



Article

Sustainable Development Goals (SDGs), and their implementation

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Sustainable Development Goals (SDGs) and their implementation

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Manuscripts

Review

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7 1 **Title: Sustainable Development Goals (SDGs), and their implementation**

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

Comment [S1]: Sub-title may be redundant

13
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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
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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
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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
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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

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

Comment [S3]: Added at request of Reviewer 1

26 40 Introduction

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30 42 The Sustainable Development Goals (SDGs), otherwise known as the Global Goals, are a
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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
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42 48 framework that is sufficiently scientifically robust, politically acceptable, and publicly intuitive.
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44 49 The goals provide us with our best chance of ensuring the necessary collaboration and
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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
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50 52 supported by targets and indicators (see Table 2 for those associated, for example, with
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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
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56 55 ineffective at worst. Secondly, despite the intuitive nature of interventions that deliver both
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58 56 immediate and long term “co-benefits” (such as sustainable transport and food systems, or
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Comment [S4]: The SDGs were to begin in 2016

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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.
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10 59 This inhibits our vision and courage to act in those areas where we should be more specific
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12 60 about health, social and economic benefits. At a global level, we should use the SDGs to
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14 61 highlight the inter-linkage between goals and champion the specific and collaborative actions
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16 62 that create multiple and beneficial outcomes for shared purpose.
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18 63

19 64 The Sustainable Development Goals (adopted by the United Nations General Assembly in
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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.

Comment [S5]: Added for clarity

26 68 The practical and political importance of the SDGs, and the challenges associated with
27
28 69 them, can only truly be appreciated by understanding what preceded them. The Millennium
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30 70 Development Goals (MDGs) were in place from 2000 to 2015 and consisted of 8
31
32 71 international development goals. The first three goals covered poverty, education and
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34 72 gender equality; the next three goals addressed 'health outcomes' covering child mortality,
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36 73 maternal health and 'HIV/AIDS, malaria and other diseases'. The remaining two goals
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38 74 addressed environmental sustainability and global partnership for development. These 8
39
40 75 MDGs were supported by a total of 21 individual targets.
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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
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48 79 and insufficient information available to be able to compare performance, especially in
49
50 80 tackling inequalities within countries¹. This highlighted the perennial challenge in such
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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 indicators², the UN could
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56 83 demonstrate considerable success on some goals, especially on reducing extreme poverty
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58 84 (numbers of people living on less than \$1.25 per day), reducing both child and maternal
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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.
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13 89 Perhaps most importantly, the Millennium Development Goals focussed primarily on the
14 90 needs of developing countries reinforcing a binary view of rich and poorer countries, of
15 91 donors and recipients and implying that the global challenge is a problem of development
16 92 which international aid can help address, rather than a set of shared problems which only
17 93 collective action globally can resolve.
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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 realised³. The UN has summarised the difference between the two approaches as
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29 follows:
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33 100 • The 17 Sustainable Development Goals (SDGs) with 169 targets are broader in
34 101 scope and go further than the MDGs by addressing the root causes of poverty and
35 102 the universal need for development that works for all people. The goals cover the
36 103 three dimensions of sustainable development: economic growth, social inclusion and
37 104 environmental protection.
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40 105 • Building on the success and momentum of the MDGs, the new global goals cover
41 106 more ground, with ambitions to address inequalities, economic growth, decent jobs,
42 107 cities and human settlements, industrialization, oceans, ecosystems, energy, climate
43 108 change, sustainable consumption and production, peace and justice.
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46 109 • The new Goals are universal and apply to all countries, whereas the MDGs were
47 110 intended for action in developing countries only.
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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.
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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 21st 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.
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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
Also see later comment on reference numbers

53 137 **Sources of data**
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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.⁵

~~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 2015³. 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.⁴ 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.

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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
9 168 SDGs. And some countries (notably Sweden, Germany, Colombia, the Philippines, and
10 169 Czechia) already have national institutional arrangements.⁵
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17 172 **Areas of agreement**

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20 174 There is general agreement on the breadth and depth of the goals. There are clear
21 175 obligations and responsibilities for all member states (for which they will be held to account)
22 176 and a recognition that cross systems approaches to implementation will be needed. This is
23 177 a significant change from the MDG process and requires explicit contributions from every
24 178 country, particularly in developing and aligning the complex analytical tools to assess
25 179 progress and assist decision making. The UN report on 'critical milestones'⁶ refers to 'an
26 180 overarching vision and framework'. Getting accountability structures fit for purpose is
27 181 already a key challenge⁷. A recent review in Nature⁸ identifies that this requires a 'new
28 182 coherent way of thinking' and that while it is implicit in the SDG logic that the goals depend
29 183 on each other, no-one has specified exactly how. To help, different models have been
30 184 developed⁹, including both scenario analysis and quantitative modelling. Some of these can
31 185 be used as top-down macro-framework level tools and some as sectoral models for option
32 186 level impact analysis. This independent review⁷ of 16 countries who volunteered for
33 187 national review (by the High Level Political Forum) noted a range of different approaches to
34 188 deal with the complexity of the implementation process. Some countries with existing
35 189 national sustainable development strategies have built on these and tried to align existing
36 190 objectives with the new goals. Other countries have developed new national SDG
37 191 Implementation Plans. Some have linked the SDGs to financial planning for sustainable
38 192 development or sought to integrate SDGs [either](#) in sectoral planning (nutrition, education
39 193 etc) or in local government planning frameworks.

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

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Other areas of agreement include the need to integrate the three dimensions of sustainable development (economic, social and environmental)-^{10 11}, the importance of raising awareness and creating ownership and the need for stakeholder engagement ^{7.88}. 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 example⁸ 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).

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7 220 | Similarly, the UN paper on mainstreaming the three dimensions^{11,14} 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).
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17 226 | **Areas of controversy**

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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'¹² to
25 232 | implement the goals without the risk of 'unintended consequences' and 'perverse
26 233 | outcomes'. Early mapping exercises^{8, 11,14, 12} have demonstrated the important
27 234 | interconnections between achieving goals but experience suggests that government
28 235 | departments and international negotiations do not always have the mandate or skills to
29 236 | realistically address what might at first appear to be inconvenient and politically contentious
30 237 | trade-offs⁸ and unintended consequences.
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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 21st 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
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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.
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10 249 More equitable and sustainable food systems would help to meet goal 2, produce ecological
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12 250 benefits (goals 13-15) and help tackle problems such as obesity and non-communicable
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14 251 disease (goal 3)^{8,12+2}.

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17 253 Interestingly, although the SDGs and supporting targets make little mention of tackling world
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19 254 population growth, there are several studies illustrating how co-ordinated, whole system
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21 255 approaches to the SDGs are already stabilising the global population. One paper¹³ 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](#)¹⁴, 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.¹⁵ 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.
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49 270 The danger is that electorates are seduced into abandoning collective responsibility for the
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51 271 three dimensions of sustainable development in the hope that this will produce short-term
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53 272 benefits for individual countries while ignoring the wider longer term environmental, social
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55 273 and economic costs, knowingly leaving these to be borne by future generations.

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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
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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
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17 281 country, region, or state could seek to build an economy which is directed at realising the
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19 282 combined economic, social and environmental benefits associated with implementing the
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21 283 SDGs, with a focus on renewable energy, sustainable food and agriculture and
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23 284 environmentally sustainable technology (recycling, energy conservation, and the like). This
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25 285 may also provide a model of sustaining prosperity given the demographic changes and likely
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27 286 labour shortages if countries, such as the UK, shift away from an economic model which
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29 287 depends on a migrant labour force for continued growth.
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32 289 Given that it took 21 years of annual conferences of parties to the United Nations Framework
33 290 Convention on Climate Change before a substantial agreement for [action \(the Paris](#)
34 291 [Agreement\)](#) was achieved in December 2015, there could well be international controversy if
35 292 reneging on key global commitments weakens the collective resolve. If we accept the fact
36 293 that human health, and its future survival and prosperity, depend on a liveable earth, we
37 294 would argue therefore that a refocus of population health to ecological¹⁶ and planetary
38 295 health¹⁵⁺⁸ is the golden thread which binds the SDGs together as a systems [approach](#).¹ This
39 296 brings us to a fundamental challenge for governments, businesses, consumers and
40 297 communities.
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49 299 **Growing points**

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51 301 To what extent can we seek to implement the SDGs by improvements in current systems
52 302 and at what point do we need a paradigm shift in our outlook and aspirations? This subject
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Comment [S13]: As suggested by reviewer 1

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

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7 303 has been explored in relation to health and food systems¹⁷ and in relation to regional trade
8 304 agreements and health related SDGs¹⁸. However, it has also been clearly addressed by the
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10 305 United Nations Environment Programme's 'Inquiry into the design of a sustainable financial
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12 306 system'¹⁹. 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
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18 309 irreversible damage to the underlying state of the real economy and the quality of life for
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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*'.²⁰

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 2009²¹ and developed further by their
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34 318 Economics Commissioner²². Essentially, this is a challenge to a global economic model,
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36 319 which sees wealth creation based on rising production to meet ever increased demand as
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38 320 the basis of development. This continued consumption based model would be
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40 321 unsustainable even if the world's population was stable but is compounded by the projected
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42 322 increase from 6 billion people in 2000 to potentially 9 billion by 2050; the consequences in
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44 323 terms of resources consumed, waste generated and boundaries exceeded will be an
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46 324 unprecedented planetary emergency²³.

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

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8 332 The UK Stakeholders for Sustainable Development recently coordinated an open letter²⁴,
9 333 from over 80 UK businesses, to the Prime Minister, asking her to highlight the UK's
10 334 commitment to the SDGs at the 2017 World Economic Forum in Davos. This included not
11 335 just many UK ethical environmental businesses but also many more traditional major
12 336 multinational companies such as Coca Cola, Tesco, HSBC, Nestle, Land Rover, KPMG and
13 337 Standard Chartered. It would seem that large corporations are more aware of the need to
14 338 fundamentally re-shape the economy than many political parties.

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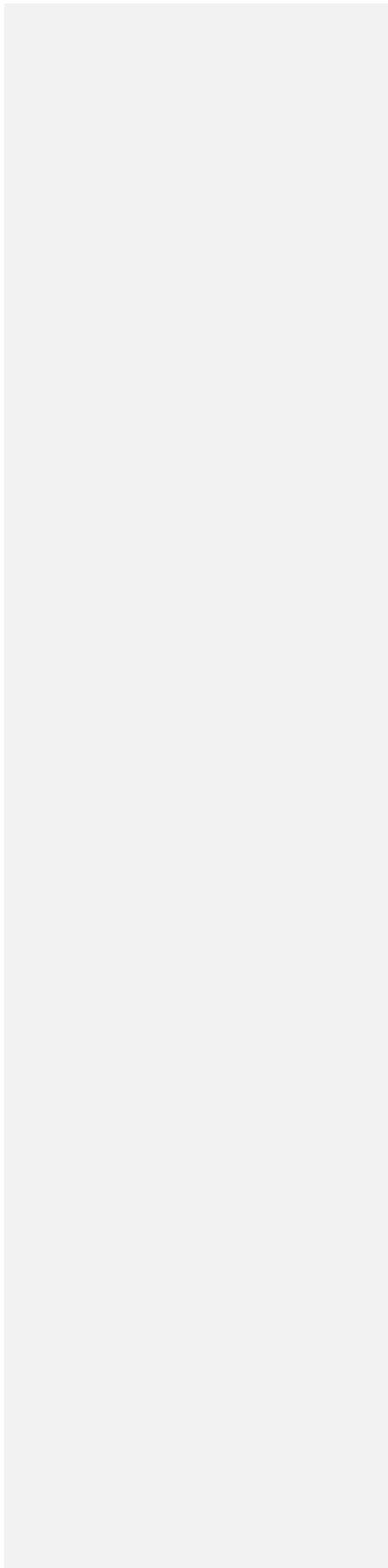
22 340 **Areas timely for developing research**

23 341 The last 2 centuries have seen huge advances in our understanding of what causes
24 342 diseases in individuals. There has been far less progress in understanding systematically
25 343 exactly what causes health in populations: from a village level or a planetary level. The
26 344 challenge for this generation is to synthesise our knowledge into creating those conditions
27 345 that foster health and protect us from poverty as much as they protect us from polio. If we
28 346 continue to devote resources disproportionately to finding ever more detailed causes of
29 347 disease without considering the solutions to some of the obvious problems we have created
30 348 for ourselves and others, we will be breaking the implicit contract we have with future
31 349 generations, with those people who have no voice or choice; that is the agreement that we
32 350 make every effort to leave the world in a better place than we found it. Without
33 351 understanding how we collectively protect and improve all those conditions that make life
34 352 worth living for all, we will be forever remembered as the generation who knew too much and
35 353 did too little. The art and science of making change is fraught with more human and cultural
36 354 barriers than with technical or knowledge barriers. The SDGs provide perhaps the last best
37 355 hope we have of being honest about why and how we should implement the evidence we
38 356 already have. The number of challenges and opportunities we face, from demographic
39 357 transitions to new models of economic activity and workforce development makes it
40 358 essential that we embrace clear and systematic frameworks for action that are measurable

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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'.²⁵

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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)**
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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

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395 **Table 2: Examples of Targets and Indicators (for Goal 2).²⁶**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

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References

- ¹ 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.
- ² 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 6th March 2017)
- ³ 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) (Accessed, 19th Feb 2017).
- ⁴ IAEG-SDGs: Inter-agency Expert Group on SDG Indicators <https://unstats.un.org/sdgs/iaeg-sdgs/> (Accessed 6th March 2017)
- ⁵ 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 6th March 2016)
- ⁶ 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) (Accessed, 19th Feb 2017)
- ⁷ Cutter A. Progressing National SDGs Implementation. Bond, London, 2016.
- ⁸ Nilsson M, Griggs D, Visbeck M. Map the interactions between Sustainable Development Goals. Nature, Vol 534, 320-322. 16 June 2916
- ⁹ 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.
- ¹⁰ 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.
- ¹¹ 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 (Accessed, 19th Feb 2017)
- ¹² 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, 19th Feb 2017)
- ¹³ 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.
- ¹⁴ Cleland J. Will Africa benefit from a demographic dividend? Health and Education Advice and Resource Team (HEART), London 2012.
- ¹⁵ Horton R, Beaglehole R, Bonita R, Raeburn J, McKee M, Wall S. From public to planetary health: a manifesto. Lancet 2014; 383(9920):847.
- ¹⁶ 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.
- ¹⁷ 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.
- ¹⁸ 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.
- ¹⁹ United Nations Environment Programme. The Coming Financial Climate: Aligning the financial system with sustainable development. United Nations, Geneva, 2015.
- ²⁰ "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 17th Feb 2017)
- ²¹ Jackson T. Prosperity without growth? The transition to a sustainable economy. Sustainable Development Commission, 2009.
- ²² Jackson T, Senker P. "Prosperity without growth: Economics for a finite planet." Energy & Environment 22.7 (2011): 1013-1016.
- ²³ Emmott S. 10 Billion. Penguin, London, 2013.

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

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

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

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

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