Integrated Indicators for Sustainable Food Systems and Healthy Diets in the Post-2015 Development Agenda

Final Statement September 17th 2015

This statement makes recommendations for 11 integrated indicators, including 3 short-listed priority indicators to measure progress towards achieving healthy diets from sustainable food systems in the Sustainable Development Goals (SDGs). Sustainable food systems and healthy diets are fundamental for securing human health and socioeconomic development on a sustainable and resilient planet.

Statement prepared by the working group - a partnership between
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A finalized version of the draft statement, corrected for all inaccuracies, will be sent for endorsement to partner organizations and working group members.
Purpose

2015 marks a critical juncture for the global political agenda on sustainable development. In September 2015, the United Nations General Assembly will meet to adopt the Sustainable Development Goals (SDGs) encompassing 17 overarching goals and 169 targets across a number of issue areas (OWG SDG, 2014). The SDGs will set the political agenda for sustainable development for the next 15 years. It is hence of crucial importance that these targets are comprehensive, ambitious and explicit.

A key element of the implementation of the SDGs is to define evidence-based quantitative indicators to measure and monitor progress towards the SDGs and their corresponding targets.

Food systems play a fundamental role in sustainable development, livelihoods and public health – three domains that are well documented to have strong and important linkages, synergies and spill-over effects. Yet the SDG targets associated with each of these areas are largely siloed. The SDGs framework needs to capture these interdependencies. Integrated indicators can therefore play a major role in bridging these interconnected objectives.

To support this process and the overall post-2015 development agenda, the EAT Initiative, the Sustainable Development Solutions Network (SDSN) and CGIAR Consortium propose a set of 8 integrated indicators for monitoring progress towards achieving healthy diets from sustainable food systems under the existing SDG framework. We have short-listed 3 priority indicators that are highlighted in this statement. These indicators cover thematic areas considered the most crucial in order to achieve overall sustainable development.

Background

Today’s global food system is highly unsustainable both in terms of human and planetary health. Agriculture is responsible for up to 30% of global greenhouse gas (GHG) emissions with 14.5% of global emissions caused by livestock production alone (Vermeulen et al., 2012; Gerber et al., 2013). Furthermore, agriculture accounts for 70% of total freshwater withdrawals; is a significant chemical polluter; the prime source of nutrient overload in aquatic and marine systems; and has expanded like no other form of human land use, at the expense of biodiversity and carbon storing forests (Foley et al., 2011). Agriculture is by all standards the largest single driver of ecosystem change in the world and as such, an essential sector to address in order to achieve overall environmental sustainability (Garnett, 2013). Reciprocally, environmental sustainability is a
fundamental determinant of the outcome of food production. A deteriorated resource base due to unsustainable freshwater and land use, chemical pollution, and the loss of key ecosystem services such as pollination, will inevitably undermine land productivity and have severe repercussions on human health and food security (Millennium Ecosystem Assessment, 2005; Myers et al., 2013).

Although enough calories are produced to feed the world’s population, the global food system is characterised by huge inefficiencies and inequities. An estimated 30-50% of all food produced is either lost or wasted along the value-chain (FAO, 2013). Furthermore, in its current form, the global food system is a key driver of morbidity and mortality. Today the world faces multiple burdens of malnutrition: while around 795 million people go hungry, more than 2 billion are overweight or obese (Ng et al., 2014) and more than 2 billion suffer from micronutrient deficiencies (FAO, 2013). An estimated 161 million children under the age of five were stunted in 2013, irreversibly affecting their mental and physical development (Ng et al., 2014; Black et al., 2013). Inadequate nutrition currently affects human health and wellbeing in low- and middle-income countries, but also in high-income countries, placing a significant economic and social burden on nations.

The rapidly increasing prevalence of obesity and non-communicable diseases (NCDs) such as cancer, cardiovascular disease and type 2 diabetes, have now surpassed infectious diseases as the world’s leading cause of death in absolute terms. Recent decades have witnessed the fastest increase in NCDs in low- and middle-income countries (LMICs), where 80% of premature deaths related to NCDs currently occur (WHO, 2015). Unhealthy diets are a key driver of this epidemic, and in 2010, diet surpassed smoking as the leading risk factor for disease worldwide (Lim et al., 2012). Underlying these problems are demographic and socioeconomic trends that are driving changes in dietary patterns worldwide. These changes are characterised by increasing demand for more Western diets, typically high in animal proteins, added salt, sugar and fats, but low in nutritional value. These foods are not only detrimental to human health, but also tend to be associated with a larger environmental footprint than plant-based foods.

To be able to tackle multiple burdens of malnutrition, rising global environmental risks and climate change, whilst at the same time creating a more secure, equitable and nutritionally adequate food supply for a world of nine and a half billion, the issues of agriculture, diet, nutrition, public health and environmental sustainability must be addressed holistically as one common agenda in the post-2015 development agenda.
Integrated indicator recommendations

Rationale for the proposed integrated indicators

The UN Statistical Commission (UNSC) endorsed the formation of an Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs), consisting of national statistical offices and, as observers, the regional and international organizations and agencies. This group is tasked with developing a proposal for the indicator framework for monitoring goals and targets of the post-2015 development agenda.

To support this process, EAT, SDSN and CGIAR propose 3 priority indicators, and a total set of 11 integrated indicators on healthy diets and sustainable food systems. These indicators seek to recognize and maximize the synergies between food, health and environmental sustainability, and to drive progress towards both population health and environmental sustainability.

An integrated indicator is an indicator on which progress entails multiple thematic “wins,” in this context these wins are related to human health, environmental sustainability and development. The fundamental strength of integrated indicators is that they measure both the environmental and the human health outcomes of diet. The proposed integrated indicators contribute to the global monitoring of the SDGs in addition to thematic reporting on targets related to food systems and diets.

Among the 169 proposed targets, 62 relate to food (Annex 3). Notably, significant emphasis is placed on sustainable food production and natural resource use across these targets, while nutrition-related challenges are not emphasised to the same extent.

The number of SDG targets implies that every globally harmonized indicator has to be carefully selected in order to keep the total number of global indicators manageable with existing and future data collection capabilities. This statement proposes a total of 11 integrated indicators, each to be assigned to a cluster of targets. Furthermore, each proposed indicator can be classified into three tiers based on methodology and data availability:

- Tier I: Methodology exists, and data is widely available. Some data gaps exist and need to be mapped.
- Tier II: Well-developed methodology exists, with variable data collection mechanisms and availability.
- Tier III: Methodology and data collection need to be developed.
This approach ensures that interconnected issues represented by different targets are bridged, as well as reducing the total amount of indicators needed for creating a comprehensive monitoring framework for the SDGs. It is important to note that the proposed set of integrated indicators does not cover all aspects of monitoring food systems and diets as that would go beyond the scope of the current SDG agenda.

Thorough rationales for the 3 priority indicators on animal protein consumption; climate-smart agriculture; and food loss and waste are presented in this statement. Annex 1 provides an in-depth explanation and rationale of the other 8 proposed integrated indicators, with a complete breakdown of relevant sectoral benefits and data availability. 3 additional indicators of interest, marked with an asterisk, are included for discussion, but require further development.

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**Box 1: Comprehensive monitoring framework for the SDGs; Call for Data Revolution:**

Implementation of the post-2015 development agenda will require robust management tools for evaluation. Measuring specific targets through indicators will be the pillar of the monitoring and reporting framework for the SDGs. Indicators will dictate the development of implementation strategies and allocation of resources. The data required to track the SDG indicators needs to be disaggregated and more complex than what was required for monitoring the Millennium Development Goals.

In order to meet the increased demand for high-quality information for the SDGs, we call for an extensive investment in national and global data collecting capabilities to maximize the opportunities presented by the Data Revolution as defined by The UN Secretary-General’s Independent Expert Advisory Group on a Data Revolution for Sustainable Development (UN IEAG-Data Revolution for Sustainable Development, 2014). A good example of the Data Revolution is to develop low-cost on-farm measurements, in order to build an “ecological landscape monitoring system”. This could allow for crowdsourcing of data from farmers, through improved access of farmers to technologies that measure the soil quality and water use efficiency of their fields.
Inclusion criteria:

Building upon the SDSN report ‘Indicators and a Monitoring Framework for the SDGs’ (SDSN, 2015), the proposed integrated indicators are guided by nine principles. Not all proposed indicators fulfil every criterion, as emphasis has been placed on the complementarity of each indicator to present a set of integrated recommendations.

1. **Bridging health, environmental sustainability and socioeconomic development/poverty reduction:**
   The issue of healthy diets from sustainable food systems is multi-faceted and closely linked with sustainable production and consumption patterns. Hence, the proposed integrated indicators need to capture the complex linkages between health, environmental sustainability and human development without resorting to composite indices.

2. **Politically legitimate:**
   The process of defining the post-2015 sustainable development agenda has at times been politically sensitive. The proposed integrated indicators should be seen as a contribution to the official process, not a move out of the realm of SDGs monitoring.

3. **Limited in number and globally harmonized:**
   Given the number of SDG targets, the scope of the sustainable development agenda and the complexity of the issues, it is important to limit the total number of indicators. Furthermore, indicators should be reported by member states annually to the HLPF.

4. **Internationally agreed methodologies and data collection mechanisms on indicators is available within 5 years:**
   Monitoring and evaluation of SDGs will continue to evolve in complexity as the international community continue to consolidate the benefits of the ongoing Data Revolution. Indicators should ideally be based on already existing internationally agreed-upon methodologies from national and global data sources. However, the current limitations in the global monitoring framework should not stop the development of a comprehensive global evaluation mechanism for the SDGs. The proposed integrated indicators are divided into 3 tiers, defined by the level and availability of existing methodologies and data. Tier 3 indicators should be able to develop internationally agreed-upon methodologies and data collection mechanisms within 5 years.

5. **Disaggregated:**
   The MDGs revealed the importance of disaggregation. For example measures of inequality at a global level improved, yet the unequal distribution of development was not reflected in this measurement. Disaggregation of indicators is therefore an important tool to track inequalities in SDG achievement. Emphasis has been placed on disaggregating indicators by the following:
• Age
• Sex
• Household income
• Urban/rural
• Ethnicity
• Education

6. **Universal:**
The proposed integrated indicators are universal, applying to low- and middle-income countries as well as high-income countries.

7. **Evidence-based and forward-looking:**
The monitoring framework of the SDGs should be based on the latest evidence and reflect the long-term nature of the post-2015 development agenda. Proposed integrated indicators must take into account the essential need for increased investment in national and global monitoring capabilities.

8. **A proxy for broader issues or conditions:**
Single integrated indicators cannot measure all relevant aspects of the global food system. Instead a complete and comprehensive set of integrated indicators is needed for measuring progress. For instance, a single indicator cannot measure the overall resource impact of food consumption. Only by utilizing a set of indicators measuring the impact of dietary patterns on specific resources such as water, land and carbon can we measure and provide an overall picture of the resource impact of dietary patterns.

9. **Dynamic (depicting changes rather than states):**
Where relevant, a broader measure for progress for the SDGs should be based on depicting changes rather than states.
Table 1: Indicator recommendations

The proposed indicators are divided into three thematic categories:

- Category 1: Sufficient, nutritious, varied and safe diets
- Category 2: Climate-resilient and environmentally sustainable food production
- Category 3: Resilient and equitable food systems

However, these indicators do not cover all aspects of each theme, as that would go beyond the scope of this statement. The short-listed priority indicators are highlighted in the table below.

<table>
<thead>
<tr>
<th>Themes and Indicators</th>
<th>Assigned to targets</th>
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</thead>
<tbody>
<tr>
<td><strong>Sufficient, Nutritious, Varied and Safe Diets</strong></td>
<td></td>
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<tr>
<td>*Theme: Animal protein consumption</td>
<td>2.4, 3.4, 12.1, 15.1, 15.3, 15.5</td>
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<tr>
<td><strong>Priority indicator 1:</strong> per capita animal protein consumption and per capita land requirement for animal protein consumption</td>
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<tr>
<td>*Theme: Malnutrition</td>
<td>2.1, 2.2, 2.3, 2.4, 2.a</td>
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<tr>
<td>Proposed Indicator: Micronutrient deficiencies of iron,</td>
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<tr>
<td>[as well as zinc, iodine, vitamin A, folate, vitamin B12</td>
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<td>and vitamin D if nationally measureable and applicable]</td>
<td></td>
</tr>
<tr>
<td>*Theme: Food security and sufficiency of household food consumption</td>
<td>2.1, 2.2, 2.3, 2.4, 2.a</td>
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<tr>
<td>Proposed Indicator: Prevalence of population with</td>
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<td>moderate or severe food insecurity, based on the Food</td>
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<tr>
<td>Insecurity Experience Scale (FIES)</td>
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<tr>
<td>*Theme: Dietary diversity and adequacy</td>
<td>2.1, 2.2, 2.3, 2.4, 3.4</td>
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<tr>
<td>Proposed Indicator: Dietary diversity score</td>
<td></td>
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<tr>
<td>*Indicator that requires further development: Dietary</td>
<td></td>
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<tr>
<td>quality score</td>
<td></td>
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<tr>
<td><strong>Climate-resilient and Environmentally Sustainable Food Production</strong></td>
<td></td>
</tr>
<tr>
<td>*Theme: Climate smart agriculture</td>
<td>2.4, 12.2, 15.1, 15.2, 15.3, 15.5</td>
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<tr>
<td><strong>Priority indicator 2:</strong> carbon emissions from</td>
<td></td>
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<tr>
<td>agricultural land use (tons per hectare per year)</td>
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<tr>
<td>*Indicator that requires further development: g or kg of</td>
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<td>carbon per m³ stored in soils</td>
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<tr>
<td>Theme: Land agrobiodiversity/ “input biodiversity”</td>
<td>2.3, 2.4, 2.5, 12.2, 14.2, 15.1, 15.5</td>
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<td>-------------------------------------------------</td>
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<tr>
<td>Proposed Indicator: Mean Species Abundance (MSA) in food production systems</td>
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<tr>
<td>Theme: Greenhouse gas (GHG) emissions from diet</td>
<td>2.4, 12.1, 13</td>
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<tr>
<td>Proposed Indicator: Consumptive greenhouse gas emissions from diets in tCO2eq per year;</td>
<td></td>
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<tr>
<td>Theme: Eutrophication of water bodies</td>
<td>2.4, 3.9, 6.1, 6.3, 6.4, 6.5, 6.6, 14.1, 14.2, 14.5</td>
</tr>
<tr>
<td>Proposed Indicator: Area eutrophicated vs total national water area – separate freshwater bodies and coastal</td>
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<tr>
<td>Theme: Freshwater use in food production</td>
<td>2.3, 2.4, 6.1, 6.4, 15.1</td>
</tr>
<tr>
<td>Proposed Indicator: m³ of blue freshwater consumed through diet per week</td>
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<tr>
<td>Theme: Sustainable agriculture</td>
<td>2.3, 2.4, 2.5, 2.a, 6.3, 6.4, 6.5, 6.6, 12.2, 12.3, 12.4, 14.1, 14.2, 14.4, 15.1, 15.2, 15.3, 15.5</td>
</tr>
<tr>
<td>*Indicator that requires further development: proportion of food produced from sustainable agriculture</td>
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</tr>
<tr>
<td>Theme: Food waste</td>
<td>11.6, 12.3, 12.4, 12.5,</td>
</tr>
<tr>
<td>Theme: Livelihoods of smallholder farmers</td>
<td>1.2, 1.4, 1.5, 2.1, 2.3, 2.4, 5.5, 8.5, 14.7</td>
</tr>
<tr>
<td>Proposed Indicator: Income of smallholder farmers and fishing communities with respect to national poverty lines</td>
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</table>
Detailed Description of Short-Listed Priority Indicators

Three out of the 11 proposed integrated indicators are considered areas of priority. These three indicators cover important areas of the global food system, and will be important for the overall success of the sustainable development agenda.

**Priority areas:**
1. Animal protein consumption
2. Climate smart agriculture
3. Food loss and waste

**Priority indicator suggestion 1:**

**Theme:** Animal protein consumption

**Indicator:** per capita animal protein consumption and per capita land requirement for animal protein consumption

**Rationale**

This indicator can be applied to track progress towards consuming less energy-intensive food in countries where a reduction in red meat consumption is a major goal. Given the different nutritional and environmental impacts of consuming white (chicken, fish) or red (beef, lamb etc.) meat, and the higher risk of NCDs and mortality associated with red meat consumption in high income countries (especially compared to other potential protein sources); this indicator will draw attention to the health and environmental concerns of resource-intensive animal protein. This indicator could also acknowledges how some populations may benefit from increased animal protein, especially young children and those with malnutrition.

**Health Impact**

Animal-based foods can be part of a balanced diet, contributing valuable nutrients that are beneficial to health, particularly for children. However, high consumption of red meat by adults is associated with increased risks of non-communicable diseases including cardiovascular disease, diabetes, and some forms of cancer (Saxe, 2014).

**Environmental Impact**

The most important driver of terrestrial ecosystem change has been the conversion of ecosystems to cropland and grazing land (Wirsenius et al., 2010). This agricultural expansion may further increase due to unprecedented demand for high-value animal protein as a result of increased incomes, affluence, population growth and urbanization (WHO/FAO, 2002). Currently, livestock production alone accounts for 80% of agricultural land making it the single largest anthropogenic user of land. The growing demand for livestock products has
undesirable impacts on the environment. Curbing and limiting agricultural land use expansion is essential for mitigating global CO2 emissions, minimising air and water pollution and conserving natural ecosystems, forests and global biodiversity (Gitz and Ciais, 2004; Fargione et al., 2008; Burneya et al., 2010). The breeding of ruminant animals for production of meat and dairy foods is especially adverse for GHG emissions due to methane production.

**Development Impact**
As a major driver of climate change, water depletion and deforestation, the livestock sector represents a substantial threat to the global economy (World Economic Forum, 2010). Climate change will have significant socioeconomic consequences, including annual economic costs in the range of $70 to $100 billion for adapting to a 2°C warmer world by 2050 (World Bank, 2011) and increasing burdens on health and social systems.

**Disaggregation**
Age, sex, household income, urban/rural, type of animal protein

**Primary Data Source**
Name of entity responsible for global monitoring: FAOSTAT
Data methodology: 24-hour dietary recalls and national dietary surveys

**Tier Category**
Tier II: Already existing well-developed methodologies with variable data collection mechanisms and availability

**Assigned to targets**
2.4, 3.4, 12.1, 15.1, 15.3, 15.5

**Priority indicator suggestion 2:**

**Theme:** Climate Smart Agriculture

Under this theme two proposals are put forward: one priority indicator and an additional indicator of interest that does not form part of the formal proposal, as it requires further development. The priority indicator will be discussed here and the additional indicator of interest is described in Annex 1.

**Priority Indicator:** Carbon emissions from agricultural land use (tons per hectare per year)

**Rationale**
Human activities, through land use, land-use change and forestry activities (LULUCF), affect changes in carbon stocks between the terrestrial ecosystem and the atmosphere (UNFCCC, 2015). As a consequence, the long-term conversion of grassland and forestland to agricultural land for food production has resulted in historic losses of soil carbon worldwide (FAO, 2015). The agricultural sector is thus a key emitter of GHG emissions and a leading driver of global climate change.
As many countries follow the 2006 IPCC guidelines for national greenhouse gas inventories, this indicator aligns closely with what the UNFCCC require under the LULUCF GHG monitoring mechanism.

**Health impact**
Increases in GHG emissions have a number of detrimental consequences on human health and well-being through increased water and food insecurity, undernutrition, greater exposure to infectious disease vectors and migration and displacement (Costello et al., 2009).

**Environmental Impact**
Whilst agriculture is a leading driver of climate change and as such, an essential sector to address to achieve environmental sustainability (Garnett, 2013), it is also profoundly affected by climate change itself. The overall effect of climate change on food production and ecosystems will pose significant challenges. While rising temperatures in some regions will benefit yields, the overall and long-term consequences to yields is expected to be adverse (FAO, 2015). Furthermore, increases in extreme weather events, including heat-waves and the severity of droughts and floods (FAO, 2015) will make it more difficult for farmers to grow crops and raise animals.

**Development Impact**
Climate change poses a fundamental threat to sustainable development and poverty eradication. In particular, poor and developing countries will be among those most adversely affected and least able to cope with the anticipated shocks to their social, economic and natural systems (UNSD, 2015).

**Disaggregation**
Crop and livestock sectors

**Primary Data Source**
The United Nations Framework Convention on Climate Change (UNFCCC) collects data on countries' national GHG inventories.

**Tier Category**
Tier I: Established methodology exists and data are already widely available

**Assigned to targets**
2.4, 12.2

**Priority indicator suggestion 3:**

Theme: Food Loss and Waste

Indicator: Percentage of food lost and wasted from food production to consumption and percentage of food waste recycled
**Rationale**
One third of all food produced in the world is wasted and goes uneaten, roughly amounting to 1.3 billion tonnes of food every year (FAO, 2013a). Food waste alone is responsible for an estimated 7% of global greenhouse gas emissions; hence reducing food waste will significantly contribute to climate change mitigation (WRAP, 2014).

A Global Food Loss Index (GFLI) is to be developed by the FAO by the end of 2015. The indicator will measure the totality of losses occurring from the time at which production of an agricultural product is recorded until it reaches the final consumer as food, but it will not take into account losses occurring at the consumer level. Consequently, as the comprehensiveness of the GFLI is not clearly established the proposed indicator aims to act as a supporting and complementary indicator that encourages measurement of food waste at the consumer level.

**Health Impact**
Food waste undermines food and nutrition security with a reduction in the local and global availability of food. Food security represents one of the most dramatic indicators of health inequality (Jaron D et al. 2009).

**Environmental Impact**
Food waste has a tremendous impact on the environment from the inefficient use of resources to the contribution of greenhouse gas emissions (GHG). The superfluous use of water, land and fertilizer used to produce food that is lost and wasted accounts for nearly 24% of the total freshwater resources used in food crop production, 23% of the total global cropland area and 23% of total global fertilizer use (Kummu et al., 2012). Food loss and waste also produce around 3.3 billion tonnes of CO₂ that is released into the atmosphere per year (FAO, 2013b).

**Development Impact**
Food loss and waste impacts the sustainability of food systems in both economic and social terms. The direct economic consequences of food wastage (excluding fish and seafood) amount to $750 billion annually (FAO, 2013b). These economic losses are felt at all stages of the food value-chain. Food loss and waste also impedes economic development and hinders social progress due to decreased food security and lost incomes.

**Disaggregation**
Food system level: Along the food value chain
Consumer level: household income, urban/rural

**Primary Data Source**
Name of entity responsible for global monitoring: FAO
Data methodology: Global Food Loss Index
The indicator is primarily model-based. The calculation of the indicator relies on primary data collected from government agencies in the Agricultural Production Questionnaire or collected from official publications and other sources.

**Tier Category**
Tier II: Already existing well-developed methodology with variable data collection mechanisms and availability

**Assigned to targets**
12.2, 12.3, 12.4, 12.5

**ANNEX 1: Detailed Description of Additional Proposed Integrated Indicators**

These 8 indicators and the 3 indicators of interest, organised by thematic category, supplement the three proposed priority integrated indicators.

**Thematic Category 1: Sufficient, Nutritious, Varied and Safe Diets**

**Theme:** Malnutrition

**Proposed Indicator:** Micronutrient deficiencies of iron [as well as zinc, iodine, vitamin A, folate, vitamin B12 and vitamin D if nationally measureable and applicable]

**Rationale**
More than 2 billion individuals suffer from micronutrient deficiency (FAO 2013). Iron deficiency is the most common and widespread micronutrient deficiency, and is often the cause of anaemia, a disease that afflicts over 30% of the world’s population (WHO, 2015). Addressing the “hidden hunger” of micronutrient deficiencies is instrumental to end hunger and improve nutrition globally.

Iron deficiency serves as a proxy indicator for several of the targets of SDG 2 to end hunger, achieve food security, improve nutrition and promote sustainable agriculture. Iron is part of a safe, nutritious and sufficient diet, and is particularly instrumental to address the nutritional needs of adolescent girls, pregnant and lactating women and older persons.

**Health Impact**
The “strong synergies between health and nutrition” are well documented; good health is not possible without good nutrition (World Bank, 2013). Furthermore, micronutrient deficiencies and malnourishment of any form pose significant risks to overall health.

**Environmental Impact**
“Nutrition-sensitive agriculture” refers to interventions that can have positive nutritional impact by improving the quality of food in terms of diversity, nutrient content and safety (Ruel & Alderman, 2013). Nutrition-sensitive agriculture can boost food species diversity, which in turn is favourable for increasing the micronutrient content of the foods produced.

**Development Impact**
“Better nutrition equals less poverty” (World Bank, 2006). Poor nutrition represents a burden on economic growth through losses in productivity and indirect losses through higher health care costs. Micronutrient deficiencies also cause earlier mortality resulting in lost investments in human capital as well as reduced productivity due to the potential for impairment in cognitive function (Global Nutrition Report, 2014).

**Disaggregation**
Disaggregation by sex, age, ethnicity, urban/rural, household income

**Primary Data Source**
WHO and NSO’s

**Tier Category**
Tier I: Methodology exists, data is widely available. However, some data gaps do exist and need to be mapped out.

**Similar indicator recommendations**
UNICEF Indicator: [Prevalence of anaemia (Hb = or < 11 g/dl) among women of reproductive age]

SDSN Complementary National Indicator: Percentage of population with shortages of: iron, zinc, iodine, vitamin A, folate, vitamin B12 [and vitamin D]

Theme: *Food security and sufficiency of household food consumption*

**Proposed indicator:** Prevalence of population with moderate or severe food insecurity, based on the Food Insecurity Experience Scale (FIES)

**Rationale**
Food security exists when “all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO, 1996).

Food security is intricately linked to SDG target 2.1: achieving access by all people, in particular the poor and people in vulnerable situations, to safe, nutritious and sufficient food all year round. The proposed indicator also supports targets 2.2 and 2.3 to end malnutrition and to increase agricultural productivity and incomes of small-scale food producers, those that often face the greatest food insecurity.

**Health Impact**
Food security is fundamentally important for good health outcomes. To a large extent, food security is a subset of nutrition security (Heady, 2013). Hence persisting malnutrition is often a result of failure to obtain food security in vulnerable regions and among vulnerable populations.

**Environmental Impact**
Environmental sustainability is a fundamental determinant of the outcome of food production: a deteriorated resource base due to unsustainable freshwater and land use, chemical pollution and loss of key ecosystem services such as pollination, will inevitably undermine land productivity, and consequently have severe repercussions on human health and food security (Millenium Ecosystem Assessment, 2005; Myers et al., 2013).

**Development Impact**
Food security is linked to all components of sustainable development, including health through malnutrition and to the environment through the sustainable use of terrestrial ecosystems, oceans, seas and marine resources. Food insecurity and hunger are intrinsically linked with extreme poverty and productivity.

**Disaggregation**
Household income, urban/rural

**Primary Data Source**
WFP, FAO, World Bank

**Tier**
Tier I: Methodology exists, data is widely available. However, some data gaps do exist and need to be mapped out.

**Similar indicator recommendations:**
**UNSC Indicator:** Prevalence of population with moderate or severe food insecurity, based on the Food Insecurity Experience Scale (FIES).

**IFAD-FAO Indicator:** The Food Consumption Score measured by the World Food Programme can in certain countries complement FIES (an undernourishment indicator). The FCS indicator is a “food access” indicator, and is based on both dietary diversity, and the frequency of food groups consumed.

**Theme:** Dietary diversity and adequacy

Under this theme two proposals are put forward: one proposed indicator and an additional indicator of interest.

**Proposed Indicator: Dietary Diversity Score**

**Rationale**
Building upon the SDSN report on Indicators and a Monitoring Framework for the SDGs (SDSN, 2015), “measuring dietary energy supply/caloric intake alone is an incomplete and insufficient metric to address the increasing burden of malnutrition globally”.

Dietary diversity is a proxy indicator for micronutrient adequacy of diets. Positive dietary diversity scores have been correlated with adequate micronutrient density of complementary foods for infants and young children (FANTA, 2006), and micronutrient and macronutrient adequacy for children and women of reproductive age in low-income countries (FAO, 2011). However, whilst this
indicator is beneficial to track micronutrient adequacy of diets, it is not a sufficient predictor of overall diet quality or optimal diet for health. There is limited evidence for dietary diversity scores to be used beyond young children and women of reproductive age in very low-income countries.

**Health Impact**
Research has demonstrated a strong association between dietary diversity, diet quality, and nutritional status of children (Mourisi M et al., 2008).

**Environmental Impact**
Dietary diversity boosts biodiversity both directly through enhancing food species and indirectly through enhancing species richness of agricultural ecosystems; as well as stimulating productivity, resilience and natural ecosystem services.

**Development Impact**
Dietary diversity is associated with food security and socioeconomic status, and the links between socioeconomic factors and nutrition outcomes are well known (Thorne-Lyman et al., 2010; World Bank, 2006). Hence this indicator is important for sustainable development outcomes.

**Disaggregation**
Age, sex, household incomes, education, urban/rural, geographic location

**Primary Data Source**
FAO

**Tier Category**
Tier II: Methodology exists, but data is not easily available

**Similar indicator recommendations**
IFAD-FAO Indicator- [Minimum Dietary Diversity for Women (MDD-W) indicator]

**UNEP Indicator-** [Minimum Dietary Diversity for Women (MDD-W) indicator]

SDSN Complementary National Indicator: Percentage of women (aged 15-49) who consume at least 5 out of 10 defined food groups

SDSN Complementary National Indicator: Percentage of total daily energy intake from protein in adults

SDSN Complementary National Indicator: Proportion of infants 6-23 months of age who receive a minimum acceptable diet

SDSN Complementary National Indicator: Share of calories from non-staple crops

SDSN Complementary National Indicator: Prevalence of persons (aged 18+ years) consuming less than five total servings (400 grams) of fruit and vegetables per day
*Indicator of interest requiring further development: Dietary Quality Score*

**Rationale**
The Dietary Diversity Score (DDS) is a useful proxy indicator for diet quality of young children and women living in poverty in low-income countries; however, it does not take into account other aspects of diet that are associated with NCDs, such as the adverse effects of sugar, refined starches, and fats. Hence, this indicator may even encourage overconsumption in some demographic groups. An indicator that measures diet quality should be developed to predict optimal health across the life cycle. A dietary quality score, developed as an alternative to FANTA’s DDS, would provide greater data on both individual diets and the role of dietary diversity in predicting NCD outcomes. A dietary quality score would require more testing in a variety of populations to establish its effectiveness to predict NCD health outcomes. Nevertheless, more research and evidence to support this indicator is required.

**Health Impact**
A dietary quality score will serve as a tool to validate the connection between diet quality and health outcomes. Unhealthy diets are the leading risk factor for disease worldwide (Lim et al., 2012). Given the current public health crisis and rapidly growing trends of obesity and NCDs such as cancer, cardiovascular disease and type 2 diabetes, an indicator which tracks dietary quality is essential to addressing the world’s fastest-rising public health challenge and leading cause of death in absolute terms.

**Environmental Impact**
For adults, a healthy diet is one that is plant-based, rich in fruits, vegetables, legumes, nuts, and whole grains with sparing portions of dairy foods and meat – mainly poultry – and fish (WHO/FAO, 2002). A plant based-diet has a much lower carbon footprint than a diet with large amounts of red meat and dairy foods. It reduces water usage, GHG emissions, and fuel dependence.

**Development Impact**
With regards to health, NCDs are expected to cost the global economy US$47 trillion over the next two decades (Bloom et al., 2011) accounting for 54% of DALYs worldwide in 2010 (Murray et al., 2010). Since chronic NCDs are more prevalent among poorer populations globally and within most nations, the substantial long-term costs associated with chronic care contribute to entrenching poverty and inequality (Alleyne et al., 2013).

**Disaggregation**
Age, sex, household income, urban/rural, social-cultural

**Primary Data Source**
Name of entity responsible for global monitoring: FAO
Data methodology: Proposed analysis (Walter Willett, personal communication, 31 August 2015)

**Tier Category**
Tier III: Methodology and data collection baseline needs to be developed.

**Assigned to targets**
2.2, 2.3, 3.4

**Thematic Category 2: Climate-resilient and Environmentally Sustainable Food Production**

Theme: *Climate Smart Agriculture*

Under this theme, our priority indicator focuses on carbon emissions from agricultural land use as described above; however, an additional indicator that focuses on the potential for carbon storage in soils merits further discussion.

*Indicator of interest requiring further development: g or kg of carbon per m³ stored in soils*

**Rationale**
Two-thirds of the increase in atmospheric CO₂ is a result of burning fossil fuels, while one third is attributed to soil organic carbon loss due to land use change (Lal, 2004). An indicator on soil organic carbon is a bridge across many sustainability issues—climate change, desertification and biodiversity—and is important for resilient and productive agriculture. However, there is a lack of consensus on both the evidence and a suitable global monitoring scheme.

**Health Impact**
Malnutrition and micronutrient deficiencies contribute to the widespread challenge of “hidden hunger” (Lal, 2009) and carry with them significant risks to health. Improving soil quality by increasing soil organic matter is essential for achieving global food security. Both the retention and availability of essential macro-elements and microelements for a healthy diet are dependent on soil organic matter (Lal, 2011).

**Environmental Impact**
Improved agricultural practices can help mitigate climate change. Soil carbon sequestration can restore degraded soil, reduce erosion, improve water quality and ultimately lead to increased food security and improved ecosystems (Ontl & Schulte, 2012).

**Development Impact**
Soil carbon sequestration can help mitigate climate change by storing carbon in plant biomass and soils (FAO, 2015). Climate change will have devastating effects on individual and public health with changing patterns of infections and disease, increasing frequency and magnitude of extreme climate events and reduced water and food security (Costello et al., 2009).
**Disaggregation**
The indicator could be spatially disaggregated to sub-national administrative units.

**Primary Data Source**
Name of entity responsible for global monitoring: United Nations Convention to Combat Desertification (UNCCD) compiles data for this indicator.

*Data methodology:*
Reliable and efficient assessment of soil carbon is required at the global scale, however this is currently not available. Several techniques have been created to measure soil carbon including Laser-Induced Breakdown Spectroscopy (LIBS) Laser-Induced Fluorescence Spectroscopy (LIFS) and Near-Infrared Spectroscopy (NIRS) (Milori et al., 2011). These mechanisms could provide faster and lower cost field analyses thus improving soil carbon databases. Dynamic remote sensing also has a role to play in the measurement of soil carbon in landscapes. For global spatial layers on soil parameters, the most recent and complete dataset is available as the Harmonized World Soil Database (HWSD).

**Tier Category**
Tier II: Already existing well-developed methodology with variable data collection mechanisms and availability.

**Assigned to targets**
2.4, 12.2, 15.1, 15.2, 15.3, 15.5,

**Theme:** Land agrobiodiversity ‘input biodiversity’

**Proposed Indicator: Mean Species Abundance (MSA) in food production systems**

**Rationale**
Mean Species Abundance provides an aggregate measure of both the number of species, and for each species group, the number of species required for key ecological functions. Mean Species Abundance tracks ecosystem resilience and is a suitable indicator for measuring progress on SDG’s 2, 12 and 15 in order to ensure sustainable, resilient agricultural practices and food production systems.

**Health Impact**
Nutrition-sensitive agriculture can boost biodiversity directly through enhancing food species diversity and indirectly through enhancing species richness of agricultural ecosystems, which in turn is favourable for increasing the micronutrient content of the foods produced.

**Environment Impact**
Agricultural biodiversity can play a role in sustaining soil health. Pollinators are vital to agricultural production.

**Development Impact**
Biodiversity is critical to support development. Agriculture is a major source of economic revenue and a base for social and economic development in many parts of the world. Furthermore, honeybee pollination, of which 33% of food consumed by humans is dependent on, is estimated to be worth at least US $190 billion to the global economy (CBD, 2014).

**Disaggregation**
Not relevant.

**Primary Data Source**
Based on the GLOBIO model, MSA uses relations between pressures and impacts on species abundance. MSA has been used in various assessment reports, including UNEP's Global Environment Outlooks, Convention on Biological Diversity’s Global Biodiversity Outlook 2 and the OECD Environmental Outlook.

**Tier**
Tier I: Methodology exists, data is widely available. However, some data gaps do exist and need to be mapped out.

**Similar indicator recommendations:**
- **UNEP Indicator:** Protected area overlays with biodiversity
- **SDSN Complementary National Indicator:** [Indicator on genetic diversity in agriculture] – to be developed
- **UNSC Indicator:** Ex-situ crop collections
- **UNSC Indicator:** Number/percentage of local breeds classified as being at-risk, not-at-risk, and unknown levels of risk extinction
- **UNSC Indicator:** Living Planet Index
- **UNEP Indicator:** [Number/percentage of local crops and breeds, and their wild relatives, classified as being at-risk, not-at-risk, and unknown-levels of risk of extinction]
- **UNSC Indicator:** Coverage of protected areas broken down by ecosystem type, including total area of forests in protected areas
- **UNSC Indicator:** Forest areas as a percentage of total land area
- **FAO Indicator:** Carbon stock in woody biomass
- **IFAD-FAO Indicator:** Percentage of agricultural area under sustainable agricultural practices

Theme: Greenhouse gas (GHG) emissions from diet
Proposed Indicator: Consumptive greenhouse gas emissions from diets in tCO$_2$eq per year

**Rationale**
The food system is a leading driver of global environmental change (De Schutter & Vanloqueren, 2011) and contributes approximately 30% of global greenhouse gas (GHG) emissions if deforestation for crop and pasture expansion and post-harvest stages (transport, manufacturing, retailing and food preparation) are included (Steffan et al., 2011). Furthermore, some 14.5% of emissions are caused by livestock production alone (United Nations Secretary-General’s High-level Panel on Global Sustainability, 2012).

An indicator that measures GHG emissions of dietary consumption patterns will highlight the deeply interconnected relationship between food consumption and its effect on the environment. This indicator is directly linked to SDG target 2.4 to ensure sustainable food production systems and implement resilient agricultural practices that maintain ecosystems.

**Health Impact**
For adults, a healthy diet is one that is plant-based, rich in fruits, vegetables, legumes, nuts, and whole grains with sparing portions of dairy foods and meat – mainly poultry – and fish (WHO/FAO, 2002). A largely plant-based diet will help to alleviate GHG emissions and reduce fuel dependence.

**Environment Impact**
Agriculture and fisheries are highly dependent on specific climate conditions and ecosystems. Climate change and GHG emissions threaten crop productivity, influence the severity of droughts and floods and minimise species diversity.

**Development Impact**
Climate change is a fundamental threat to economic development in our lifetime (World Bank, 2015). Between 2010 and 2050 the cost of adapting to an approximately 2°C warmer world by 2050 is estimated to be in the range of $70 billion to $100 billion a year (World Bank, 2011). Climate change disproportionately impacts the poor, particularly those living in vulnerable areas with the fewest resources to help adapt. As the effects of climate change worsen, escaping poverty becomes more difficult (World Bank, 2015).

**Disaggregation**
Household incomes, urban/rural

**Primary Data Source**
NSO’s, UNFCCC, UNEP, WHO, FAO

**Tier**
Tier III: Methodology and data collection baseline needs to be developed.

**Similar indicator recommendations**
UNSC Indicator: Emissions of greenhouse gases in agriculture (per hectare of land and per unit of output, separately for crop and livestock sectors)
SDSN Indicator: Net GHG emissions in the Agriculture, Forest and other Land Use (AFOLU) sector (tCO2e)

UNSC Indicator: Absolute levels of emissions in relevant sectors and sub-sectors

FAO-STAT: Ammonia (NH3) emissions from agriculture

UNSC-FAO-STAT: Greenhouse gas (GHG) emissions in agriculture

Theme: Eutrophication of water bodies

Indicator: Area eutrophicated vs. total national water area- separate freshwater bodies and coastal waters

Rationale
Alterations to nutrient cycles, primarily nitrogen and phosphorus used in agriculture, have caused widespread eutrophication of inland and coastal waters. This eutrophication has driven the formation of anoxic and hypoxic environments in bottom waters at global scales (Diaz & Rosenberg, 2008).

An indicator that measures eutrophication is critical to measuring SDG target 14.1: to prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities. This dynamic indicator, that depicts changes rather than states, also focuses on targets 6.3 and 6.5 regarding water resource management and target 14.2 regarding the protection and restoration of water-related marine and coastal ecosystems.

Health Impact
Eutrophication can have detrimental health effects when polluted fresh water, extracted from eutrophic areas, is used for the production of drinking water (WHO & European Commission, 2002). Eutrophication also threatens the viability of fisheries, a major source of nutrients.

Environment Impact
Long-term nutrient discharges and resulting eutrophication threaten the viability of freshwater and coastal ecosystems. On a global basis, by 2050, coastal marine systems are expected to experience, from today’s levels, a 2.4-increase in nitrogen and 2.7-fold increase in phosphorus loading (Tilman et al., 2001) with severe consequences to ecosystem functions. The environmental degradation of water quality will jeopardize future production of both aquaculture and capture fisheries (OECD, 2012).

Development Impact
Over the past 20-30 years aquaculture has become a major source of food and livelihood (OECD, 2012). Damage to both aquaculture and capture fisheries is likely to occur through intensification and eutrophication. Unless stress from eutrophication can be managed, there will likely be declines in food provisioning services from aquaculture with negative economic consequences on fisheries (OECD, 2012).
Disaggregation
Freshwater and coastal water bodies

Primary Data Source
World Resources Institute, UNEP, OECD and some NSO’s

Tier
Tier I: Methodology exists, data is widely available. However, some data gaps do exist and need to be mapped out.

Similar indicator recommendations
SDSN Complementary National Indicator: Eutrophication of major estuaries

UNSC Indicator: Ocean Health Index
UNSC Indicator: Fertilizer consumption

Theme: Freshwater use in food production

Indicator: m³ of blue freshwater consumed per week through diet

Rationale
Globally, 70% of freshwater withdrawals are used for irrigation while one-third of the world’s land surface is used for food production (Vermeulen et al., 2012).

This indicator will monitor SDG targets 6.4, 6.6 and 15.1 which focus on sustainable use of freshwater ecosystems and their services. The indicator will also serve as a proxy indicator for SDG 12.1 to ensure sustainable food consumption and production patterns.

Health Impact
A lack of water to meet daily needs has serious health consequences. Inadequate drinking water, sanitation and hygiene are estimated to cause 842,000 diarrhoeal disease deaths per year (WHO, 2014). Additionally, the health consequences of water scarcity include diarrhoeal diseases such as cholera, typhoid fever, salmonellosis, poliomyelitis, other gastrointestinal viruses and dysentery (WHO, 2007).

Environmental Impact
Depletion of non-renewable freshwater resources (ground water reserves) decreases water security and threatens absolute water scarcity. Many of the water systems that keep ecosystems thriving and feed the growing global population are stressed. Many rivers, lakes and aquifers are drying up or becoming too polluted for use. Furthermore, more than half of the world’s wetlands have disappeared (WWF, 2015).

Development Impact
Major changes in policy and management, across the entire agricultural production chain, are needed to ensure best use of available water resources in
meeting growing demands for food and other agricultural products. The global food system is an important component of the global economy. The value of agricultural exports amounted to US$1.65 trillion in 2012, representing 9% of all traded products worldwide (WTO, 2014). If changes are not implemented to ensure efficiency and prevent water scarcity, the unsustainable management of water resources will have negative effects on agriculture and food production and consequently the economy.

**Disaggregation**
Household incomes, urban/rural

**Primary Data Source**
AQUASTAT (FAO), NSOs

**Tier**
Tier III: Methodology and data collection baseline needs to be developed.

**Similar indicator recommendations**
SDSN Indicator: [Crop water productivity (tons of harvested product per unit irrigation water)] – to be developed

SDSN Complementary National Indicator: [Indicator on irrigation access gap] – to be developed

SDSN Indicator: Proportion of total water resources used (MDG Indicator)

FAO-STAT: Water withdrawal for agricultural use (% of total water withdrawal)

Theme: **Sustainable Agriculture**

*Indicator of interest requiring further development: proportion of food produced by sustainable agriculture*

**Rationale**
We define sustainable agriculture as agriculture that operates within the planetary boundaries. The planetary boundaries have been proposed along nine critical dimensions: climate change, novel entities, stratospheric ozone depletion, atmospheric aerosol loading, ocean acidification, biochemical flows, freshwater use, land-system change and biosphere integrity (Steffen et al., 2015).

Sustainable agricultural practices improve land and soil quality, help maintain ecosystems, and protect public health and animal welfare. This indicator will tie closely to FAO’s suggested indicator on “percentage of agriculture area under sustainable agricultural practices” that is recommended to measure target 2.4.

**Health Impact**
The environmental impact of unsustainable agriculture inevitably has adverse effects on public health. The overuse of antibiotics to promote growth and feed conversion efficiency of livestock in meat production (circa 70% of global antibiotics use) contributes to antibiotic resistance in humans, and may also lead to modification of the human micro-biome with potential feedback consequences on the prevalence of obesity (Cho et al., 2012). Additionally, pesticide use in
agriculture is associated with elevated risks of cancer and endocrine dysfunction (Horrigan et al., 2002).

**Environmental Impact**
Current agriculture practices consume fossil fuels, water, and topsoil at unsustainable rates contributing to numerous forms of environmental degradation, including the loss of up to 75% of crop genetic diversity, exploitation of more than half of the world’s fish stocks, and loss of biodiversity (FAO, 2015).

**Development**
The food and agriculture sector offer key solutions for development, and are central for the eradication of hunger and poverty, and a prosperous global economy. Agricultural sustainability is a fundamental determinant of the outcome of food production and consequently has severe repercussions on human health, food security and social development. Agricultural sustainability is also important for a well-functioning viable agriculture economy.

**Disaggregation**
Not relevant.

**Primary Data Source**
FAO

**Tier**
Tier II: Methodology Exists, data not easily available

**Similar indicator recommendations**
FAO Indicator- Percentage of agricultural area under sustainable agricultural practices.

**Thematic Category 3: Resilient and Equitable Food Systems**

**Theme:** Livelihoods of smallholder farmers

**Proposed Indicator:** Income of smallholder farmers and fishing communities against national poverty lines

**Rationale**
Currently, there are 1.4 billion poor people living on less than US$1.25 a day. One billion of them live in rural areas where agriculture is their main source of livelihood (IFAD, 2013). Smallholders form a vital part of the global agricultural community, yet they are often neglected. Smallholders manage over 80% of the world’s estimated 500 million small farms and provide over 80% of the food consumed in a large part of the developing world, contributing significantly to poverty reduction and food security (IFAD, 2013).

An indicator that monitors the income of smallholder farmers serves to track SDG 2.3 to double the agricultural productivity and incomes of small-scale food
producers, and as a proxy indicator for increased resilience amongst the poor and reduced exposure and vulnerability to climate-related events.

**Health Impact**
Smallholder farmers are estimated to represent half of the world’s hungry and three-quarters of the hungry in Africa (Sanchez & Swaminathan, 2005). Consequently, reducing poverty, hunger and improving health outcomes will be dependent on the fate of smallholder farmers.

**Environmental Impact**
Smallholder productivity in particular depends on well-functioning ecosystems. The productivity of smallholder agriculture and its contribution to the economy, food security and poverty reduction depend on the services provided by well-functioning ecosystems, including soil fertility, freshwater delivery, pollination and pest control (IFAD, 2013).

**Development Impact**
Agriculture serves as a valuable source of income, contributing to poverty reduction. As climate change is expected to disproportionately affect smallholder farmers, it will have significant effects on development, economic growth and livelihoods in these regions (IFAD, 2009).

**Disaggregation**
Sex, household income

**Primary Data Source**
FAO, WB and NSOs

**Tier**
Tier I: Methodology exists, data is widely available. However, some data gaps do exist and need to be mapped out.

**Similar indicator recommendations:**

**SDSN Complementary National Indicator:** Percentage of women, men, indigenous peoples, and local communities with secure rights to land, property, and natural resources, measured by (i) percentage with documented or recognized evidence of tenure, and (ii) percentage who perceive their rights are recognized and protected.

**SDSN Indicator:** Number of agricultural extension workers per 1000 farmers [or share of farmers covered by agricultural extension programs and services]

**UNSC Indicator:** Extent to which sustainable practices and management by women and men pastoralists, farmers, fishers, forest dwellers on common lands, including national and trans-national mobility, are legally protected and enhanced by policies and regulations share of farmers covered by agricultural extension programs and service.
ANNEX 2: Review of SDG Indicators proposed by key stakeholders

A review was conducted of existing indicator recommendations by key stakeholder groups prior to formulating the integrated indicator recommendations. A wide range of actors have provided input to the SDG process, from representatives of national and international statistical offices to scientific and research bodies, and intergovernmental organizations. The review included representative samples of official documents developed by relevant UN agencies and NGOs, in addition to the statements and inputs submitted in writing for the IAEG-SDGs meeting held on 1-2 June 2015.

The first list of proposed priority indicators and detailed inputs to be discussed by the IAEG-SDGs were also analysed. The review aimed to gain a robust understanding of the landscape of indicators that have already been suggested by key stakeholders as well as the potential role of EAT and our partners to fill gaps or strengthen existing recommendations. Particularly, the review investigated the abundance and comprehensiveness of the recommended indicators, their association with specific SDG targets, as well as the extent to which – and how holistically – they relate to food, health and sustainability. The review encompassed indicator recommendations from the following organisations:

- Sustainable Development Solutions Network (SDSN)
- United Nations Security Council (UNSC)
- World Health Organization (WHO)
- Food and Agriculture Organization of the United Nations (FAO)
- United Nations Environment Programme (UNEP)
- International Fund for Agricultural Development (IFAD)
- United Nations Children’s Fund (UNICEF)
- United Nations Standing Committee on Nutrition (UN SCN)

Common points across stakeholder comments:

Lack of integrated indicators – There is a lack of suggestions for integrated indicators that take into account the three dimensions of food, health and the environment and their interactions in a way that allows analysis of the synergies and trade-offs between them, as well as the spill over effects of changes in one dimension for the others. Particularly, in Goals 2 and 3, there is a need to underline the importance of dietary nutritional quality rather than just decreasing the incidence of under nutrition. Global food security should be achieved through the implementation of sustainable production practices rather than just increasing production. This emphasizes the need to integrate the different aspects of food security, nutritional status and environmental issues.

Complementarity – Many goals and targets overlap and can be considered complementary - the same is true for many indicators under different goals. In spite of this, none the goals, targets or indicators are integrated, nor are their interdependencies and interlinkages highlighted. Thus, combining more than one indicator, especially if they fit under different goals, would strengthen their potential.
Types of indicators – Several of the targets are more means of implementation rather than ends in themselves. Instead, emphasis should be given on complementary national indicators.

Definitions – There is a lack of universally agreed-upon definitions, which can hamper the achievement of the goals/targets and/or the measurement of progress. It is necessary to specify clear and generally accepted definitions in order to be able to monitor progress (for example: what is meant by the terms productivity, climate change, poverty, sustainable, food security, etc.).

Data availability and costs – There is an urgent need to have more precise data for many of the indicators. Reliable data is not available for some indicators as well as a large number of countries. It is also difficult to determine for some indicators when a country has achieved a target. Another issue pertains to data costs. Collecting reliable data for some indicators will be too costly in some countries.

ANNEX 3: SDG targets related to food

1.4 By 2030, ensure that all men and women, particularly the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership, and control over land and other forms of property, inheritance, natural resources, appropriate new technology, and financial services including microfinance.

1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.

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.

2.2 By 2030, end all forms of malnutrition, including achieving by 2025 the internationally agreed targets on stunting and wasting in children under five years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older persons.

2.3 By 2030, double the agricultural productivity and the incomes of small-scale food producers, particularly 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.

2.4 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.
2.5 By 2020, maintain genetic diversity of seeds, cultivated plants, farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at national, regional and international levels, and ensure access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge as internationally agreed.

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 to enhance agricultural productive capacity in developing countries, in particular in least developed countries.

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.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.

3.4 By 2030, reduce by one-third premature mortality from non-communicable diseases (NCDs) through prevention and treatment, and promote mental health and wellbeing.

3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water, and soil pollution and contamination.

6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and increasing recycling and safe reuse by x% globally.

6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity, and substantially reduce the number of people suffering from water scarcity.

6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.

6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.

6.a By 2030, expand international cooperation and capacity-building support to developing countries in water and sanitation related activities and programmes,
including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.

6.b Support and strengthen the participation of local communities for improving water and sanitation management.

7.a By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology.

7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, particularly LDCs and SIDS.

8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes for sustainable consumption and production, with developed countries taking the lead.

9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets.

9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.

11.4 Strengthen efforts to protect and safeguard the world’s cultural and natural heritage.

11.5 By 2030, significantly reduce the number of deaths and the number of affected people and decrease by y% the economic losses relative to GDP caused by disasters, including water-related disasters, with the focus on protecting the poor and people in vulnerable situations.

11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality, municipal and other waste management.

11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, particularly for women and children, older persons and persons with disabilities.

11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.
11.b By 2020, increase by x% the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, develop and implement in line with the forthcoming Hyogo Framework holistic disaster risk management at all levels.

12.1 Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.

12.2 By 2030, achieve sustainable management and efficient use of natural resources.

12.3 By 2030, halve per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains including post-harvest losses.

12.4 By 2020, achieve environmentally sound management of chemicals and all wastes throughout their life-cycle in accordance with agreed international frameworks and significantly reduce their release to air, water and soil to minimize their adverse impacts on human health and the environment.

12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling, and reuse.

12.6 Encourage companies, especially large and trans-national companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.

12.a Support developing countries to strengthen their scientific and technological capacities to move towards more sustainable patterns of consumption and production.

12.c Rationalize inefficient fossil fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities.

13.1 Strengthen resilience and adaptive capacity to climate related hazards and natural disasters in all countries.

13.2 Integrate climate change measures into national policies, strategies, and planning.

13.a Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the
needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate fund through its capitalization as soon as possible.

13.b Promote mechanisms for raising capacities for effective climate change related planning and management, in LDCs, including focusing on women, youth, local and marginalized communities.

14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution.

14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration, to achieve healthy and productive oceans.

14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels.

14.4 By 2020, effectively regulate harvesting, and end overfishing, illegal, unreported and unregulated (IUU) fishing and destructive fishing practices and implement science-based management plans, to restore fish stocks in the shortest time feasible at least to levels that can produce maximum sustainable yield as determined by their biological characteristics.

14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on best available scientific information.

14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, and eliminate subsidies that contribute to IUU fishing, and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the WTO fisheries subsidies negotiation.

14.7 By 2030, increase the economic benefits to SIDS and LDCs from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism.

14.a Increase scientific knowledge, develop research capacities and transfer marine technology taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular SIDS and LDCs.

14.b Provide access of small-scale artisanal fishers to marine resources and markets.
14.c Ensure the full implementation of international law, as reflected in the United Nations Convention on the Law of the Sea for States parties thereto, including, where applicable, existing regional and international regimes for the conservation and sustainable use of oceans and their resources by their parties.

15.1 By 2020, ensure conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.

15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests, and increase afforestation and reforestation by x% globally.

15.3 By 2020, combat desertification, and restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land-degradation neutral world.

15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, to enhance their capacity to provide benefits which are essential for sustainable development.

15.5 Take urgent and significant action to reduce degradation of natural habitat, halt the loss of biodiversity, and by 2020 protect and prevent the extinction of threatened species.

15.6 Ensure fair and equitable sharing of the benefits arising from the utilization of genetic resources, and promote appropriate access to genetic resources.

15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems, and control or eradicate the priority species.

15.9 By 2020, integrate ecosystems and biodiversity values into national and local planning, development processes and poverty reduction strategies, and accounts.

15.a Mobilize and significantly increase from all sources financial resources to conserve and sustainably use biodiversity and ecosystems.

15.b Mobilize significantly resources from all sources and at all levels to finance sustainable forest management, and provide adequate incentives to developing countries to advance sustainable forest management, including for conservation and reforestation.

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