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1 **Five priorities to operationalize the EAT-Lancet Commission Report**

2

3 Christophe Béné^{1*}, Jessica Fanzo², Lawrence Haddad³, Corinna Hawkes⁴, Patrick Caron^{5,6}, Sonja
4 Vermeulen⁷, Mario Herrero⁸, and Peter Oosterveer⁹

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6

7 ¹ International Center for Tropical Agriculture (CIAT) Colombia, c.bene@cgiar.org

8 ² Johns Hopkins Bloomberg School of Public Health, USA jfanzo1@jhu.edu

9 ³ The Global Alliance for Improved Nutrition (GAIN), lhaddad@gainhealth.org

10 ⁴ City University of London, UK corinna.hawkes@city.ac.uk

11 ⁵ University of Montpellier, France patrick.caron@umontpellier.fr

12 ⁶ Centre de coopération internationale en recherche agronomique pour le développement (CIRAD),
13 France

14 ⁷ CGIAR System, France S.Vermeulen@cgiar.org

15 ⁸ Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia
16 mario.herrero@csiro.au

17 ⁹ Wageningen University & Research, The Netherland peter.oosterveer@wur.nl

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19 * author for correspondence

20

21

22 **Standfirst:**

23 To operationalize the great food system transformation and ensure its sustainability, five areas of
24 research and action require more attention: (i) economic and structural costs; (ii) political economy;
25 (iii) diversity of cultural norms; (iv) equity and social justice; and (v) governance and decision support
26 tools.

27

28 The EAT–*Lancet* Commission report on healthy diets from sustainable food systems ¹ has now
29 become a landmark publication in the debate on why food systems must transform, and why human
30 and planetary health must be conjoined objectives. The report called for a ‘great food
31 transformation’ to enable substantial dietary shifts and sustainable food production; it presented an
32 universal reference diet for healthy intake levels of different food groups protective against a set of
33 disease burdens, and it calculated the environmental impacts of this reference diet in a 2050
34 scenario. While several high-profile documents had already compiled extensive information on food
35 systems and diets ^{2,3,4}, the EAT–*Lancet* report shows that it is possible to feed a population of 10
36 billion healthy diets within planetary boundaries, as long as ambitious actions across agricultural
37 production, governance of land use, supply chain efficiencies, food environments and energy
38 transitions are taken.

39

40 The crucial next step pivots on a more comprehensive approach to health, environment and
41 sustainability – one that incorporates social equity, fair politics and viable economics in a way that
42 explicitly addresses some of the inevitable trade-offs humanity must face in this 21st century. To
43 operationalize the great transformation with these sensitivities, we identify five areas where more
44 research and data are needed. For each of these areas, we present examples of interventions which
45 have proven effective at triggering the types of transformative changes that are necessary.

46

47 **Economic viability**

48 The transformation from prevailing diets to more sustainable ones will incur economic costs across
49 many dimensions. In many cases, healthier diets are more expensive than unhealthy ones ^{5,6}. Recent
50 modeling shows for instance that the EAT–*Lancet* diet would not be affordable for 1.6 billion of the
51 world’s poor ⁷. The immediate costs of the food system transformation will not be limited, however,
52 to the costs of changing diets for consumers. The required changes to land use, food production
53 practices, storage and processing technologies, food environment, distribution and food waste/loss
54 management are also likely to have significant impacts on different actors - with some losers and
55 winners. The nature, price tag and distribution of these economic, technological, social and
56 institutional costs must be clearly elucidated, along with the identification of which food system
57 actors will bear the brunt of these costs ⁸. There should be a particular focus on protecting women
58 who tend to represent a higher proportion of food system workers ⁹.

59

60 Possible actions to offset costs and generate new economic opportunities could include the
61 provision of discounts to low-income households to purchase fruits and vegetables. This option has
62 been shown to lead to significant increases in spending on these foods and, subsequently, a larger
63 market for producers ^{10,11}. Another example is the formulation of national or international technical
64 guides on safeguarding land tenure rights ¹². While acknowledging the need for greater investment
65 in agriculture and food systems, these technical guides provide guidance on how to transfer or
66 safeguard land and resource rights while respecting and protecting the livelihoods of local
67 populations (including indigenous peoples) - fostering sustainable management and use of land and
68 other natural resources, and doing no harm to local environments.

69

70 **Political economy**

71 Status quo within the food system must be challenged and contested, as powerful players often
72 encourage practices which are not necessarily driven by health or sustainability concerns ¹³. Changes

73 at the system level will also have to involve other food system actors, big and small, from different
74 sectors, who have different ways of understanding the nature of the problems and the solutions ¹⁴.

75

76 Important challenges in the political economy of food system transformation are also found within
77 public policies, which often are not geared towards creating sustainable food systems. Too little
78 public R&D funding in agriculture is being invested in non-staple, nutritious foods ¹⁵. Likewise,
79 private finance and investments are often directed to profitability or efficiency, with insufficient
80 incentives for production of nutritious food or sustainable practices ¹³. The difficulties in
81 implementing the required food transformations may therefore not be so much about the
82 technicalities of the change, as they may be about the realpolitik of that change.

83

84 Innovation can disrupt the prevailing political economy within food systems. Digital (smart phone)
85 applications alerting consumers to when markets are discounting food potentially destined for waste
86 can guide them towards healthy eating and deliver food through shared economy app services ¹⁶.
87 Other potentially disruptive innovations involves strengthening civil society action – for example, the
88 push to clarify the consequences of genetically modified crops and to increase animal welfare in
89 Europe ¹⁷ or to end the sale and consumption of endangered species in China (sharks' fin soup).
90 Formal accountability mechanisms, such as the Access to Nutrition Initiative that fames and shames
91 powerful food actors, can improve transparency and accountability in the food industry ¹⁸. Other
92 forms of action such as political consumerism, including buying local, organic and sustainably
93 labelled food or promoting vegetarian or vegan diets in contexts of excessive consumption, can also
94 contribute to food system change ¹⁹.

95

96 **Cultural norms**

97 Achieving sustainable food systems will also require substantial changes in the food habits of
98 millions of people. These changes may conflict with, or diverge substantially from current or even
99 still-to-emerge cultural or social norms. In many middle-income countries, for instance, consuming
100 beef or pork is perceived as a sign of economic success for the new, urbanizing, middle-class.
101 Concurrently, many nutritious foods have been or may still be perceived as “poor man’s meals”
102 (such as lentils, beans or millet), and their consumption remains below what could contribute to
103 improving diets. Unhealthy norms emerge all the time, as foods high in fat, sugar and salt become
104 more widely available and marketed at lower prices throughout the world. Guiding cultural norms
105 towards sustainability may also be challenging, more so because of the infinite diversity of diets
106 from place to place, and the weak or incomplete evidence-base upon which to encourage these
107 changes.

108

109 Consumer choice will be a key driver of food system transformation ²⁰. Although it is often assumed
110 that diets are difficult to change because of habits and social, cultural or religious norms, recent
111 history has shown the possibility for rapid and widespread changes towards more diverse and
112 healthier diets ²¹. Altering the choice architecture of food environment can be an effective tool in
113 this regard. Studies in US show that adequate placement of a diversity of fruits and vegetables at the
114 point of sale increased their selection and sales ²². In Chile, Mexico and Thailand, taxes and front-of-
115 pack warning labels have been used with success to moderate the purchase of unhealthy food, as
116 well as influence reformulation of such products by food industry players ²³⁻²⁵.

117

118 **Equity**

119 While the EAT-*Lancet* reference diet has sufficient flexibility to reflect and embrace national and
120 subnational diversities, not everyone will contribute to or be affected in the same way by the actions
121 required to operationalize the transition. Likewise, readiness and capacities to change varies
122 between individuals, groups and countries. A case in point is the red meat transition. The report's
123 analysis suggests that the environmental impact of red meat production²⁶ combined with the health
124 risks of excessive consumption of processed red meat²⁷ requires greater than 50% reduction in red
125 meat consumption, in average, at the global level¹. Yet, animal-sourced foods remain a
126 concentrated source of vital vitamins and minerals such as iron, and for young children and young
127 women, especially in low-income countries, the consumption of more rather than less meat is
128 advisable²⁻⁴. Implementing the red meat transition in the global food systems will therefore require
129 those who eat too much to reduce their consumption for their own benefit *and* to create
130 environmental space for others to consume enough to meet their nutrient needs. Beyond this
131 specific example, the food transformation debate needs also to consider issues of social justice while
132 averting promoting the message that changes involve only high-income countries. Indeed food
133 systems need to become much more efficient in all countries, including low- and middle-income
134 countries (LMICs), and even those with lower harvest or food losses and fewer environmentally
135 costly practices.

136
137 Inequalities are also prevalent within countries, and data and laws are critical in countering them.
138 For example, in the seafood industry, forced labour, child labour and slavery are not uncommon²⁸.
139 The systematic use of full supply chain traceability has been shown to promote internal
140 transparency, and is potentially a tool to foster social justice in the industry and protect people
141 employed in LMICs²⁹. Legislation and regulations are also vital to promote equity. In high-income
142 countries, although social inequality in certain populations and components of food systems still
143 exist (for example, in seasonal fruit picking, catering and restaurant industries, and in access to food
144 for the poor), laws and regulations have been progressively established to improve the sustainability
145 of food systems and to protect vulnerable groups. In the US, the Migrant and Seasonal Agricultural
146 Worker Protection Act (AWPA/MSPA) and the Fair Labor Standards Act (FLSA) establish federal rules
147 regarding minimum wages, overtime pay provisions and child labor standards, and are cornerstones
148 of federal employment law for farmworkers. Adapted legislation is needed in all countries to address
149 equity. At the international level, the Declaration on the Rights of Peasants and other People
150 Working in Rural Areas (UNDROP), adopted by the United Nations in Dec 2018, is an important
151 supporting document that aims to strengthen the right to food and other human rights in food
152 systems, thereby enhancing sustainable access to healthy, safe and nutritious food for the most
153 marginalized and excluded groups.

154

155 **Governance and tools**

156 The four distinct but closely related economic, political, cultural, and social considerations identified
157 above create a complex space in which different actors interact with divergent or even competing
158 interests, limited or lack of information, or with political attention turned to other important
159 priorities (such as poverty, security, migration, natural disasters, pandemics). The question then
160 becomes: how to navigate this complex space and define context specific priorities for politically
161 acceptable and socially equitable actions that account for tensions and trade-offs, are supported by
162 evidence, and can build the required capacities for effective implementation?

163

164 To operate in this complex space, in addition to knowledge, skills and data, stakeholders will need
165 tools to identify, prioritize and manage trade-offs and diverging/competing priorities. The role of
166 foresight techniques (scenario methods aiming at exploring expected and alternative futures and
167 guiding policy and decisions) will be key in that regard. In Sweden, the decision support tool ReDiReL
168 (“resource distribution and recycling logistics”) has been used with success by scientists and
169 stakeholders to identify synergies and trade-offs and define subsequent priorities and possible
170 interventions³⁰. Other examples include the current Food Systems Dashboard being developed by
171 GAIN and John Hopkins University³¹ or the Food System Sustainability Index developed by the
172 International Center for Tropical Agriculture³².

173

174 **Final consideration**

175 The EAT-*Lancet* report did an excellent job of waking the world up to the interlinked issues of health
176 and environment and showed that diets are the common denominator. But, at the crux of the great
177 food transformation is the critical issue of science-policy interactions. Ensuring that food is in all
178 policies and that there is coherence in how food is dealt with in policy will be vital³³. One of the
179 recommendations of the EAT-*Lancet* Report was to establish an Inter-governmental Panel on Food
180 Systems. Building upon the achievements and complementing the High-Level Panel of Experts of the
181 UN Committee on World Food Security (HLPE/CFS), we support the creation of such a mechanism. It
182 would complement the focus on food security and nutrition and address the role, pathways and
183 perspective of food systems transformation to meet the whole 2030 SDG Agenda. It would bring
184 evidence and researchers together from around the world and science-policy interactions would be
185 encouraged at all levels, from global to local.

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247

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249 All the authors contributed equally to the conception, writing and revision of this paper.

250

251 **Competing interests:**

252 The authors declare no competing interests

253

254