### Planetary boundary exceeded by 250 percent (UK 2007).

#### Domain

*'Humanity may be reaching a point where further agricultural land expansion at a global scale may seriously threaten biodiversity and undermine regulatory capacities of the Earth System.'*  
(J. Rockström *et al.*)

The original planetary boundary on *Land use change* was based upon setting a maximum of 15 percent of ice-free land to be converted to crop land. The rationale behind this was that the conversion of forest and savannah and other ecosystems for agricultural purposes had negative impacts upon habitats and biodiversity, carbon storage, climate systems and hydrological processes.<sup>184</sup>

So while agricultural expansion may, in the short term, allow for greater food production (although possibly on increasingly marginal land), in the longer term its continuation will impact negatively on Earth systems and therefore on stability and global bio-productivity.

### Indicator

There are no data sets available for Wales alone, therefore we rely upon an assessment of UK-related data.

The SRC identifies two methods for downscaling the 15 percent of ice-free land boundary to a national scale.<sup>185</sup> One method involves limiting the conversion of nationally available land to crop land to 15 percent. However, the usefulness of this method is doubtful as '*... food and agricultural commodities are internationally traded to such a large extent, a better comparison would be consumptive use of global land*'.<sup>186</sup>

A per capita boundary has therefore been calculated by the SRC by simply dividing the safe amount of ice-free land by global population. This results in a boundary of 0.3 ha per capita, which can then be compared to actual national consumptive use of land – i.e. the amount of land use embedded in national consumption of goods and services, including imports.

However, this boundary has been criticized for various reasons. A major criticism comes from the United Nations Environmental Programme (UNEP): that it takes no account of the expansion of settlement and infrastructure and the resultant decrease in available land for agriculture.<sup>187</sup> Taking this and a range of other factors into account, including predicted population growth, UNEP suggests that a safer limit would be 0.2 ha per capita by 2020.

For the purposes of this report, another issue with the national results shown by the SRC is that it has not published the methodology used to produce them. Therefore, while the SRC results show the UK transgressing the 0.3 ha boundary by around 10 percent,<sup>188</sup> we have no way of updating this figure, or of comparing it with other methodologies that show results for the UK ranging from 0.7 ha<sup>189</sup> to 1.6 ha<sup>190</sup> per capita. The latter methodologies differ from each other due to the higher estimate calculating all consumptive land use, including forestry and industrial use. Another issue with using any of the data referenced here is that they are dated and are not due to be updated.

There are then several methodological issues with using and comparing datasets for this domain. It has been pointed out before in several reports that data on land use are seriously lacking, and this is perhaps a central finding of this section.<sup>191</sup> Therefore, an agreed methodology on determining what a safe limit may be, and how consumptive land use is measured, is urgently required.

However, what is equally clear is that the UK's consumptive use of land outstrips any of the possible safe limits presented here. Therefore, as land use is so fundamental to so many of the planetary boundaries, we have chosen to use the data we have available and to include interim results on the UK's performance in this area.

It is clear that the Welsh per capita consumptive land use may differ from the UK's, not least because of population density. However, we have no data that break down consumptive use by constituent countries and are therefore must rely upon UK data.

### Result

Planetary boundary exceeded by 250 percent (UK 2007).

### Method

- Boundary = 0.2 ha per capita (UNEP)
- Actual UK consumption = 0.7 ha per capita<sup>192</sup>
- Exceedance = 0.5 ha
- $0.5/0.2*100 = 250$  percent.

Arguments could be made for using any of the range of data discussed above. Here we opt for UNEP's proposed safe limit, which recommends stabilizing land use change at 0.2 ha per capita by 2020. We choose this mainly as we are convinced of UNEP's arguments regarding predicted population growth and the increase in land being converted for settlement and infrastructure, limiting what is left for conversion for agricultural purposes. We compare this limit against results showing a UK consumptive use of 0.7 ha per capita. We opt for this figure as its methodology is published and therefore preferable to the SRC's result; also it is not currently clear to the authors that the upper figure of 1.6 ha per capita is suitable, as this also measures the consumption of goods and services which flow from forestry, which in itself may not equate to the conversion of forests. We remain open to suggestions regarding data selection and use.

## 8.7 NITROGEN CYCLE

### Planetary boundary exceeded by 212 percent (UK 2013)

#### Domain

Nitrogen was included as a planetary boundary because disruption of the nitrogen cycle results in pollution of waterways and coastal zones, causing eutrophication. Eutrophication is an ecosystem response to the addition of substances such as nitrogen and phosphorus to waterways. The most obvious impact of this can be seen in the growth of algal blooms and other lower-level organisms. This in turn leads to the deprivation of nutrients, oxygen and light for higher-level organisms.

Nitrogen also leads to increased soil acidity. In 2011 around 65 percent of sensitive habitats in the UK saw critical loads of nitrogen exceeded.<sup>193</sup>

The disruption of the nitrogen cycle therefore impacts on bio-productivity and drives biodiversity loss both locally and globally.

#### Indicator

The nitrogen cycle is disrupted through additional nitrogen being manufactured and used for fertilizers. The manufacture of nitrogen occurs in only a few countries. The UK imports and records all the nitrogen it uses in fertilizers. In this instance we have no data measuring nitrogen embedded in imports of other goods and services, so the indicator is based only on territorial consumption of fertilizers. The data therefore represent a significant underestimate, but they are internationally comparable and the best currently available.

However, while separate results are available for Scotland and Northern Ireland, once again there seems to be a lack of data showing how much of the fertiliser imported into the UK is used in Wales. We therefore present UK data here.

#### Boundary

The SRC has proposed a boundary of 5kg N/capita/year.<sup>194</sup> For the UK as a whole, this gives a limit of 0.3185 MtN/year.

#### Result

Planetary boundary exceeded by 212 percent (UK 2013).

#### Method

- UK limit = 0.3185 MtN/year
- Actual use in 2012 = 0.995 MtN/year<sup>195</sup>
- Exceedance = 0.6765
- % exceedance:  $0.6765/0.3185*100 = 212$  percent.

## 8.8 OCEAN HEALTH

Ocean acidification is the term used to describe the ongoing decrease in ocean pH caused by rising CO<sub>2</sub> emissions. It is included in the SRC's planetary boundaries. The oceans currently absorb approximately half the CO<sub>2</sub> produced by the burning of fossil fuels. Ocean pH has already decreased by 30 percent and it is predicted to fall further at a rate that has not been experienced for over 400,000 years.<sup>196</sup> Such a change in ocean chemistry is likely to have a large and negative impact on ocean life. However, although this is clearly important, the driver for ocean acidification is CO<sub>2</sub>, which is covered within the climate change domain and is therefore not included here.

### Alternative domain – Ocean harvesting

**64 percent of fish stocks are harvested unsustainably (UK 2012).**

#### Domain

Instead of *Ocean acidification*, we suggest *Ocean harvesting* of fish stocks as an alternative measure of ocean health and sustainability. This fits with the overall aim of the Doughnut in that it measures the impact of our patterns of consumption and resource management upon the bio-productivity of the marine environment, and on the general diversity and sustainability of marine ecosystems.

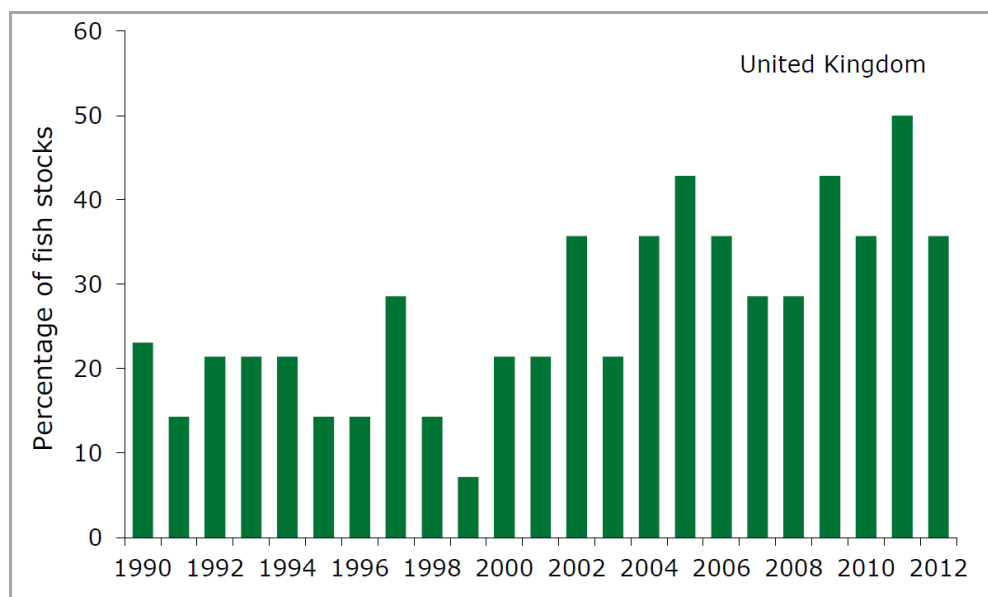
#### Indicator

The traditional definition of *sustainable harvesting* is that it does not cause a decline in stock numbers, or in fish size, over time. Unsustainable harvesting is caused by overfishing, which reduces the reproductive capacity of the stock through heavy fishing of the adult population (recruitment overfishing) or in harvesting fish at younger ages (growth overfishing).

Unfortunately, again there is a lack of publicly available Wales only data. It is hoped that data assessing the percentage of stock being harvested sustainability and in line with scientific advice may become available through work carried out under the Wales Marine and Fisheries Strategic Action Plan (2013).<sup>197</sup> In the meantime we rely upon UK data.

Defra produces annual data on 14 fish stocks around the UK that are of *major importance* and for which there are reliable data.<sup>198</sup> Figure 20 shows the numbers of fish stocks being harvested sustainably and at full reproductive capacity.

**Figure 20: Percentage of key fish stocks which were considered to be harvested sustainably scientific advice (UK 1990–2012)**



Note: Based on 14 stocks for which accurate time series are available derived from stock assessment reports. Source: Reproduced from Defra (2014)<sup>199</sup>

## Boundary

The boundary proposed here is 100 percent of the 14 monitored UK fish stocks to be classified as being sustainably harvested and at full reproductive capacity.

## Result

64 percent of fish stocks are harvested unsustainably (UK 2012).<sup>200</sup>

This portion of fish stocks being unsustainably harvested worsened between 2011 and 2012, a year which saw this increased from 52 percent to 64 percent.

# 8.9 OZONE DEPLETION

## Zero emissions of ozone depleting substances

### Domain

The severe depletion of Antarctic ozone, known as the *ozone hole*, was first observed in the 1980s and was linked to the production of chlorofluorocarbons (CFCs) and other ozone-depleting substances (ODS). There are a variety of negative impacts that flow from this, including global warming and harm to human health.<sup>201</sup>

### Indicator

We have chosen here the territorial consumptive use of ODS – which includes substances embedded in imports – as the most relevant indicator. The production of CFCs and other ODS was regulated under a 1987 international agreement, the Montreal Protocol, which has now been ratified by more than 180 nations. In the UK, hydrofluorocarbons (HFCs) are now used as a substitute for CFCs. HFCs do not contribute to ozone depletion and data show that the UK, and indeed the EU, neither produces nor consumes ODS to any significant level.

### Results

Zero emissions of ozone depleting substances.<sup>202</sup>

Such success in turning around Wales' and the UK's contribution to stratospheric ozone depletion demonstrates the potential for public policy to tackle the damaging effects of consumption and production. This current situation however does not imply that historic use of ODS in Wales no longer has a negative impact.

# 8.10 PHOSPHOROUS CYCLE

## 3 percent of Welsh river testing sites have poor or bad loads of phosphorus (Wales 2013)

### Domain

The phosphorous cycle was included in the original planetary boundaries paper '*...to reflect the risk of a global oceanic anoxic event that would trigger a mass extinction of marine life*'.<sup>203</sup>

Increased levels of phosphorus in both salt and fresh water can lead to a series of negative impacts through eutrophication. Phosphorus is added to the environment through fertilizers, manure, detergent and some pesticides.

## Indicator

While there was a planetary boundary proposed of 11Mt of annual inflow of reactive phosphorus into oceans, the SRC has, as yet, been unable to downscale this to a national level.<sup>204</sup> The causal links between national use and impact on ocean inflow are scientifically uncertain. Additionally, there are insufficient data available.

It was therefore decided to explore an alternative indicator for this project, focused on national impacts. The levels of phosphorus loads in Welsh rivers were selected, as this addresses the most serious short-term environmental impact of phosphorus – localized eutrophication. However, data that are comparable across the UK are limited. Therefore, we rely here upon data and recommendations from the UK Technical Advisory Group (UKTAG) on the Water Framework Directive.<sup>205</sup> We accept that these are not as yet definitive, as they still need to be approved by ministers, and that categorization across the constituent nations of the UK may eventually differ. This indicator may therefore need to be revised.

## Boundary

We propose a boundary of *poor* or *bad* phosphorus loads in Welsh rivers.

## Result

3 percent of river testing sites are classified as having *poor* or *bad* loads of phosphorus (*Wales 2013*).<sup>206</sup>

This compares to 11 percent in the UK, 29 percent in England, 7 percent in Northern Ireland, and 4 percent in Scotland.

## 9 CONCLUSIONS

The evidence brought together in this report paints a stark picture. Almost one-quarter of households in Wales are living in relative poverty, with 40 percent of households unable to heat their homes adequately. Too many people are going hungry, living in overcrowded housing, experiencing poor health and anxiety, with little access to social support networks. All of these societal failures are intricately linked to the long-term and systemic issue of inequality – they create it, sustain it and flow from it.

Not only does the Doughnut highlight the degradation of people's life experiences, it also shines a light upon the degradation of our local and global ecosystems. We live on a fragile planet which is under increasing stress to the extent that we are transgressing a number of planetary boundaries – clearly, this cannot continue.

However, the environmental data available for Wales is limited. In the case of some e.g. *land use change* and *fresh water use* this is perhaps understandable as data sets are limited in general and methodologies uncertain. It would seem though that a central function of the Welsh Government should be to source and publish data sets on carbon footprint, nitrogen use and sustainable fisheries. These are available at a UK and Scottish levels and would be useful in order to measure relative impacts and progress.

In all but two of the environmental indicators used, Wales and/or the UK fails to stay within safe limits. In the three planetary boundaries that can be downscaled to a UK or Welsh level – climate change, nitrogen use and land-use change – we not only fail, but fail spectacularly. While carbon emissions have been moving in the right direction, we still see recommended safe limits breached by over 400 percent, and UK land-use change and nitrogen cycles breached by over 200 percent, while well over half of UK fish stocks are unsustainably harvested. Only in regards to the use of *Ozone Depleting Substances* and in *Air Quality*, does Wales stay within the limits proposed in this paper.

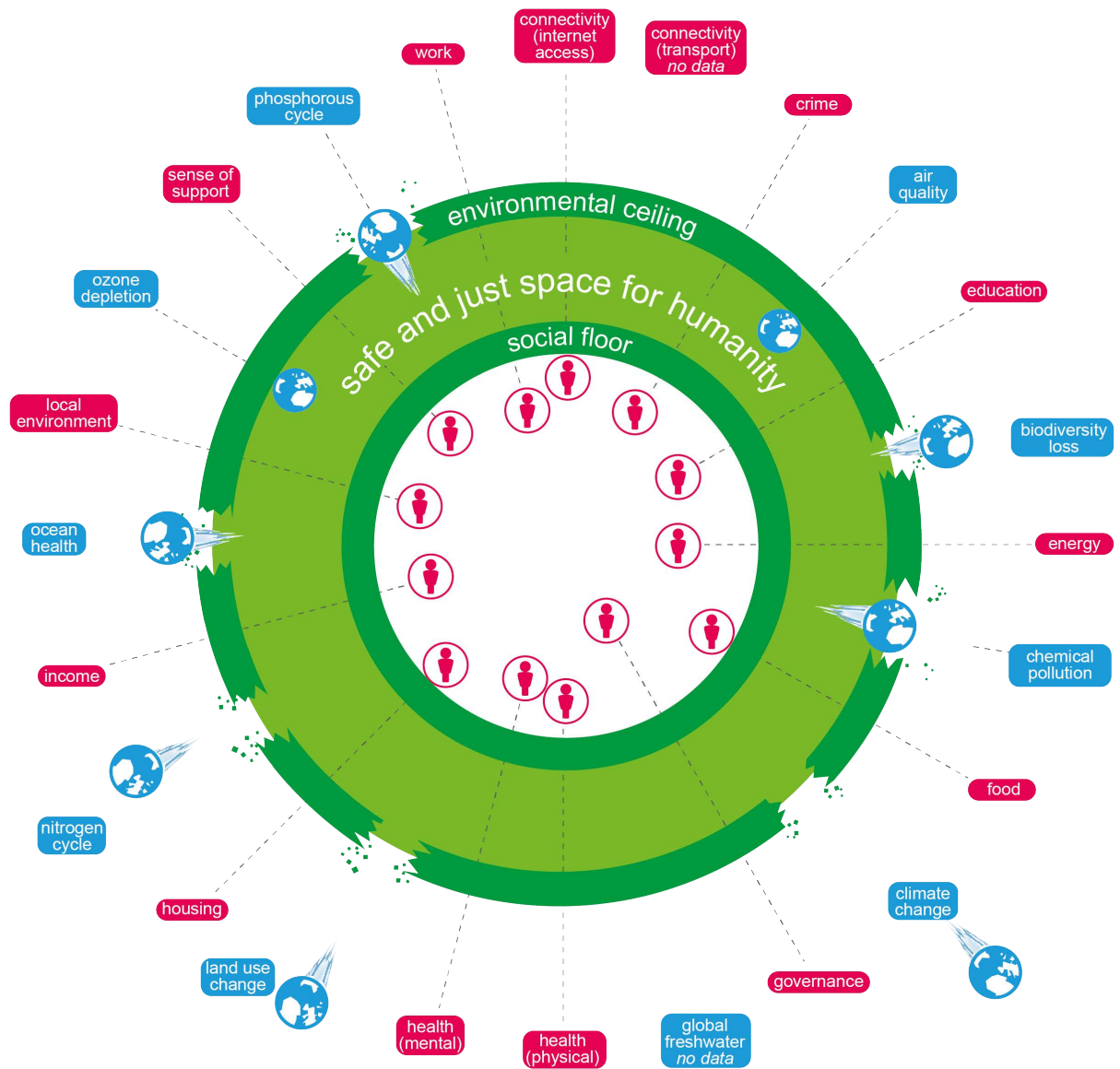
This report does not go into the reasons behind these failures. However, it does highlight the immense inequalities experienced by our citizens across all social domains. Moreover, the environmental section tells a story not of scarcity, but of a society over-consuming its share of the world's resources. Thus Wales' environment is degraded by our methods and patterns of production and consumption. Our activities degrade the environment globally, as changing Earth systems undermine the bio-productivity of ecosystems, creating global food and water stresses.

These are the statements of fact presented within the Welsh Doughnut. However, neither the environmental nor social realities outlined are set in stone.

We can choose to develop a more sustainable future. Debates surrounding potential solutions are ongoing and focused on changes to industrial and agricultural production, consumption patterns and broader mechanisms to tackle resource demand. What is required is the will (amongst policy makers, businesses, families and individuals) to implement policies designed to shape such decisions and tackle the detrimental impact created by existing production and consumption patterns.

Nor are the social failures described inevitable: they are the result of the way we organize our society and construct our economy. They are the result of successive governments' policy choices at Welsh and UK levels surrounding how we use the tax system and public spending, as well as how we regulate and deliver services and provide support for our citizens. A more equal distribution of the wealth created could deliver a social floor where all citizens could enjoy what we define as a minimum acceptable standard for all.

Figure 21: The Welsh Doughnut (Wales 2014)



The Welsh Oxfam Doughnut makes no claim to have described the definitive *safe and just operating space* for our society. Debates will continue regarding what is a *just* quality of life for people to expect in particular, but we have based the social floor upon the extensive participatory research cited. The setting of an environmental ceiling, or *safe space*, focuses as closely as possible on the priorities identified by the Earth system scientists of the Stockholm Resilience Centre, but remains open to development.

What the Doughnut provides, however, is an aim, or set of objectives, which would make for a much more sustainable society organized in a way that delivers an improved quality of life for all, without compromising the ability of others here or abroad, now or in the future, to an equally acceptable quality of life.

We hope the Welsh Doughnut can add to challenges to the dominant socio-economic narrative and help develop the political will required to create paths to a more sustainable and just society.

# RESOURCES

- British Social Attitudes Survey <http://www.natcen.ac.uk/>
- Centre for Sustainable Energy <http://www.cse.org.uk/pages/resources/open-data/fuel-poverty-data>
- Department for Transport statistics  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/49966/acs0108.csv/preview](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/49966/acs0108.csv/preview)
- Equality and Human Rights Commission's Equality Monitoring Framework  
<http://www.equalityhumanrights.com/key-projects/equality-measurement-framework/Pseuk>
- European Health Expectancies <http://www.ehemu.eu/>
- Friends of the Earth Scotland Air Quality data <http://www.foe-scotland.org.uk/node/1740>  
(accessed June 2014)
- Joseph Rowntree Foundation [http://www.jrf.org.uk/?qclid=CIWI\\_56D08MCFXQatAodBCgAyA](http://www.jrf.org.uk/?qclid=CIWI_56D08MCFXQatAodBCgAyA)
- Kate Raworth's Doughnut Economics [www.kateraworth.com](http://www.kateraworth.com)
- Natural Resources Wales <http://naturalresourceswales.gov.uk/>
- National Survey for Wales <http://nationalsurveyforwales.co.uk>
- Office of National Statistics *Measuring National Well-being Wheel*  
<http://www.ons.gov.uk/ons/interactive/well-being-wheel-of-measures/index.html>
- Oxford Consultants for Social Inclusion <http://www.ocsi.co.uk/news/2011/03/24/why-the-imd-is-still-important-in-the-open-data-age/>
- Passenger Focus <http://www.passengerfocus.org.uk/bus-passengers>
- Public Health Wales <http://www.publichealthwales.wales.nhs.uk/>
- Rio+ 20 <http://sustainabledevelopment.un.org/rio20.html>
- Shelter *Housing Facts and Figures: Overcrowding*  
[http://england.shelter.org.uk/campaigns/why\\_we\\_campaign/housing\\_facts\\_and\\_figures/subsection?section=overcrowding](http://england.shelter.org.uk/campaigns/why_we_campaign/housing_facts_and_figures/subsection?section=overcrowding)
- Stockholm Resilience Centre <http://www.stockholmresilience.org/21/research/research-programmes/planetary-boundaries/planetary-boundaries/about-the-research/the-nine-planetary-boundaries.html>
- The Literacy Trust [http://www.literacytrust.org.uk/adult\\_literacy/illiterate\\_adults\\_in\\_england](http://www.literacytrust.org.uk/adult_literacy/illiterate_adults_in_england)
- The Poverty Site <http://www.poverty.org.uk/59/index.shtml>
- The Resolution Foundation <http://resolutionfoundation.org>
- Trussell Trust <http://www.trusselltrust.org/foodbank-projects>
- UK Air (Defra) <http://uk-air.defra.gov.uk/networks/>
- UK Ocean Acidification Research Programme (2013). <http://www.oceanacidification.org.uk/>
- Welsh Government (2014) 'The Wales We Want, National Conversation – Interim Report'.  
<http://www.thewaleswewant.co.uk/interim-report>
- Welsh Government (2014) 'The Well-being of Future Generations (Wales) Bill'.  
<http://wales.gov.uk/legislation/programme/assemblybills/future-generations/?lang=en>
- Welsh Government (2014) 'Welsh Index of Multiple Deprivation (WIMD)',  
<http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/?lang=en>
- WHO <http://www.euro.who.int/en/health-topics/environment-and-health/air-quality/data-and-statistics>
- WHO (2013) <http://www.who.int/mediacentre/factsheets/fs313/en/>
- WWF infographic on UK virtual water  
<http://www.theguardian.com/environment/interactive/2008/aug/19/water?uni=Article:in%20body%20link>

# APPENDIX: LITERATURE REVIEW FOR SOCIAL FLOOR

The social domains, indicators and thresholds in the main report were chosen following analysis of a wide range of literature covering similar ground. Many of these reports were based on participatory research methods that sought to find out what people in the UK felt about what should be deemed an acceptable standard of living. This literature review outlines some of these reports.

## RESOURCES USED

In order to offer some suggestions as to what the domains of the UK's social floor might encompass, several existing projects and sets of evidence were consulted:

- 1. The Poverty and Social Exclusion: UK project (led by the University of Bristol)**
- 2. The Minimum Income Standard (University of Loughborough and the Joseph Rowntree Foundation)**
- 3. The Office for National Statistics Well-being Consultation**
- 4. The Equalities and Human Rights Commission's Equality Measurement Framework**
- 5. Oxfam's Humankind Index for Scotland**

These offer insight into what people say is necessary to live with dignity in the UK and what people need to have their social needs met.

### **1. The Poverty and Social Exclusion: UK project (led by the University of Bristol)**

This follows similar surveys in 1983, 1990 and 1999, and in Northern Ireland in 2002–03, seeking to highlight what the public think is an acceptable standard of living in the UK.

In 2012 1,400 respondents to a survey were given a list of 76 items (comprising 46 for adults and 30 for children) and asked to choose between what they thought was 'necessary and which all people... should not have to go without' and items which they felt were 'desirable, but... not necessary'.<sup>207</sup> This list was derived from focus group discussions (based on a hypothetical typical family). It found considerable agreement between groups (across gender, ethnicity, occupation, income level, education, political persuasion, housing tenure and family type) in all of the surveys.

Items agreed as 'necessary' by more than 75 percent of adults in the research were:<sup>208</sup>

- Heating to warm living areas of the home;
- A damp-free home;
- Two meals a day for adults;
- Ability to repair or replace broken electrical goods;
- Ability to attend weddings, funerals and other such occasions;
- Ability to visit family and friends in hospital;

- Access to a telephone;
- Access to a washing machine;
- All recommended dental work;
- A warm waterproof coat (children and adults);
- Ability to take part in celebrations on special occasions;
- Fresh fruit and vegetables every day;
- Meat, fish or equivalent every other day;
- New, properly fitting shoes for children;
- Garden or outdoor space for children to play safely;
- Suitable books for children;
- A suitable place for children to do homework;
- Indoor games for children;
- Toddler/nursery group once a week.

These factors have been used to inform the suggested domains.

## 2. The Minimum Income Standard (University of Loughborough and the Joseph Rowntree Foundation)

Academics at Loughborough University and their colleagues from other institutions have created a Minimum Income Standard (MIS) based on what people say is necessary to realise an acceptable standard of living in Britain today. It combines expert views with the perspectives of ordinary people.<sup>209</sup>

The MIS is defined as ‘having what you need in order to have the opportunities and choices necessary to participate in society’.<sup>210</sup> It is the standard to which we should ‘aspire for everyone to meet... [it is] rooted in social consensus about the goods and services that everyone in modern Britain should be able to afford’.<sup>211</sup> The MIS is about identifying the minimum – but it goes beyond simple subsistence needs (food, warmth and shelter) to include the possessions and activities necessary for people to be able to participate in society with dignity. It does, however, exclude those items which are seen as aspirational, and so delineates between needs and wants.<sup>212</sup> In a way it is the income needed to access the modern equivalent of Adam Smith’s ‘linen shirt’. In *An Enquiry into the Nature and Causes of the Wealth of Nations*, Smith wrote:

*By necessities I understand, not only the commodities which are indispensably necessary for the support of life, but whatever the custom of the country renders it indecent for creditable people, even of the lowest order, to be without. A linen shirt, for example, is, strictly speaking, not a necessary of life... But in the present times... a creditable day-labourer would be ashamed to appear in public without a linen shirt... Under necessities, therefore, I comprehend, not only those things which nature, but those things which the established rules of decency have rendered necessary to the lowest rank of people.*

When circumstances change, items deemed necessary change: in the recession people specified lower budgets for eating out and for buying presents.<sup>213</sup>

The MIS draws on two methodological approaches: the family budget unit approach, which brings together guidance, expert opinion and statistics (such as consumption data); and consensual budget standards, which elevate the views of people representing different family or household types, recognizing that they are the people best placed to construct a budget for respective household types. It prioritizes discussion to achieve ‘informed negotiation and agreement about what constitutes a minimum’.<sup>214</sup>

Fieldwork took place in the Midlands and, to a lesser extent, in Scotland, Wales and London. The extra needs of disabled people were not taken into account, and budgets required to reach the MIS assume no additional health needs.

In practical terms, participants were presented with text from the UN Convention on Human Rights, which provides an understanding of 'minimum' as those things necessary for a person's physical, mental, spiritual, moral and social well-being. Groups recognized the need for presentation to be socially acceptable – the need to be able to invite people into their home or participate in activities that peers undertake.<sup>215</sup> MIS budgets are not constrained by actual income.

Items deemed crucial in order to live with dignity in the UK (these were then costed to calculate the MIS)<sup>216</sup> were:

- Food;
- Alcohol;
- Clothing;
- Water rates;
- Council tax;
- Household insurance;
- Fuel;
- Other housing costs;
- Household goods;
- Household services;
- Childcare;
- Personal goods and services;
- Travel costs;
- Social and cultural participation;
- Rent.

### **3. The Office for National Statistics' Well-being Consultation**

The ONS undertook a public consultation (November 2010 to April 2011) asking, 'What matters to you?' There were many aspects of the consultation: nearly 8,000 people participated in an online and paper survey (two rounds); 34,000 people participated via online discussions, a phone line, letter and email; and over 7,000 joined events across the UK. The consultation invited comment on a pre-determined set of 10 areas or 'domains' (with space to list others) and 40 potential headline measures of national well-being.

Drawing on responses to this debate, existing research and international initiatives, the ONS developed domains and measures which are frequently revised.<sup>217</sup> These measures are grouped into a set of domains covering areas such as individual well-being, health, personal relationships and 'what we do'.

#### **ONS well-being domains<sup>218</sup>**

##### Personal life satisfaction

- Percentage with medium and high rating of satisfaction with their lives overall
- Percentage with medium and high rating of how worthwhile the things they do are
- Percentage who rated their happiness yesterday as medium or high
- Percentage who rated how anxious they were yesterday as low or very low

## Our relationships

- Average rating of satisfaction with family life (out of 10)
- Percentage who were somewhat, mostly or completely satisfied with their social life
- Percentage who said they had one or more people they could really count on in a crisis

## Health

- Healthy life expectancy at birth
- Percentage who reported a long-term illness or a disability
- Percentage who were somewhat, mostly or completely satisfied with their health
- Percentage with some evidence indicating probable psychological disturbance or mental ill health

## What we do

- Unemployment rate
- Percentage who were somewhat, mostly or completely satisfied with their job
- Percentage who were somewhat, mostly or completely satisfied with their amount of leisure time
- Percentage who were somewhat, mostly or completely satisfied with their leisure time
- Percentage who volunteered in the past 12 months

## Where we live

- Crimes against the person (per 1,000 adults)
- Percentage who felt very or fairly safe walking alone after dark
- Percentage who accessed green spaces at least once a week in England
- Percentage who agreed or agreed strongly that they felt they belonged to their neighbourhood

## Personal finance

- Percentage of individuals living in households with less than 60 percent of median income after housing costs
- Mean wealth per household, including pension wealth
- Percentage who were somewhat, mostly or completely satisfied with their household income
- Percentage who report finding it quite or very difficult financially to get by

## Education and skills

- Human capital – the value of individuals' skills, knowledge and competences in the labour market
- Percentage with five or more GCSE grades A\*–C (including English and maths)
- Percentage of UK residents aged 16–64 years with no qualifications

## The economy

- Real household income per head
- Net national income of the UK (£ million)
- UK net national debt as a percentage of gross domestic product
- Consumer Price Inflation index (2005–2010)

The ONS domains of relationships, health, what we do, where we live, personal finance, and education and skills are used as a basis for this report because they seem to shed most light on what a modest social floor might encompass.

## 4. The Equalities and Human Rights Commission’s Equality Measurement Framework (EMF)

The EHRC’s EMF<sup>219</sup> is a measurement framework to assess equality and human rights via a baseline of evidence. It is underpinned by the Amartya Sen’s capabilities approach, and has an underlying focus on the areas that people say are important to them to do and to be (equality of outcomes, inequality of process and inequality of autonomy). Its development entailed ‘extensive consultation’ with the general public and with individuals and groups at risk of discrimination and disadvantage (10 consultations in London; full-day events in Scotland and Wales; a web-based consultation; and one-to-one meetings with stakeholders and subject specialists).

The domains and associated indicators distilled from these events are:

Domain	Indicators
Life	Life expectancy; homicide; specific-cause mortality rates; death from non-natural causes for people resident or detained in public or private institutions
Health	Limiting illness, disability and mental health; subjective evaluation of current health status; dignity and respect in health treatment; healthy living; vulnerability to accidents
Physical security	Violent crime; hate crime; physical security for people in public or private institutions; fear of crime
Legal security	Offences reported and brought to justice (rape, domestic violence and hate crime); equal treatment by the police and criminal justice system (objective and subjective measures); deprivation of liberty (numbers and conditions); equal protection and support for individuals with justiciable civil justice problems
Education and learning	Basic skills; educational qualifications; participation in life-long learning; use of the Internet; being treated with respect in education
Standard of living	Housing quality and security; poverty and security of income; access to care; quality of the local area; being treated with respect by private companies and public agencies in relation to your standard of living
Productive and valued activities	Employment; earnings; occupation; discrimination in employment; unpaid care and free time
Individual, family and social life	Availability of support; being free from domestic abuse (emotional or financial); being able to participate in key social and cultural occasions that matter to you; being able to be yourself; being able to form and pursue the relationships you want
Identity, expression and self-respect	Freedom to practise your religion or beliefs; cultural identity and expression; ability to communicate in the language of your choice; self-respect; freedom from stigma
Participation, voice and influence	Formal political participation; perceived influence in local area; political activity; taking part in civil organisations; being treated with dignity and respect while accessing and participating in decision-making forums

## 5. Oxfam Humankind Index for Scotland

Oxfam has built a measure of Scotland’s prosperity (the Oxfam Humankind Index<sup>220</sup>), based on a consultation with Scottish people to understand what sort of assets they need to live well in their communities: what sort of human assets, what sort of financial assets, what sort of social assets and so on. This reflects the Sustainable Livelihoods Approach,<sup>221</sup> which highlights that to prosper, be resilient and build a life free of poverty, families (and individuals) require five types of asset: financial, environmental, physical, human and social.<sup>222</sup>

In doing so, Oxfam engaged almost 3,000 people, making a particular effort to reach out to seldom-heard communities and creating time and space for deliberation, discussion and debate

around the question, 'What do you need to live well in your community?'. This generated a set of priorities that were weighted to reflect the relative importance of each factor of prosperity relative to the others.

The Humankind Index is about assets people need to build sustainable livelihoods – it is not a measure of minimum standards, and certainly not a measure of poverty.

The table below shows the 18 sub-domains that make up the broad range of factors that people in Scotland believe are necessary to live well in their communities and, of equal importance, details the weightings for each of these to reflect their relative importance to Scottish people (the total weighting adds up to 100).

<b>Domain (factors of prosperity)</b>	<b>(Weighting)</b>
Affordable/decent home + Having a safe and secure home	11
Being physically and mentally healthy	11
Living in a neighbourhood where you can enjoy going outside + Having a clean and healthy environment	9
Having satisfying work to do (whether paid or unpaid)	7
Having good relationships with family and friends	7
Feeling that you and those you care about are safe	6
Access to green/wild spaces + open spaces/play areas	6
Secure work/suitable work	5
Having enough money to pay the bills and buy what you need	5
Having a secure source of money	5
Access to arts/culture/hobbies/leisure activities	5
Having the facilities you need available locally	4
Getting enough skills and education to live a good life	4
Being part of a community	4
Having good transport to get to where you need to go	4
Being able to access high-quality services	3
Human rights/freedom from discrimination/acceptance/respect	2
Feeling good	2

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Jamie Livingstone, Oxfam

Rachael Orr, Oxfam

# NOTES

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- <sup>1</sup> **Stockholm Resilience Centre (SRC)** (2009) 'The Nine Planetary Boundaries', Stockholm: SRC. <http://www.stockholmresilience.org/21/research/research-programmes/planetary-boundaries/planetary-boundaries/about-the-research/the-nine-planetary-boundaries.html> (accessed July 2014).
- <sup>2</sup> This paper has been developed alongside another outlining a Scottish Doughnut report, published in 2014, and a GB version due to be published in early 2015. Where possible, indicators have been selected that are comparable across the UK.
- <sup>3</sup> **J. Rockström et al.** (2009) 'Planetary Boundaries: Exploring the Safe Operating Space for Humanity', *Ecology and Society* 14(2): 32. <http://www.ecologyandsociety.org/vol14/iss2/art32/> (accessed July 2014).
- <sup>4</sup> **SRC and Stockholm Environmental Institute (SEI)** (2013) 'National Environmental Performance on Planetary Boundaries: A study for the Swedish Environmental Protection Agency', Stockholm: SRC and SEI. <http://www.stockholmresilience.org/21/research/research-news/6-28-2013-a-safe-operating-space-for-sweden.html> (accessed July 2014).
- <sup>5</sup> **W. Steffen et al.** (2015) 'Planetary boundaries: Guiding Human Development on a Changing Planet', *Science*, 15 January 2015. <http://www.sciencemag.org/content/early/2015/01/14/science.1259855.abstract> (accessed January 2015).
- <sup>6</sup> A variety of changes are introduced to the planetary boundaries framework in the updated work by **W. Steffen et al.** (2015) *op. cit.*, which are touched on within the main report below. However, Oxfam's Doughnut Report continues its focus on the SRC's 2013 downscaling of the framework to a national level as the most relevant for our objective of analysing and influencing national impacts.
- <sup>7</sup> **K. Raworth** (2012) 'A Safe and Just Space for Humanity: Can We Live Within the Doughnut?', Oxford: Oxfam GB. <http://policy-practice.oxfam.org.uk/publications/a-safe-and-just-space-for-humanity-can-we-live-within-the-doughnut-210490> (accessed July 2014).
- <sup>8</sup> See <http://policy-practice.oxfam.org.uk/publications/the-scottish-doughnut-a-safe-and-just-operating-space-for-scotland-323371> and <http://policy-practice.oxfam.org.uk/publications/the-uk-doughnut-a-framework-for-environmental-sustainability-and-social-justice-344550>
- <sup>9</sup> We use the term 'environmental ceiling' to differentiate between the planetary boundaries and national contexts, see section 6 below.
- <sup>10</sup> **Welsh Government** (2014a) 'The Well-being of Future Generations (Wales) Bill'. <http://wales.gov.uk/legislation/programme/assemblybills/future-generations/?lang=en>
- <sup>11</sup> **P. Plunkett** (2012) 'Do Workers Reap the Benefits of Productivity Growth?', *OECD Insights*, February 2012. <http://oecdinsights.org/2012/02/20/do-workers-reap-the-benefits-of-productivity-growth/> (accessed April 2014).
- <sup>12</sup> This measure is based on household income, adjusted for family size, compared with median income. Those with less than 60 percent of median income are classified as in relative poverty. Latest figures can be found at: <http://www.ons.gov.uk/ons/interactive/well-being-wheel-of-measures/index.html> (accessed July 2014).
- <sup>13</sup> **The High Pay Commission** (2011) 'More for Less: What Has Happened to Pay at the Top and Does It Matter?', London: High Pay Centre. [http://highpaycentre.org/img/High\\_Pay\\_Commission\\_More\\_for\\_Less.pdf](http://highpaycentre.org/img/High_Pay_Commission_More_for_Less.pdf) (accessed June 2014).
- <sup>14</sup> **Resolution Foundation** (2012) 'Gaining from Growth: the Final Report of the Commission on Living Standards', London: Resolution Foundation, p.9. <http://www.resolutionfoundation.org/publications/gaining-growth-final-report-commission-living-standards/> (accessed June 2014).
- <sup>15</sup> **F. O'Grady** (2012) 'The income squeeze holding back the economy', *Guardian*, 1 October 2012. <http://www.guardian.co.uk/commentisfree/2012/oct/01/income-squeeze-holding-back-economy> (accessed June 2014).
- <sup>16</sup> See, for example, Resolution Foundation, (2012), *op. cit.*, Chapter 1; and **Oxfam** (2011) 'Whose Economy?' <http://policy-practice.oxfam.org.uk/publications/whose-economy-seminar-papers-complete-series-188809> (accessed July 2014).
- <sup>17</sup> **J. Rockström et al.** (2009) This work has now been updated in **W. Steffen et al.** (2015) *op. cit.*
- Also see <http://www.stockholmresilience.org/21/research/research-programmes/planetary-boundaries.html> (accessed Jan. 2015). The updated report uses slightly different domain names and methodologies at a planetary level. However, we continue to rely here upon the SRC/SEI work downscaling the original

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boundaries to a national level where possible. See Section 8 below for full description of the various methods employed.

- <sup>18</sup> **SRC and SEI** (2013) *op. cit.*
- <sup>19</sup> **J. Rockström et al.** (2009) *op.cit.*
- <sup>20</sup> **W. Steffen et al.** (2015) *op cit.* fig. 3.
- <sup>21</sup> **A. Ratcliff** (2014) 'Hot and Hungry: How to Stop Climate Change Derailing the Fight Against Hunger', Oxford: Oxfam GB. <http://policy-practice.oxfam.org.uk/publications/hot-and-hungry-how-to-stop-climate-change-derailing-the-fight-against-hunger-314512>
- <sup>22</sup> **SRC** (2013) *op. cit.*
- <sup>23</sup> **Welsh Government** (2014a) *op. cit.*
- <sup>24</sup> **J. Rockström et al.** (2009) *op. cit.*
- <sup>25</sup> **W. Steffen et al.** (2015) *op. cit.*
- <sup>26</sup> **K. Raworth** (2012) *op. cit.*
- <sup>27</sup> As part of the Sustainable Development Alliance, Oxfam Cymru is working towards strengthening current proposal for this Bill, details can be found at <http://www.oxfam.org.uk/cymru/blog/2014/11/we-can-build-a-better-bill>
- <sup>28</sup> This understanding of poverty resonates with the concept of *social exclusion*, which R. Levitas *et al.* (2007) define as: 'A complex and multi-dimensional process. It involves the lack or denial of resources, rights, goods and services, the inability to participate in the normal relationships and activities available to the majority of people in a society, whether in economic, social, cultural or political areas. It affects both the quality of life of individuals and the equity and cohesion of society as a whole.' **R. Levitas et al.** (2007) 'The Multi-Dimensional Analysis of Social Exclusion: Report for Department for Communities and Local Government', University of Bristol. p. 9.
- <sup>29</sup> See: <http://sustainabledevelopment.un.org/rio20.html> (accessed May 2014).
- <sup>30</sup> **K. Raworth** (2012) *op. cit.* p.10.
- <sup>31</sup> Workshop participants felt that resilience should be removed or converted to a sensitivity measure for the following reasons: it is a descriptive term that can apply to other domains; it can be negative in that resilience to poverty keeps people poor; and social scientists and natural scientists argue over the definition of resilience.
- <sup>32</sup> **Poverty and Social Exclusion: UK** (PSE: UK) (2013) 'What Do We Think We Need?' UK: PSE:UK. <http://www.poverty.ac.uk/pse-research/what-do-we-think-we-need> (accessed 28 May 2013); and **E. Fahmy, S. Pemberton and E. Sutton** (2011) 'Public Perceptions of Poverty, Social Exclusion and Living Standards: Preliminary Report on Focus Group Findings', *Working Paper Methods Series 12*, UK: PSE:UK.
- <sup>33</sup> **Oxfam** (2013) 'Oxfam Humankind Index: The New Measure of Scotland's Prosperity', Oxford: Oxfam GB. <http://policy-practice.oxfam.org.uk/publications/oxfam-humankind-index-the-new-measure-of-scotlands-prosperity-second-results-293743>
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- <sup>161</sup> 'Specialists' are bird species which are restricted to, or heavily dependent, upon farmland habitat.
- <sup>162</sup> **Defra** (2014c) 'Wild Bird Populations in the UK, 1970 to 2012: Annual Statistical Release'. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/251176/Wild\\_birds\\_1970-2012\\_UK\\_FINAL.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/251176/Wild_birds_1970-2012_UK_FINAL.pdf) (accessed April 2014); and **Defra** (2013) 'Observatory Programme Indicators: DE5 Farmland Bird Populations', London: Defra. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/267556/agindicator-de5-18dec13.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/267556/agindicator-de5-18dec13.pdf) (accessed March 2014).
- <sup>163</sup> *Ibid.*
- <sup>164</sup> **RSPB Cymru et al.** 'The State of Birds in Wales 2012', Cardiff: RSPB Cymru. <http://www.birdsinwales.org.uk/downloads/SOBIW2012eng.pdf> (accessed November 2014.)
- <sup>165</sup> For example snapshots provided by **T. Sharrock** (British Trust for Ornithology & Irish Wildbird Conservancy 1976), *The Atlas of Breeding Birds in Britain and Ireland* UK: Poyser.
- <sup>166</sup> **Defra** (2014c) *op. cit.*
- <sup>167</sup> *Ibid.* (accessed Jan. 2015).
- <sup>168</sup> *Ibid.*
- <sup>169</sup> The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, usually known as the Basel Convention, is an international treaty that was designed to reduce the movements of hazardous waste between nations.
- <sup>170</sup> Good data exist on POPs in the eggs and tissues of predatory birds: **Centre for Ecology and Hydrology** (2012) Predatory Bird Monitoring Scheme. <http://data.gov.uk/dataset/the-predatory-bird-monitoring-scheme-pbms> (accessed December 2013). and for a range of POPs, including PCBs and dioxins, in air samples monitored annually at stations across the UK by Defra under its Toxic Organic Micro Pollutants (TOMPs) scheme (see **Defra** (2013) *op. cit.* <http://uk-air.defra.gov.uk/data/tomps-data>, accessed March 2014). Both of these sources provide data from which an index or indices could be derived; however, at present, they simply record information for individual chemicals.
- <sup>171</sup> **Council of Europe** (2000) 'Directive 2000/60/EC', p.59. <http://www.doeni.gov.uk/wfd.pdf>
- <sup>172</sup> **Welsh Government** (2012) 'Sustainability Indicator 13, River quality - Percentage of River Lengths of Good Chemical or Biological Quality', Cardiff: Welsh Government. <https://statswales.wales.gov.uk/Catalogue/Sustainable-Development/Sustainable-Development-Indicators/ChemicalAndBiologicalRiverWaterQuality-by-Year> (accessed October 2014)
- <sup>173</sup> **Welsh Government** (2014b) *op. cit.* p. 26.
- <sup>174</sup> **Welsh Government** (2014b) *op. cit.* p. 25. Chart 2.
- <sup>175</sup> **The Scottish Government** (2013) 'Scotland's Carbon Footprint 1998 – 2010', Edinburgh: The Scottish Government. <http://www.scotland.gov.uk/Publications/2013/09/5719> (accessed October 2014).

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- <sup>177</sup> **Department of Energy and Climate Change (DECC)** (2014) 'Annual Statement of Emissions for 2012', London: DECC. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/296152/38238\\_Un\\_Act\\_D\\_ECC\\_web\\_accessible\\_v2.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296152/38238_Un_Act_D_ECC_web_accessible_v2.pdf)
- <sup>178</sup> **SRC** (2013) *op. cit.* section.4.1.1.
- <sup>179</sup> **Defra** (2013) 'Statistical release: UK's Carbon Footprint 1997–2011' London: Defra. <https://www.gov.uk/government/statistics/uks-carbon-footprint>
- <sup>180</sup> **Defra** (2013) *op. cit.*
- <sup>181</sup> **SRC** (2013) *op. cit.*
- <sup>182</sup> For an interactive infographic on where UK virtual water is imported from, see 'Britain's Borrowed Water' the *Guardian* 20 August, 2008. <http://www.theguardian.com/environment/interactive/2008/aug/19/water?guni=Article:in%20body%20link>
- <sup>183</sup> **A. Chapagain and S. Orr** (2008) 'UK Water Footprint: the Impact of The UK's Food and Fibre Consumption on Global Water Resources', London: WWF. [http://www.waterfootprint.org/Reports/Orr\\_and\\_Chapagain\\_2008\\_UK\\_waterfootprint-vol1.pdf](http://www.waterfootprint.org/Reports/Orr_and_Chapagain_2008_UK_waterfootprint-vol1.pdf)
- <sup>184</sup> The updated proposal for a planetary boundary in this domain focuses more specifically on the amount of remaining forest cover, **W. Steffen et al** (2014) *op. cit.* p. 5. However, we are aware of no data which would allow a national boundary for this to be set and therefore maintain our focus on the SRC approach as laid out here.
- <sup>185</sup> **SRC** (2013) *op. cit.* section 4.1.4.
- <sup>186</sup> *Ibid.* p.55.
- <sup>187</sup> **United Nations Environment Programme (UNEP), International Resources Panel (IRP)**(2014) 'Assessing Global Land Use: Balancing Consumption with Sustainable Supply', Chapter 4.2.1. pp.67-8. [http://www.unep.org/resourcepanel/Portals/24102/PDFs/Full\\_Report-Assessing\\_Global\\_Land\\_UseEnglish\\_\(PDF\).pdf](http://www.unep.org/resourcepanel/Portals/24102/PDFs/Full_Report-Assessing_Global_Land_UseEnglish_(PDF).pdf)
- <sup>188</sup> **SRC** (2013) *op. cit.* Figure 16.
- <sup>189</sup> **Friends of the Earth Europe (FOEE)** (2013) 'Hidden Impacts: How Europe's Resource Overconsumption Promotes Global Land Conflicts', Table 3.1.
- <sup>190</sup> **M. Buckner et al.** (2011) 'Europe's Global Land Demand: A Study on the Actual Land Embodied in European Imports and Exports of Agricultural and Forestry Products', Vienna: Sustainable Europe Research Institute (SERI). Table 2. [http://seri.at/wp-content/uploads/2011/10/Europe\\_Global\\_Land\\_Demand\\_Oct11.pdf](http://seri.at/wp-content/uploads/2011/10/Europe_Global_Land_Demand_Oct11.pdf)
- <sup>191</sup> **A. Evans** (2011) 'Resource Scarcity, Fair Shares and Development', Discussion Paper. London/Oxford: WWF/Oxfam GB. [http://assets.wwf.org.uk/downloads/wwf\\_oxfam\\_scarcityfairsharesdev2011.pdf](http://assets.wwf.org.uk/downloads/wwf_oxfam_scarcityfairsharesdev2011.pdf); and UNEP (2014) *op. cit.*
- <sup>192</sup> **FOEE** (2013) *op. cit.*, Table 3.1.
- <sup>193</sup> **Defra** (2014) 'UK Biodiversity Indicators, Indicator 2014', Figure B5a. <http://jncc.defra.gov.uk/page-4245> (accessed January 2015).
- <sup>194</sup> **SRC** (2013) *op. cit.* p.48.
- <sup>195</sup> **Defra** (2014) 'The British Survey of Fertiliser Practice, Fertiliser Use on Farm for the 2013 Crop Year', London: Defra. Table B2.6 [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/301475/fertiliseruse-statsnotice-08apr14.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/301475/fertiliseruse-statsnotice-08apr14.pdf)
- <sup>196</sup> **UK Ocean Acidification Research Programme** (2013). <http://www.oceanacidification.org.uk/>
- <sup>197</sup> **Welsh Government** (2013) 'Wales Marine and Fisheries Strategic Action Plan (2013)', Cardiff: Welsh Government. <http://wales.gov.uk/topics/environmentcountryside/fisheries/walesfisheriesstrategy/documents/strategic-action-plan/?lang=en>
- <sup>198</sup> **Defra** (2014b), Biodiversity 2020. *Op. cit.* p.180. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/383902/England\\_full\\_2014\\_finalv2.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/383902/England_full_2014_finalv2.pdf) (accessed Jan. 2015); **Joint Nature Conservation Committee** 'Biodiversity Indicators' <http://jncc.defra.gov.uk/page-4244-theme=print> (accessed Jan. 2015)
- <sup>199</sup> *Ibid.*
- <sup>200</sup> *Ibid.*

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- <sup>201</sup> 'Ozone Depletion: Losing Earth's Protective Layer', *National Geographic*.  
<http://environment.nationalgeographic.com/environment/global-warming/ozone-depletion-overview/>
- <sup>202</sup> **SRC** (2013) *op. cit.* Figure 17.
- <sup>203</sup> *Ibid.* p.63.
- <sup>204</sup> However, a regional level boundary has now been proposed by **W. Steffen et al.** (2014) *op. cit.* p. 5.
- <sup>205</sup> UKTAG is a working group of experts drawn from the following agencies: Natural Resources Wales, Natural England (NE), Environment Agency, Northern Ireland Environment Agency (NIEA), Joint Nature Conservation Committee (JNCC), Scottish Environment Protection Agency (SEPA), Scottish Natural Heritage (SNH), Republic of Ireland's Department of Environment, Community and Local Government (DECLG).
- <sup>206</sup> **UKTAG** 'Updated recommendations on phosphorus standards for rivers: River Basin Management (2015–2021)', Table 3.  
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- <sup>207</sup> **D. Gordon et al.** (2013) *op. cit.*
- <sup>208</sup> **M. Gannan and N. Bailey** (2013) 'Attitudes to the 'necessities of life' in Scotland; Can a UK Poverty Standard be Applied in Scotland?' UK: PSE: UK.  
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<http://php.york.ac.uk/inst/spru/pubs/ipp.php?id=1046>
- <sup>210</sup> *Ibid.* p.1.
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- <sup>212</sup> *Ibid.* p.3. Also **A. Davis, D. Hirsch, N. Smith, J Beckhelling, M. Padley** (2012) 'A Minimum Income Standard for the UK in 2012', York: JRF.
- <sup>213</sup> *Ibid.*
- <sup>214</sup> **Bradshaw et al.** (2008) *op. cit.* p.3.
- <sup>215</sup> *Ibid.* p.14.
- <sup>216</sup> *Ibid.* p.27. MIS budgets are 'well below median income levels, but higher than the 60% of median income poverty threshold (except pensioner couples)... people at the standard poverty line, 60% of median, are mostly well below the MIS'. *Ibid.* p.38.
- <sup>217</sup> **A. Self and J. Beaumont** (2012) 'Initial Findings from the Consultation on Proposed Domains and Measures of National Well-being', London: ONS. [http://www.ons.gov.uk/ons/dcp171766\\_257206.pdf](http://www.ons.gov.uk/ons/dcp171766_257206.pdf)
- <sup>218</sup> **ONS** (2013) Domains and Measures spreadsheet. <http://www.ons.gov.uk/ons/rel/wellbeing/measuring-national-well-being/domains-and-measures---may-2013/rft---domains-and-measures.xls>
- <sup>219</sup> **Equality and Human Rights Commission**, Equality Measurement Framework.  
<http://www.equalityhumanrights.com/key-projects/equality-measurement-framework/>
- <sup>220</sup> **Oxfam** (2012) 'Oxfam Humankind Index', *Oxford: Oxfam GB*. [www.oxfam.org.uk/humankindindex](http://www.oxfam.org.uk/humankindindex)
- <sup>221</sup> **C. May, G. Brown, N. Cooper and L. Brill** (2009) 'The Sustainable Livelihoods Handbook: An asset based approach to poverty', Oxford/Manchester: Oxfam GB/Church Action on Poverty. <http://policy-practice.oxfam.org.uk/publications/the-sustainable-livelihoods-handbook-an-asset-based-approach-to-poverty-125989>
- <sup>222</sup> Financial assets include income from work, pensions, other income support and stocks of wealth. Environmental assets include local green space, air quality, parks and clean streets. Physical assets include infrastructure, houses and tools and equipment. Human assets include skills, education and health. Social assets are people's networks of friends, family and contacts.



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