

## Article

# Sustainable Development Goals (SDGs), and their implementation

Morton, Stephen, Pencheon, David and Squires, Neil

Available at <http://clock.uclan.ac.uk/29056/>

*Morton, Stephen, Pencheon, David and Squires, Neil (2017) Sustainable Development Goals (SDGs), and their implementation. British Medical Bulletin, 124 (1). pp. 81-90. ISSN 0007-1420*

It is advisable to refer to the publisher's version if you intend to cite from the work.  
<http://dx.doi.org/10.1093/bmb/ldx031>

For more information about UCLan's research in this area go to <http://www.uclan.ac.uk/researchgroups/> and search for <name of research Group>.

For information about Research generally at UCLan please go to <http://www.uclan.ac.uk/research/>

All outputs in CLoK are protected by Intellectual Property Rights law, including Copyright law. Copyright, IPR and Moral Rights for the works on this site are retained by the individual authors and/or other copyright owners. Terms and conditions for use of this material are defined in the <http://clock.uclan.ac.uk/policies/>

**Sustainable Development Goals (SDGs) and their implementation**

Journal:	<i>British Medical Bulletin</i>
Manuscript ID	BMB-2017-012.R1
Manuscript Type:	Invited Review
Date Submitted by the Author:	n/a
Complete List of Authors:	Morton, Stephen ; Former Programme Director and Sustainability Lead for Public Health Benefits, Public Health England Pencheon , David ; Sustainable Development Unit for NHS England and Public Health England Squires, Neil ; Director of Global Public Health, Public Health England
Keywords:	Sustainable development, global health, implementation, global goals

SCHOLARONE™  
Manuscripts

Review

1  
2  
3  
4  
5  
6  
7 1 **Title: Sustainable Development Goals (SDGs), and their implementation**

8 2  
9  
10 3 **Sub title? A national global framework for health, development and equity needs a**  
11  
12 4 **systems approach at every level.**

**Comment [S1]:** Sub-title may be redundant

13  
14 5  
15 6 **Authors:**

16 7  
17 8 Dr Stephen Morton, Former Programme Director for Sustainability and Public Health  
18  
19 9 Benefits, Public Health England. [stevemorton@doctors.org.uk](mailto:stevemorton@doctors.org.uk)

20 10  
21 11 Dr David Pencheon, Director, Sustainable Development Unit for NHS England and Public  
22  
23 12 Health England. [david.pencheon@nhs.net](mailto:david.pencheon@nhs.net)

24 13  
25 14 Dr Neil Squires, Director of Global Public Health, Public Health England.  
26  
27 15 [neil.squires@phe.gov.uk](mailto:neil.squires@phe.gov.uk)

28 16  
29 17 **Keywords:**

30 18 Sustainable development; global health, implementation, global goals

31 19  
32 20 **Abstract**

33 21 The Sustainable Development Goals (SDGs) are a set of global goals for fair and  
34  
35 22 sustainable health at every level: from planetary biosphere to local community. This bold  
36  
37 23 new global agenda to end poverty by 2030 and pursue a sustainable future was  
38  
39 24 unanimously adopted **today** by the 193 Member States of the United Nations in 2015. The  
40  
41 25 framework aims to end poverty, protect all that makes the planet habitable, and ensure that  
42  
43 26 all people enjoy peace and prosperity, now and in the future. Although the goals represent a  
44  
45 27 well consulted framework that is scientifically robust, and widely intuitive, there is much to be  
46  
47 28 done if they are to build upon the progress established by the Millennium Development

**Comment [S2]:** Both reviewers highlighted that the word today was redundant and inaccurate

1  
2  
3  
4  
5  
6  
7 29 Goals (MDGs). There is empirical evidence that many countries have yet to understand the  
8  
9 30 difference between the MDGs and the SDGs – particularly their universality, the huge  
10  
11 31 potential of new data methods to help with their implementation, and the systems thinking  
12  
13 32 that is needed to deliver the vision. The UN describe this as 'system wide strategic planning'  
14  
15 33 to 'integrate the economic, social and environmental dimensions into policy and actions':  
16  
17 34 more simply it means looking at the impact of any action across all 17 Goals. (200+63  
18  
19 35 words)

Comment [S3]: Added at request of Reviewer 1

## 20 21 22 23 24 25 26 40 Introduction

27  
28 41  
29  
30 42 The Sustainable Development Goals (SDGs), otherwise known as the Global Goals, are a  
31  
32 43 set of objectives within a universal agreement to end poverty, protect all that makes the  
33  
34 44 planet habitable, and ensure that all people enjoy peace and prosperity, now and in the  
35  
36 45 future. The Goals were adopted by all member states of United Nations formally in 2015, for  
37  
38 46 the period 20165-2030 to address the overwhelming empirical and scientific evidence that  
39  
40 47 the world needs a radically more sustainable approach. The goals provide a well consulted  
41  
42 48 framework that is sufficiently scientifically robust, politically acceptable, and publicly intuitive.  
43  
44 49 The goals provide us with our best chance of ensuring the necessary collaboration and  
45  
46 50 alignment as we implement global approaches to securing a fair, healthy and prosperous  
47  
48 51 future for ourselves, our children and grandchildren. Although the 17 goals (Table 1) are  
49  
50 52 supported by targets and indicators (see Table 2 for those associated, for example, with  
51  
52 53 Goal 2) the key learning is that all the goals are intimately interconnected – a failure to  
53  
54 54 appreciate this will perpetuate an approach which will be non-aligned at best and highly  
55  
56 55 ineffective at worst. Secondly, despite the intuitive nature of interventions that deliver both  
57  
58 56 immediate and long term “co-benefits” (such as sustainable transport and food systems, or  
59  
60

Comment [S4]: The SDGs were to begin in 2016

1  
2  
3  
4  
5  
6  
7 57 better access to green space), there is a worrying lack of generalisable, quantifiable  
8 58 evidence on the levels of benefit that appeals to policy makers, scientists, or practitioners.  
9  
10 59 This inhibits our vision and courage to act in those areas where we should be more specific  
11  
12 60 about health, social and economic benefits. At a global level, we should use the SDGs to  
13  
14 61 highlight the inter-linkage between goals and champion the specific and collaborative actions  
15  
16 62 that create multiple and beneficial outcomes for shared purpose.  
17  
18 63

19 64 The Sustainable Development Goals (adopted by the United Nations General Assembly in  
20  
21 65 September 2015) run from 2016 to 2030 and are formally the goals of the United Nations'  
22  
23 66 'Transforming our world; the 2030 Agenda for Sustainable Development', [an agenda](#) which  
24  
25 67 sets out the vision, principles and commitments to a fairer and more sustainable world for all.  
26  
27 68 The practical and political importance of the SDGs, and the challenges associated with  
28  
29 69 them, can only truly be appreciated by understanding what preceded them. The Millennium  
30  
31 70 Development Goals (MDGs) were in place from 2000 to 2015 and consisted of 8  
32  
33 71 international development goals. The first three goals covered poverty, education and  
34  
35 72 gender equality; the next three goals addressed 'health outcomes' covering child mortality,  
36  
37 73 maternal health and 'HIV/AIDS, malaria and other diseases'. The remaining two goals  
38  
39 74 addressed environmental sustainability and global partnership for development. These 8  
40  
41 75 MDGs were supported by a total of 21 individual targets.  
42  
43 76

44 77 The MDGs, although a move in the right direction, were subject to certain criticisms. One  
45  
46 78 was that there was insufficient analysis to [justify](#) why these goals were selected as priorities  
47  
48 79 and insufficient information available to be able to compare performance, especially in  
49  
50 80 tackling inequalities within countries<sup>1</sup>. This highlighted the perennial challenge in such  
51  
52 81 initiatives of balancing political consensus with scientific validity. Nevertheless, based on  
53  
54 82 data compiled by the Inter-Agency and Expert Group on MDG indicators<sup>2</sup>, the UN could  
55  
56 83 demonstrate considerable success on some goals, especially on reducing extreme poverty  
57  
58 84 (numbers of people living on less than \$1.25 per day), reducing both child and maternal  
59  
60

Comment [S5]: Added for clarity

1  
2  
3  
4  
5  
6  
7 85 mortality, increasing access for people living with HIV to antiretroviral treatment and reducing  
8 86 new HIV infections. However, the report recognised that *'progress has been uneven across*  
9 87 *regions and countries'* in the implementation of the MDGs.  
10  
11  
12 88

13  
14 89 Perhaps most importantly, the Millennium Development Goals focussed primarily on the  
15 90 needs of developing countries reinforcing a binary view of rich and poorer countries, of  
16 91 donors and recipients and implying that the global challenge is a problem of development  
17 92 which international aid can help address, rather than a set of shared problems which only  
18 93 collective action globally can resolve.  
19  
20  
21  
22 94

23  
24 95 In contrast to the MDGs, the SDGs are both broader in scope, more collective in action, and  
25 96 more detailed in content, including a clear message that every nation must act if success is  
26 97 to be realised<sup>3</sup>. The UN has summarised the difference between the two approaches as  
27  
28  
29 follows:  
30  
31  
32 99

Formatted: Superscript

- 33 100
- 34 101 • The 17 Sustainable Development Goals (SDGs) with 169 targets are broader in  
35 102 scope and go further than the MDGs by addressing the root causes of poverty and  
36 103 the universal need for development that works for all people. The goals cover the  
37 104 three dimensions of sustainable development: economic growth, social inclusion and  
38 105 environmental protection.
  - 39 106 • Building on the success and momentum of the MDGs, the new global goals cover  
40 107 more ground, with ambitions to address inequalities, economic growth, decent jobs,  
41 108 cities and human settlements, industrialization, oceans, ecosystems, energy, climate  
42 109 change, sustainable consumption and production, peace and justice.
  - 43 110 • The new Goals are universal and apply to all countries, whereas the MDGs were  
44 111 intended for action in developing countries only.
- 45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

- 1  
2  
3  
4  
5  
6  
7 111 • A core feature of the SDGs is their strong focus on means of implementation: the  
8 112 mobilization of financial resources; capacity-building and technology; as well as data  
9 113 and institutions.  
10 114 • The new Goals recognize that tackling climate change is essential for sustainable  
11 115 development and poverty eradication. SDG 13 aims to promote urgent action to  
12 116 combat climate change and its impacts.  
13  
14  
15  
16  
17  
18  
19  
20

**Comment [S6]:** This section is re-produced from the UN website on Sustainable Development. It includes American English spelling e.g. industrialization, mobilization, recognize... I haven't edited these.

21 119 The UN resolution refers to five 'areas of critical importance'; sometimes known as the 5  
22 120 'P's, these are People, Planet, Prosperity, Peace and Partnerships– (See Table 1). The  
23 121 goals were launched with the strap-line of 'Ensuring that no-one is left behind' with its  
24 122 implication that development and levelling up will be the keys to progress by 2030. How this  
25 123 aspiration is reconciled with maintaining ecosystems and tackling climate change will be a  
26 124 challenge in itself. However, the SDGs do have a clear goal on climate action (goal 13),  
27 125 which has been strengthened subsequently by the Paris Agreement of the 21<sup>st</sup> Conference  
28 126 of Parties (COP21) to the United Nations Framework Convention on Climate Change  
29 127 (UNFCCC). However, the SDGs are voluntary commitments by governments in contrast to  
30 128 the formal Paris Agreement made by the COP21 process which is legally binding now that  
31 129 it has been signed by 55% of parties and that those who have signed are responsible for  
32 130 more than 55% of greenhouse gas emissions. Also adopted in March 2015, and with a similar  
33 131 timescale, was the Sendai Framework for Disaster Risk Reduction (2015-2030) which succeeded the  
34 132 Hyogo Framework for Action (2005-2015); the Sendai Framework was agreed by 187 countries and  
35 133 was endorsed by the UN General Assembly in June 2015.  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52

**Comment [S7]:** As suggested by Reviewer 1.

**Comment [S8]:** Added at suggestion of reviewer 2  
No formal reference is included here although the document can be found at  
[http://www.unisdr.org/files/43291\\_sendaiframeworkfordrren.pdf](http://www.unisdr.org/files/43291_sendaiframeworkfordrren.pdf)  
Also see later comment on reference numbers

53 137 **Sources of data**  
54  
55  
56  
57  
58  
59  
60

1  
2  
3  
4  
5  
6  
7 138  
8  
9 139  
10 140  
11  
12 141  
13  
14 142  
15  
16 143  
17 144  
18  
19 145  
20  
21 146  
22  
23 147  
24  
25 148  
26 149  
27  
28 150  
29  
30 151  
31  
32 152  
33 153  
34  
35 154  
36  
37 155  
38  
39 156  
40 157  
41  
42 158  
43  
44 159  
45  
46 160  
47  
48 161  
49  
50 162  
51 163  
52  
53 164  
54  
55 165  
56  
57  
58  
59  
60

There is a wealth of published material on sustainable development in general and on the SDGs in particular from the UN, from international non-governmental organisations, and from many other concerned and committed organisations and individuals more locally. It is easy to get lost in all of this so we have been selective in the sources we have used. Most importantly, there is a widely held view that much more innovative ways to both collecting data and using data, from crowd sourcing to the use of big data, need to be used if the mechanism for implementing and delivering the SDGs are to take full advantage of the data revolution.<sup>5</sup>

~~Firstly,~~ There is a dedicated United Nations website on sustainable development (<http://www.un.org/sustainabledevelopment/>) as well as a sustainable development knowledge platform (<https://sustainabledevelopment.un.org/>) with updates on the High Level Political Forum, on individual topics and milestones, and a directory of resources including recent publications. Both sites have much supporting material on the SDGs and also on the challenge of integrating the three dimensions of sustainable development (economic, social and environmental).

The formal resolution adopted by the UN General Assembly in September 2015 was published on 21 October 2015<sup>3</sup>. In the same year the United Nations Statistical Commission created an Inter Agency and Expert Group on SDG Indicators (IAEG-SDGs), which will coordinate proposals of a global indicator framework.<sup>4</sup> This should be properly recognised by all countries and associated organisations who are working towards consistent methods of tracking progress so that duplication can be avoided, gaps identified, and resources directed most effectively. While work continues on international action to support the SDGs, all countries are 'expected to take ownership and establish a national framework for achieving the 17 goals'. The UN states that countries have the 'primary responsibility for follow-up and review' and this 'will require quality, accessible and timely data collection'. In

**Comment [S9]:** Reference 5 appears before Reference 4. These should be reversed but I am unable to delete the existing numbers.

**Comment [S10]:** This 'Firstly' had become redundant.



1  
2  
3  
4  
5  
6  
7 166 the UK, for example, the Office for National Statistics (ONS), has been working with the UK  
8 167 Stakeholders for Sustainable Development (UKSSD) to consult on national indicators for the  
9  
10 168 SDGs. And some countries (notably Sweden, Germany, Colombia, the Philippines, and  
11  
12 169 Czechia) already have national institutional arrangements.<sup>5</sup>  
13  
14 170  
15 171

### 17 172 **Areas of agreement**

18  
19 173

20 174 There is general agreement on the breadth and depth of the goals. There are clear  
21  
22 175 obligations and responsibilities for all member states (for which they will be held to account)  
23  
24 176 and a recognition that cross systems approaches to implementation will be needed. This is  
25  
26 177 a significant change from the MDG process and requires explicit contributions from every  
27  
28 178 country, particularly in developing and aligning the complex analytical tools to assess  
29  
30 179 progress and assist decision making. The UN report on 'critical milestones'<sup>6</sup> refers to 'an  
31  
32 180 overarching vision and framework'. Getting accountability structures fit for purpose is  
33  
34 181 already a key challenge<sup>7</sup>. A recent review in Nature<sup>8</sup> identifies that this requires a 'new  
35  
36 182 coherent way of thinking' and that while it is implicit in the SDG logic that the goals depend  
37  
38 183 on each other, no-one has specified exactly how. To help, different models have been  
39  
40 184 developed<sup>9</sup>, including both scenario analysis and quantitative modelling. Some of these can  
41  
42 185 be used as top-down macro-framework level tools and some as sectoral models for option  
43  
44 186 level impact analysis. This independent review<sup>7</sup> of 16 countries who volunteered for  
45  
46 187 national review (by the High Level Political Forum) noted a range of different approaches to  
47  
48 188 deal with the complexity of the implementation process. Some countries with existing  
49  
50 189 national sustainable development strategies have built on these and tried to align existing  
51  
52 190 objectives with the new goals. Other countries have developed new national SDG  
53  
54 191 Implementation Plans. Some have linked the SDGs to financial planning for sustainable  
55  
56 192 development or sought to integrate SDGs [either](#) in sectoral planning (nutrition, education  
57  
58 193 etc) or in local government planning frameworks.

**Comment [S11]:** Changes in lines 192 & 197 and  
In response to the reviewers' request for greater  
clarity.

1  
2  
3  
4  
5  
6  
7 194  
8  
9 195  
10 196  
11  
12 197  
13  
14 198  
15  
16 199  
17 200  
18  
19 201  
20  
21 202  
22  
23 203  
24 204  
25  
26 205  
27  
28 206  
29  
30 207  
31 208  
32  
33 209  
34  
35 210  
36  
37 211  
38  
39 212  
40 213  
41  
42 214  
43  
44 215  
45 216  
46  
47 217  
48  
49 218  
50  
51 219  
52  
53  
54  
55  
56  
57  
58  
59  
60

Other areas of agreement include the need to integrate the three dimensions of sustainable development (economic, social and environmental)-<sup>10 11</sup>, the importance of raising awareness and creating ownership and [the](#) need for stakeholder engagement <sup>7.88</sup>. This is especially important to address the widespread misbelief that sustainable development concerns only the environmental dimension and conflicts with necessary “economic growth”. No strategy, not even one agreed by all member states of the United Nations, can immediately address historical cultures; yet, it remains one of the most fundamental challenges (and opportunities) for us all to address. The reality is that addressing all three dimensions collaboratively will yield the greatest benefits, whilst the alternative - addressing them separately and in competitive isolation - will deliver much less and with greater risks.

The agreement on the need for ‘systems thinking’, and integration across the three dimensions, is welcome, but the difficulties inherent in this approach should not be underestimated. This has been illustrated by recent worked examples and case studies.

One worked example<sup>8</sup> concludes that action on the route to zero hunger in sub-Saharan Africa interacts positively with Goal 1 (poverty), goal 3 (health and wellbeing), and goal 4 (quality education). However, it also notes that food production has a more complex interaction with goal 13 (climate change mitigation). This is because agriculture contributes 20-35% of global greenhouse gases, so climate mitigation constrains some types of food production (particularly meat). Additionally, food production (goal 2) can compete with renewable energy production (goal 7) and eco-system protection (goals 14 and 15). Conversely, climate stability (goal 13) and preventing ocean acidification (goal 14) will support sustainable food production and fisheries (Goal 2).

Formatted: Superscript

1  
2  
3  
4  
5  
6  
7 220 | Similarly, the UN paper on mainstreaming the three dimensions<sup>11,14</sup> highlights water as a  
8 221 | nexus of integration and describes how water and sanitation (Goal 6) underpin other areas  
9 222 | such as health (Goal 3), food (Goal 2), energy (Goal 7), elimination of poverty (Goal 1),  
10 223 | economic productivity (Goal 8), equity (Goal 10) and access to education (Goal 4).  
11  
12  
13  
14 224  
15 225

Formatted: Superscript

### 17 226 | **Areas of controversy**

18  
19 227  
20  
21 228 | Perhaps the biggest single controversy, particularly because simplicity and logic favour  
22 229 | collaborative and system wide implementation, is the high number of goals, targets and  
23 230 | supporting actions that have been agreed. This raises concerns about whether  
24 231 | governments and international agencies have sufficient skills in 'whole systems thinking'<sup>12</sup> to  
25 232 | implement the goals without the risk of 'unintended consequences' and 'perverse  
26 233 | outcomes'<sup>8</sup>. Early mapping exercises<sup>8, 11,14, 12</sup> have demonstrated the important  
27  
28 234 | interconnections between achieving goals but experience suggests that government  
29 235 | departments and international negotiations do not always have the mandate or skills to  
30 236 | realistically address what might at first appear to be inconvenient and politically contentious  
31 237 | trade-offs<sup>8</sup> and unintended consequences.  
32  
33  
34  
35  
36  
37  
38  
39 238

Formatted: Font: Calibri, Superscript

40 239 | Deciding which goals to prioritise and then assessing the positive (or negative impacts) on  
41 240 | other goals, is a crucial step. There is scope for concern if governments, corporations or  
42 241 | agencies were to prioritise energy production (to meet goal 7), agricultural output (to meet  
43 242 | goal 2) or development of business and infrastructure (to meet goals 8 and 9), without  
44 243 | considering impacts on climate (goal 13), water (goal 14) or land (goal 15). The root cause  
45 244 | of this problem is the failure to imagine better ways of addressing energy, agricultural output,  
46 245 | and what defines success of a business in the 21<sup>st</sup> century. It is rarely more of what has  
47 246 | gone before. The SDGs are the formal stimulus for us to innovate collectively at scale and  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

1  
2  
3  
4  
5  
6  
7 247 pace; and to think and act better not bigger. For instance, we need to be more open to the  
8 248 increasing evidence of the many potential positive interactions between different goals.  
9  
10 249 More equitable and sustainable food systems would help to meet goal 2, produce ecological  
11  
12 250 benefits (goals 13-15) and help tackle problems such as obesity and non-communicable  
13  
14 251 disease (goal 3)<sup>8,12+2</sup>.

Formatted: Font: (Default) Arial, Superscript

15 252  
16  
17 253 Interestingly, although the SDGs and supporting targets make little mention of tackling world  
18  
19 254 population growth, there are several studies illustrating how co-ordinated, whole system  
20  
21 255 approaches to the SDGs are already stabilising the global population. One paper<sup>13</sup> looks at  
22  
23 256 how the SDG targets on mortality, reproductive health and education for girls will directly and  
24  
25 257 indirectly influence future demographic trends. Another [paper](#)<sup>14</sup>, looking from the opposite  
26  
27 258 perspective, describes how reductions in fertility in Africa could reduce dependency ratios  
28  
29 259 ([the](#) proportion of population not economically active) and thus help tackle poverty (goal 1),  
30  
31 260 increase productivity (goal 8), and improve education and gender equality (goals 4 and 5).

Comment [S12]: Changes in lines 257, 259 & 263 for clarity

32 261  
33 262 It should be clear that each country will pursue these Global Goals differently, and that a key  
34  
35 263 a benefit of the SDG approach is [that gives a degree of local](#) flexibility. However, there are  
36  
37 264 certain goals which require urgent collective action, where the clock is ticking on the world's  
38  
39 265 ability to tackle changes that are already significantly impacting on planetary health.<sup>15</sup> This  
40  
41 266 means that international collaboration must give primacy to action on climate change (goal  
42  
43 267 13) and the need to make economic policy subservient to the minimisation of environmental  
44  
45 268 impact (see goal 12: Responsible consumption and production). This is of increasing  
46  
47 269 importance with the recent expressions of electoral judgements in some western countries.  
48  
49 270 The danger is that electorates are seduced into abandoning collective responsibility for the  
50  
51 271 three dimensions of sustainable development in the hope that this will produce short-term  
52  
53 272 benefits for individual countries while ignoring the wider longer term environmental, social  
54  
55 273 and economic costs, knowingly leaving these to be borne by future generations.

56  
57  
58  
59  
60 274

1  
2  
3  
4  
5  
6  
7 275 A significant risk of allowing countries to take unilateral and apparently self-interested  
8 276 approaches by opting out of multi-state arrangements and economic agreements is the  
9  
10 277 threat of a 'race to the bottom' where a country adopts low taxation, relaxed labour laws and  
11 278 reduced regulation as a deceptively attractive way to avoid economic crises. This approach  
12  
13 279 risks increasing health inequity alongside continued restraints on social assistance and  
14  
15 280 environmental protection, with negative impacts on many of the SDGs. Alternatively, a  
16  
17 281 country, region, or state could seek to build an economy which is directed at realising the  
18  
19 282 combined economic, social and environmental benefits associated with implementing the  
20  
21 283 SDGs, with a focus on renewable energy, sustainable food and agriculture and  
22  
23 284 environmentally sustainable technology (recycling, energy conservation, and the like). This  
24  
25 285 may also provide a model of sustaining prosperity given the demographic changes and likely  
26  
27 286 labour shortages if countries, such as the UK, shift away from an economic model which  
28  
287 depends on a migrant labour force for continued growth.

29 288  
30  
31 289 Given that it took 21 years of annual conferences of parties to the United Nations Framework  
32  
33 290 Convention on Climate Change before a substantial agreement for [action \(the Paris](#)  
34  
35 291 [Agreement\)](#) was achieved in December 2015, there could well be international controversy if  
36  
37 292 reneging on key global commitments weakens the collective resolve. If we accept the fact  
38  
39 293 that human health, and its future survival and prosperity, depend on a liveable earth, we  
40  
41 294 would argue therefore that a refocus of population health to ecological<sup>16</sup> and planetary  
42  
43 295 health<sup>15+8</sup> is the golden thread which binds the SDGs together as a systems [approach](#).<sup>1</sup> This  
44  
45 296 brings us to a fundamental challenge for governments, businesses, consumers and  
46  
47 297 communities.

### 48 49 299 **Growing points**

50 300  
51  
52 301 To what extent can we seek to implement the SDGs by improvements in current systems  
53  
54 302 and at what point do we need a paradigm shift in our outlook and aspirations? This subject  
55  
56  
57  
58  
59  
60

**Comment [S13]:** As suggested by reviewer 1

**Comment [S14]:** Will check this reference with co-authors.

**Formatted:** Font: (Default) Arial, Superscript

1  
2  
3  
4  
5  
6  
7 303 has been explored in relation to health and food systems<sup>17</sup> and in relation to regional trade  
8 304 agreements and health related SDGs<sup>18</sup>. However, it has also been clearly addressed by the  
9  
10 305 United Nations Environment Programme's 'Inquiry into the design of a sustainable financial  
11  
12 306 system'<sup>19</sup>. This inquiry points out that 'failure of the financial system to take adequate  
13  
14 307 account of climate change could result in extensive damage to financial assets globally, may  
15  
16 308 well threaten the stability of the financial system itself, and most importantly could impose  
17  
18 309 irreversible damage to the underlying state of the real economy and the quality of life for  
19  
20 310 those who depend on it for their livelihoods', a point that has been repeatedly echoed by  
21  
22 311 some of the most powerful financial organisations and people globally. It is not enough to  
23  
24 312 simply wait until action is obviously needed. As Mark Carney, the Governor of the Bank of  
25  
26 313 England, says: '*...once climate change becomes a defining issue for financial stability, it may*  
27  
28 314 *already be too late*'.<sup>20</sup>

29  
30 316 The existing macroeconomic model had already been challenged by a report prepared for  
31  
32 317 the UK's Sustainable Development Commission in 2009<sup>21</sup> and developed further by their  
33  
34 318 Economics Commissioner<sup>22</sup>. Essentially, this is a challenge to a global economic model,  
35  
36 319 which sees wealth creation based on rising production to meet ever increased demand as  
37  
38 320 the basis of development. This continued consumption based model would be  
39  
40 321 unsustainable even if the world's population was stable but is compounded by the projected  
41  
42 322 increase from 6 billion people in 2000 to potentially 9 billion by 2050; the consequences in  
43  
44 323 terms of resources consumed, waste generated and boundaries exceeded will be an  
45  
46 324 unprecedented planetary emergency<sup>23</sup>.

47  
48 326 However, before we despair completely, some of these reports are also clear that there  
49  
50 327 would be many social, environmental and economic benefits in changing our current model  
51  
52 328 and that 'transitioning to a green economy opens us to many opportunities as well as posing  
53  
54 329 many challenges'<sup>19+9 21+4</sup>. The fundamental challenge is aligning the three dimensions  
55  
56 330 across all 17 SDGs and that will challenge many current sectoral interests.

Formatted: Font: (Default) Arial, Superscript

Formatted: Font: (Default) Arial, Superscript

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

331  
332  
333  
334  
335  
336  
337  
338  
339  
340  
341  
342  
343  
344  
345  
346  
347  
348  
349  
350  
351  
352  
353  
354  
355  
356  
357  
358

The UK Stakeholders for Sustainable Development recently coordinated an open letter<sup>24</sup>, from over 80 UK businesses, to the Prime Minister, asking her to highlight the UK's commitment to the SDGs at the 2017 World Economic Forum in Davos. This included not just many UK ethical environmental businesses but also many more traditional major multinational companies such as Coca Cola, Tesco, HSBC, Nestle, Land Rover, KPMG and Standard Chartered. It would seem that large corporations are more aware of the need to fundamentally re-shape the economy than many political parties.

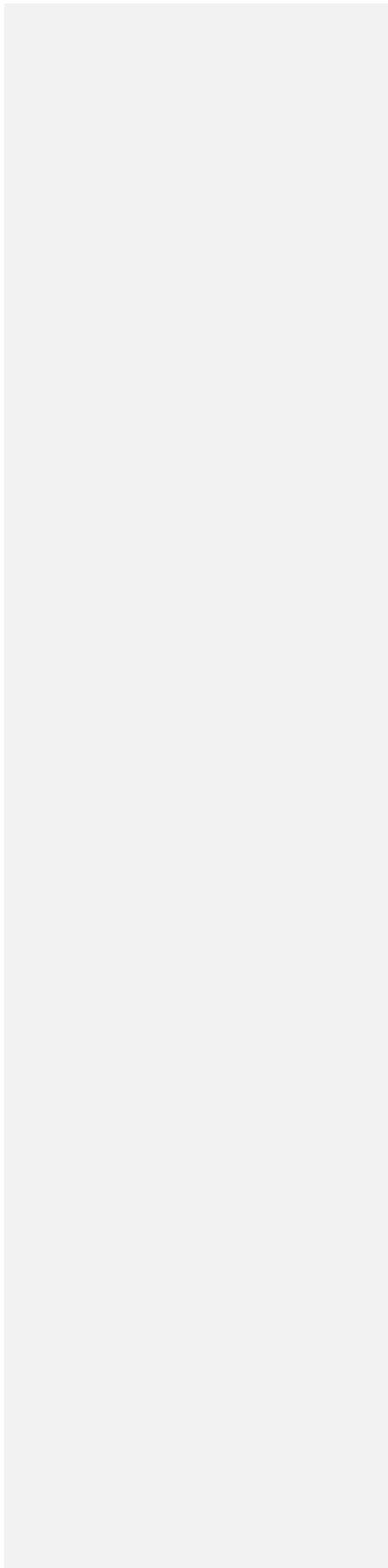
### **Areas timely for developing research**

The last 2 centuries have seen huge advances in our understanding of what causes diseases in individuals. There has been far less progress in understanding systematically exactly what causes health in populations: from a village level or a planetary level. The challenge for this generation is to synthesise our knowledge into creating those conditions that foster health and protect us from poverty as much as they protect us from polio. If we continue to devote resources disproportionately to finding ever more detailed causes of disease without considering the solutions to some of the obvious problems we have created for ourselves and others, we will be breaking the implicit contract we have with future generations, with those people who have no voice or choice; that is the agreement that we make every effort to leave the world in a better place than we found it. Without understanding how we collectively protect and improve all those conditions that make life worth living for all, we will be forever remembered as the generation who knew too much and did too little. The art and science of making change is fraught with more human and cultural barriers than with technical or knowledge barriers. The SDGs provide perhaps the last best hope we have of being honest about why and how we should implement the evidence we already have. The number of challenges and opportunities we face, from demographic transitions to new models of economic activity and workforce development makes it essential that we embrace clear and systematic frameworks for action that are measurable

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

359 and monitorable and for which we should all be held accountable and responsible. Every  
360 generation in history has faced global challenges. 'We Are the First Generation that Can  
361 End Poverty, the Last that Can End Climate Change'.<sup>25</sup>

For Peer Review





362 **Table 1: Summary of the UN's 17 Sustainable Development Goals, linked to the 5**  
363 **Areas of Critical Importance**

**Comment [S15]:** See reviewer's comments on placement of tables and figure.

- 364
- 365 • **People**
    - 366 – **No Poverty (Goal 1)**
    - 367 – **Zero Hunger (Goal 2)**
    - 368 – **Good Health and Well-being (Goal 3)**
    - 369 – **Quality Education (Goal 4)**
    - 370 – **Gender Equality (Goal 5)**
    - 371 – **Clean Water and Sanitation (Goal 6)**
  - 372 • **Planet**
    - 373 – **Climate Action (Goal 13)**
    - 374 – **Life below Water (Goal 14)**
    - 375 – **Life on Land (Goal 15)**
  - 376 • **Prosperity**
    - 377 – **Affordable Clean Energy (Goal 7)**
    - 378 – **Decent Work and Economic Development (Goal 8)**
    - 379 – **Industry, Innovation and Infrastructure (Goal 9)**
    - 380 – **Reduce Inequalities (Goal 10)**
    - 381 – **Sustainable Cities and Communities (Goal 11)**
    - 382 – **Responsible consumption and production (Goal 12)**
  - 383 • **Peace and partnerships**
    - 384 – **Peace, Justice and Strong Institutions (Goal 16)**
    - 385 – **Partnerships for the Goals (Goal 17)**
- 386  
387  
388  
389  
390  
391  
392  
393  
394  
395  
396  
397  
398  
399  
400  
401  
402  
403  
404  
405  
406  
407  
408  
409  
410  
411  
412  
413  
414  
415  
416  
417  
418  
419  
420  
421  
422  
423  
424  
425  
426  
427  
428  
429  
430  
431  
432  
433  
434  
435  
436  
437  
438  
439  
440  
441  
442  
443  
444  
445  
446  
447  
448  
449  
450  
451  
452  
453  
454  
455  
456  
457  
458  
459  
460

388 [Figure 1: UN Graphical Illustration of the 17 SDGs](#) And as a simple well-publicised  
 389 graphical table...  
 390 (high resolution version available directly from UN SDG sites): [Figure 1](#)



view

394

395 **Table 2: Examples of Targets and Indicators (for Goal 2).<sup>26</sup>**396 [\(Extracted from the UN Sustainable Development Knowledge Platform, July 2017\)](#)

TARGETS	INDICATORS
2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round	2.1.1 Prevalence of undernourishment
	2.1.2 Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale (FIES)
2.2 By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons	2.2.1 Prevalence of stunting (height for age <-2 standard deviation from the median of the World Health Organization (WHO) Child Growth Standards) among children under 5 years of age
	2.2.2 Prevalence of malnutrition (weight for height >+2 or <-2 standard deviation from the median of the WHO Child Growth Standards) among children under 5 years of age, by type (wasting and overweight)
2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment	2.3.1 Volume of production per labour unit by classes of farming/pastoral/forestry enterprise size
	2.3.2 Average income of small-scale food producers, by sex and indigenous status
2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality	2.4.1 Proportion of agricultural area under productive and sustainable agriculture
2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed	2.5.1 Number of plant and animal genetic resources for food and agriculture secured in either medium or long-term conservation facilities
	2.5.2 Proportion of local breeds classified as being at risk, not-at-risk or at unknown level of risk of extinction
2.A Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries	2.A.1 The agriculture orientation index for government expenditures
	2.A.2 Total official flows (official development assistance plus other official flows) to the agriculture sector
2.B Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round	2.A.1 Producer Support Estimate
	2.B.2 Agricultural export subsidies
2.C Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility	2.C.1 Indicator of food price anomalies

397

398

## References

- <sup>1</sup> Deveulin S. Ideas related to Human Development. In: An Introduction to the Human Development and Capability Approach, Eds Deveulin S, Shahani L. Earthscan, Sterling VA, 2009.
- <sup>2</sup> The Millennium Development Goals Report 2015. United Nations, New York, 2015.  
[http://www.un.org/millenniumgoals/2015\\_MDG\\_Report/pdf/MDG%202015%20rev%20\(July%201\).pdf](http://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20(July%201).pdf) (Accessed 6<sup>th</sup> March 2017)
- <sup>3</sup> United Nations General Assembly. Transforming our world: The 2030 Agenda for Sustainable Development. 21 October 2015. ([http://www.un.org/ga/search/view\\_doc.asp?symbol=A/RES/70/1&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E)) (Accessed, 19<sup>th</sup> Feb 2017).
- <sup>4</sup> IAEG-SDGs: Inter-agency Expert Group on SDG Indicators <https://unstats.un.org/sdgs/iaeg-sdgs/> (Accessed 6<sup>th</sup> March 2017)
- <sup>5</sup> Sustainable Development Solutions Network: Getting Started with the Sustainable Development Goals – A Guide for Stakeholders. December 2105. <http://unsdsn.org/resources/publications/sdg-guide-getting-started-with-the-sdgs/> (Accessed 6<sup>th</sup> March 2016)
- <sup>6</sup> United Nations General Assembly. United Nations General Assembly. Critical milestones towards coherent, efficient and inclusive follow-up and review at the global level. 15 January 2016. ([http://www.un.org/ga/search/view\\_doc.asp?symbol=A%20/70/684&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A%20/70/684&Lang=E)) (Accessed, 19<sup>th</sup> Feb 2017)
- <sup>7</sup> Cutter A. Progressing National SDGs Implementation. Bond, London, 2016.
- <sup>8</sup> Nilsson M, Griggs D, Visbeck M. Map the interactions between Sustainable Development Goals. Nature, Vol 534, 320-322. 16 June 2916
- <sup>9</sup> Allen C, Metternicht G, Wiedmann T. National pathways to the Sustainable Development Goals (SDGs): A comparative review of scenario modelling tools. Environmental Science and Policy. Vol 66, 199-207. 2016.
- <sup>10</sup> Weinberger K et al. Integrating the three dimensions of sustainable development: a framework and tools. ESCAP (Environmental and Social Commission for Asia and the Pacific) United Nations, Bangkok, 2015.
- <sup>11</sup> United Nations Economic and Social Council. Mainstreaming of the three dimensions of sustainable development throughout the United Nations system. 29 March 2016.  
[http://www.un.org/ga/search/view\\_doc.asp?symbol=A/71/76&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/71/76&Lang=E) (Accessed, 19<sup>th</sup> Feb 2017)
- <sup>12</sup> Sukhdev P. Embracing the SDGs' complexity. Guardian 11 January 2017.  
<https://www.theguardian.com/the-gef-partner-zone/2017/jan/11/embracing-sustainable-development-goals-complexity?CMP=ema-1702&CMP> (Accessed, 19<sup>th</sup> Feb 2017)
- <sup>13</sup> Abel G.J., Barakat B., Kc S., Lutz W. Meeting the sustainable development goals leads to lower world population growth. Proceedings of the National Academy of Sciences of the United States of America. 113 (50) (pp 14294-14299), 2016. Date of Publication: 13 Dec 2016.
- <sup>14</sup> Cleland J. Will Africa benefit from a demographic dividend? Health and Education Advice and Resource Team (HEART), London 2012.
- <sup>15</sup> Horton R, Beaglehole R, Bonita R, Raeburn J, McKee M, Wall S. From public to planetary health: a manifesto. Lancet 2014; 383(9920):847.
- <sup>16</sup> Lang T, Rayner G, Ecological public health: the 21st century's big idea? An essay by Tim Lang and Geof Rayner. 2012. BMJ 2012;345:e5466.
- <sup>17</sup> Buse K., Hawkes S. Health in the sustainable development goals: Ready for a paradigm shift? Globalization and Health. 11 (1) 2015. Article Number: 13. March 21, 2015.
- <sup>18</sup> Ruckert A., Schram A., Labonte R., et al. Policy coherence, health and the sustainable development goals: a health impact assessment of the Trans-Pacific Partnership. Critical Public Health. 27 (1) (pp 86-96), 2017. Date of Publication: 01 Jan 2017.
- <sup>19</sup> United Nations Environment Programme. The Coming Financial Climate: Aligning the financial system with sustainable development. United Nations, Geneva, 2015.
- <sup>20</sup> "Breaking the Tragedy of the Horizon – climate change and financial stability" Speech given by Mark Carney Governor of the Bank of England Chairman of the Financial Stability Board Lloyd's of London 29 September 2015. <http://www.bankofengland.co.uk/publications/Documents/speeches/2015/speech844.pdf> (Accessed 17<sup>th</sup> Feb 2017)
- <sup>21</sup> Jackson T. Prosperity without growth? The transition to a sustainable economy. Sustainable Development Commission, 2009.
- <sup>22</sup> Jackson T, Senker P. "Prosperity without growth: Economics for a finite planet." Energy & Environment 22.7 (2011): 1013-1016.
- <sup>23</sup> Emmott S. 10 Billion. Penguin, London, 2013.

**Comment [S16]:** Will also check Reference 26 with co-authors.

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60

---

<sup>24</sup> UKSSD and others. Sustainability is good for business; open letter to the Prime Minister. Times, 16 January 2017.

<sup>25</sup> UN Secretary-General Ban Ki-moon. 28<sup>th</sup> May 2015. Belgium.  
<https://www.un.org/press/en/2015/sgsm16800.doc.htm> (Accessed, 19<sup>th</sup> Feb 2017)

<sup>26</sup> Sustainable Development Goal indicators website. <https://unstats.un.org/sdgs/> (Accessed, 19<sup>th</sup> Feb 2017)

For Peer Review

