Agriculture, food and nutrition security interventions that facilitate sustainable development and have a positive impact on health: an overview of systematic reviews (Protocol)

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Background

What is sustainable development?

History of sustainable development, including key conferences
The United Nations Conference on the Human Environment (also known as the Stockholm Conference) was an international conference convened under United Nations auspices held in Stockholm, Sweden from June 5-16, 1972. It was the UN's first major conference on international environmental issues, and marked a turning point in the development of international environmental politics.

The need for the integration of economic development, natural resources management and protection and social equity and inclusion was introduced for the first time by the 1987 Brundtland Report – *Our Common Future* (World Commission on Environment and Development, 1987), and it has become central in framing the discussions at the 1992 United Nations Conference on Environment and Development also known as the Earth Summit.

In 1992, sustainable development was formally endorsed by the international community at the historic United Nations Conference on Environment and Development (known informally as the Earth Summit) held in Rio de Janeiro, Brazil from 3-14 June. The Earth Summit resulted in the creation of Agenda 21, an ambitious action plan for global sustainable development, and the Rio Declaration, which outlined 27 principles for global sustainability.

The United Nations Commission on Sustainable Development was established by the UN General Assembly in December 1992, as the UN high level political body entrusted with the monitoring and promotion of the implementation of the Rio outcomes, including Agenda 21.

The 2002 World Summit on Sustainable Development advanced the mainstreaming of the three dimensions of sustainable development in development policies at all levels through the adoption of the Johannesburg Plan of Implementation (JPOI). The conference was held in Johannesburg, South Africa from 26 August to 4 September, 2002.
From 22-26 June 2012, world leaders and participants from government, NGOs, the private sector, and civil society gathered again in Rio de Janeiro for the UN Conference on Sustainable Development (commonly referred to as Rio+20) to advance sustainable development—20 years after the 1992 Earth Summit that resulted in agreement on important principles but insufficient action. The conference resulted in a focused political outcome document – The future we want – which contains clear and practical measures for implementing sustainable development (UN, 2012). In Rio, Member States decided to launch a process to develop a set of Sustainable Development Goals, which will build upon the Millennium Development Goals and converge with the post 2015 development agenda.

**Definition of sustainable development**

The term *sustainability* comes from the concept of sustainable development defined in the 1987 report *Our Common Future* by the Brundtland Commission of the United Nations as:

> “development which meets the needs of current generations without compromising the ability of future generations to meet their own needs’” (World Commission on Environment and Development, 1987).

Though this definition is ambiguous, as have been all subsequent alternative definitions which scholars have come up with, it is widely accepted and used (Kates et al., 2005). Sustainable development is supported by three pillars—the economic, social, and environmental —where health is both an outcome of, and a precondition for, all three pillars (UN, 2012).

**An integrated framework for realizing the “future we want for all”**

Prior to Rio+20 the UN System Task Team on the Post-2015 UN Development Agenda proposed an integrated framework for realizing the “future we want for all” in the post-2015 UN development agenda (Figure 1) (UN System Task Team, 2012). The framework includes the core values of human rights, equality and sustainability and four key dimensions of: (1) inclusive social development; (2) inclusive economic development; (3) environmental sustainability; and (4) peace and security. These four dimensions build on the three pillars of sustainable development. The fourth dimension recognizes peace and security, or “freedom from fear” as an important element in realizing the “future we want for all” (UN System Task Team, 2012). There are also four broad areas of “enablers” in the framework, which are indicative of each of the four dimensions, yet understood as supportive to all (UN System Task Team, 2012). Policies for these “enablers” should be seen as not just effective towards achieving goals related to one dimension, but rather across all dimensions and are designed to bring coherence among policies at different levels, e.g. national, regional, global (UN System Task Team, 2012).

**How do agriculture, food and nutrition security fit into the integrated framework?**

Policies relating to food and nutrition security are seen as an “enabler” in the proposed integrated framework (Figure 1) so are relevant to all four dimensions. Food and nutrition security are also specifically mentioned within the key dimensions of “inclusive social development” (Adequate nutrition for all) and “inclusive economic development” (Eradicating income poverty and hunger). Though not specifically mentioned in the framework, sustainable food and nutrition security is a contributor to, and dependent on, “environmental sustainability” and “peace and security”.
Sustainable development in relation to agriculture, food and nutrition security

In one of their Sustainable Development Innovation Briefs, the United Nations Department of Economic and Social Affairs discussed the potential for sustainable agriculture to contribute towards sustainable development.

“Sustainable agriculture generally refers to the capacity of agriculture over time to contribute to overall welfare by providing sufficient food and other goods and services in ways that are economically efficient and profitable, socially responsible, and environmentally sound” (UNDESA-DSD, 2009).

Sustainable agriculture emphasizes the use of techniques of food production that integrate and are adapted to local natural processes such as nutrient cycling, biological nitrogen fixing, soil regeneration and natural enemies of pests (UNDESA-DSD, 2009).

Olivier De Schutter, the UN Special Rapporteur on the Right to Food elaborated further in his Report to the United Nations Human Rights Council, 2011 on what are “sustainable diets” and their relationship to sustainable development (Schutter, 2011). Experts now agree, he wrote, that food systems must ensure
the access of all to “sustainable diets”, defined as “diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations.

“Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources”1.

This definition recognizes the need to gear agrifood systems away from an exclusive focus on boosting production and towards integrating the requirements of the adequacy of diets, social equity and environmental sustainability (Schutter, 2011).

The agrifood systems must be reshaped to address the challenges of malnutrition—undernutrition, micronutrient deficiency, and overnutrition (overweight and obesity)—not in isolation, but concurrently. Ensuring adequate availability of and accessibility to fruits and vegetables and diets that are sufficiently diverse and balanced across food groups requires the rebuilding of agrifood systems. This means prioritizing access to adequate diets that are socially and environmentally sustainable over the mere provision of cheap calories (Schutter, 2011).

**Agriculture, food and nutrition security interventions – some examples**

Schutter recommended interventions that shift the emphasis away from demand-side measures, focused on consumers’ choices, to supply-side measures: the range of foods made available to consumers and the prices of different types of food (Schutter, 2011). Types of interventions included:

- Using taxation to encourage healthy diets, e.g. by taxing soft drinks (sodas), and foods high in saturated fats, trans-fatty acids, sodium and sugar (HFSS foods);
- Revising the existing system of subsidies - to align agricultural policies with the requirement of adequate diets;
- Regulating food marketing practices to reduce marketing of HFSS foods to children and to restrict marketing to other groups;
- Using public procurement schemes for school-feeding programs and for other public institutions to support the provision of locally sourced, nutritious foods, with particular attention to poor consumers;
- Increasing support to farmers’ markets and urban and peri-urban agriculture, in land-planning schemes, through fiscal incentives and by ensuring appropriate infrastructure to link local producers to the urban consumers.

Other types of interventions mentioned by experts in the field of sustainable development and/or health include:

- Reducing consumption of animal products in high-consuming populations (Haines et al., 2012) and to substitute animal sources of fat and protein with other types (e.g. fish, poultry, nuts (WHO, 2012).

- Sustainable agricultural practices to increase yields including: 1) more efficient water use in both dryland and irrigated farming; 2) improvements in organic matter accumulation in soils and carbon

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1 Definition adopted by consensus by the participants in the International Scientific Symposium on Biodiversity and Sustainable Diets, held from 3 to 5 November 2010 in Rome. See the final report of the Symposium, p. ix, available from www.fao.org/ag/humannutrition/29186-021e012ff2db1b0eb66f228e1d98c806a.pdf.
sequestration; and 3) pest, weed, and disease control emphasizing on-farm biodiversity and reduced pesticides through integrated pest management or other techniques (UNDESA-DSD, 2009).

- Regulation of food production processes that impact on public health as well as occupational health, e.g. excessive use of agrochemicals and use of antibiotics as growth promoters;
- Implementation of national strategies for integrated pest management; and
- Conduct (and make available to the public) environmental, social and health impact assessments on agricultural policies, plans and projects (WHO, 2012).

- Replacement of chemical inputs, herbicides, and pesticides with organic and biological alternatives (UNCESD Secretariat, 2011).

- Replace conventional agriculture with organic systems;
- Integrated nutrient management, conservation tillage, agro-forestry, water harvesting in dryland areas, livestock integration, and integrated pest management;
- Reform of subsidies that currently favor resources and input-intensive methods of cultivation and extension of credit facilities for non-capital purchases;
- Organic and fair trade price premiums and procurement programs that favor sustainable agricultural products such as school feeding programs could be considered; and
- To ease biomass constraints, policies have to be developed that: provide access to modern cooking fuels to rural households; encourage incorporating forage legumes in the cropping systems and rotation cycle to improve livestock productivity; encourage using integrated nutrient management; and encourage the strengthening and structuring of available rural labor sharing mechanisms (UNDESA-DSD, 2009).

Focus of this overview – sustainable food production

The area of sustainable agriculture, food and nutrition security is very broad and can range from large-scale supply-side issues such as revising national subsidies to promote the production of more diverse crops or to decrease meat production to small-scale demand-side issues such as providing health information to encourage consumers to eat less of foods high in saturated fats, sodium and sugar.

This review will focus on sustainable food production (supply-side measures) for the following reasons:

- The UN Special Rapporteur on the Right to Food recommended more focus on supply-side measures;
- Demand-side measures for sustainable diets are already well-studied and reviewed;
- One of the aims of this series of overviews on sustainable development is to promote collaboration between health and other sectors and most demand-side measures are traditionally seen as health sector issues; and
- The need to keep the breadth of the overview manageable.

Objectives

The objective of this overview is to answer the following questions using the best available evidence:
1. What are the agriculture, food and nutrition security interventions that facilitate sustainable food production and have a positive impact on health?
   a. What is their impact on health inequalities (including gender, place of residence, age)?
   b. What evidence is there for their cost-effectiveness?
   c. Which dimensions of the integrated framework are affected by the intervention and how?

2. Given the interdisciplinary and inter-sectorial nature of sustainable development, which sectors should the health sector engage with in order to promote sustainable food production to preserve and promote public health and equity?

**Methods**

**Criteria for considering reviews for inclusion**
Publications in English, Spanish or Portuguese and published in the last 15 years (from 1997 to present) will be included.

**Types of studies**
Systematic reviews of studies of effectiveness, including reviews of randomized controlled trials (individuals or clusters), quasi-randomized controlled trials, controlled before-and-after studies, interrupted time series, and analytic observational studies (cohort, case-control, cross-sectional studies) will be included. A systematic review is characterized by (Higgins and Green, 2011):
- a clearly stated set of objectives with pre-defined eligibility criteria for studies;
- an explicit, reproducible methodology;
- a systematic search that attempts to identify all studies that would meet the eligibility criteria;
- an assessment of the validity of the findings of the included studies, for example through the assessment of risk of bias;
- a systematic presentation, and synthesis, of the characteristics and findings of the included studies.

Economic evaluations (cost-effectiveness, cost-utility, and/or cost-benefit) and systematic reviews of economic evaluations will also be included.

**Types of participants**
Studies of individuals, groups, communities, countries or regions will be included. Both developed and developing countries will be included.

**Types of interventions**
Interventions include programs, policies, strategies, courses of action and legislation. Agriculture, food and nutrition security interventions that aim to facilitate sustainable food production will be included. Interventions can include the use of taxes, subsidies, public procurement schemes, fiscal incentives, and agricultural policy and practices to promote sustainable food production.

To classify as ‘sustainable’ interventions need to aim (explicitly or implicitly) to positively impact on at least two dimensions of the integrated framework, e.g. environmental sustainability and inclusive social development (which includes health) or environmental sustainability and inclusive economic development (but where impact on health is also measured).

Interventions focused only on demand-side measures will be excluded.
Types of comparisons
Suitable comparisons include:
- No intervention
- Another intervention
- Current practice

Types of outcome measures

Primary outcomes
Health measures at the level of the individual, group, community, country, region, and/or globally, including:
- Disease incidence, prevalence, burden
- Mortality
- Morbidity
- Health service use
- Health-related costs
- Health-inequalities, including by gender, age, life stage, area of residence, etc.

Secondary outcomes
Secondary outcomes will be examined if reported in an eligible study. Studies reporting only secondary outcomes without reporting any objective measure of primary outcomes will not be eligible for the review. These measures are considered intermediaries between sustainable food production practices and health outcomes and were recommended by a WHO Expert Consultation (WHO, 2012). They include:
- Food access and dietary quality in association with sustainable foods production: adequate access to protein supply; excessive adult saturated fat consumption; household dietary diversity; and prevalence/incidence of foodborne disease outbreaks.
- Food market/trade policies supporting health and sustainability: foods that comply with international food safety standards including hormone, pesticides, and antibiotic residues; number of countries that have phased out use of antibiotics as growth promoters; and assessment of health and sustainability impacts in agricultural trade negotiations, policies, and plans.

Any impact on human rights will also be examined if reported in an eligible study.

Search methods for identification of reviews

Sources

Databases
The following sources from 1997 to the present will be searched:
- PubMed (which includes Medline content)
- EMBASE - Excerpta Medica database
- CINAHL - Nursing & Allied Health Literature
- ASSIA - Applied Social Sciences Index and Abstracts
- ScienceDirect
- LILACS (http://lilacs.bvsalud.org/en/)
Specialized sources of systematic reviews and syntheses of systematic reviews:

- The Cochrane Library Plus, including the Database of Abstracts of Reviews of Effectiveness (DARE) and the Health Technology Assessment (HTA) database (http://regional.bvsalud.org/php/index.php)
- The Campbell Library (http://www.campbellcollaboration.org/)
- Effective Public Health Practice Project (http://www.ephpp.ca/)
- Evidence for Policy and Practice Information and Coordinating Centre (EPPI-Centre) (http://eppi.ioe.ac.uk/cms/Default.aspx?tabid=61)
- Health-evidence Canada (http://health-evidence.ca/articles/search)
- National Institute for Health and Care Excellence (NICE) (http://guidance.nice.org.uk/Type/PHG/Published)
- 3ie – International Initiative for Impact Evaluation (http://www.3ieimpact.org/)

Specialized sources of economic evaluations:

- Paediatric Economic Database Evaluation (PEDE) (http://pede.ccb.sickkids.ca/pede/index.jsp)
- EconLit - Economics Literature

Grey literature / manual search

Some of the selected databases index a combination of published and unpublished studies (for example, doctoral dissertations and conference abstracts) therefore unpublished studies will be partially captured through the electronic search process. In addition key websites will be searched:

- World Health Organization, including WHOLIS (a bibliographic database that contains publications from the World Health Organization http://www.who.int/library/databases/en/) and IRIS (WHO’s Institutional Repository for Information Sharing http://apps.who.int/iris/)
- Google and Google Scholar
- Food and Agriculture Organization of the United Nations (http://www.fao.org/)
- Food Research and Action Centre (USA) (http://frac.org/)

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2 This library contains rapid reviews of the evidence on selected topics – the reference list of relevant rapid reviews will be searched for systematic reviews and economic evaluations that meet the inclusion criteria for this ‘overview’.

3 Do these two databases include different information?
The reference list of included systematic reviews will also be searched.

**Search strategy**

Databases will be searched using the following keywords (Table 1) – searched for in title and abstract, except where otherwise stated. Keyword areas will be joined using ‘AND’. Searches will be limited to Humans and with a publication date between 1st January 1997 and the present.

**Table 1. Keyword areas for searching**

<table>
<thead>
<tr>
<th>Keyword Areas</th>
<th>Details</th>
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<tbody>
<tr>
<td>1. Agriculture, food or nutrition</td>
<td>food OR drink OR beverage OR nutrition OR agriculture OR crop</td>
</tr>
<tr>
<td></td>
<td>(OR farm$ OR livestock)* (OR “sustainable” as subject)*†</td>
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<tr>
<td>2. Interventions</td>
<td>program OR policy OR policies OR strategy OR legislation OR law</td>
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<td></td>
<td>OR intervention OR technique OR planning OR practice OR fiscal</td>
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<tr>
<td></td>
<td>OR regulation OR sustainable OR tax$ OR subsid$ OR procurement OR incentive</td>
</tr>
<tr>
<td>3. Outcomes</td>
<td>disease OR burden OR incidence OR prevalence OR mortality OR morbidity OR health$</td>
</tr>
<tr>
<td>4. Systematic reviews</td>
<td>“systematic review” OR &quot;meta-analysis&quot; (OR “review” as subject)*</td>
</tr>
</tbody>
</table>

* These keywords will be used for non-health databases only. †This keyword will be used for specialized sources of systematic reviews and economic evaluations.

Health and medical databases will be searched using keyword areas 1, 2 and 4. The search will be extended to keyword area 3 if the number of records found is more than 200. For non-health databases the search will begin with keyword areas 1 and 4, but with the added keywords shown in brackets in Table 1. The search will be extended to keyword area 3 if the number of records found is more than 50. Specialized sources of systematic reviews and economic evaluations will be searched using keyword area 1, extended to include “sustainable” as a subject.

If additional relevant keywords are detected during any of the electronic or other searches the electronic search strategies will be modified to incorporate these terms – any changes will be documented.

Searches for economic evaluations will be limited to the databases listed under “Sources of economic evaluations” (above) using keywords from areas 1 and 2.

Results will be downloaded into the EndNote reference management program and duplicates removed. The search strategy for PubMed can be found in Appendix 1. This will be modified for other databases as appropriate.
Data collection and analysis

Selection of reviews and economic evaluations
Searches will be conducted and screened according to the selection criteria by one review author (MH). The full text of any potentially relevant papers will be retrieved for closer examination. The inclusion criteria will be applied against these papers by two reviewers. All studies which initially appear to meet the inclusion criteria but on inspection of the full text paper do not meet the inclusion criteria will be detailed in a table ‘Characteristics of excluded systematic reviews’ together with reasons for their exclusion. Disagreements regarding eligibility of studies will be resolved via consensus.

The results of the review selection process will be presented in a flow chart using the format suggested in the PRISMA statement (Moher et al., 2009) – Figure 2.

Data extraction
One reviewer will extract all relevant data from included papers and a second reviewer will verify the extracted data. Differences will be resolved by discussion and consensus. Data extracted for each included systematic review will include:

- Objectives
- Inclusion criteria for the systematic review (Participants, Interventions, Comparisons, Outcomes, Study types - PICOS)
- Date of search
- Country of studies
- Number of studies included
- Details of the included studies, including participants, interventions and study types and the sectors involved in each of the interventions studied.
- The dimensions of the integrated framework that the individual studies attempted to impact.
- Summary of findings – including impact on health and impact on any of the four dimensions of the integrated framework
- Limitations
- Research gaps

Information cited in the systematic review on factors that influence the effectiveness of the interventions (‘critical success factors’) will also be noted.

Assessment of methodological quality of included reviews
The quality of included systematic reviews will be assessed by two reviewers using AMSTAR: A MeaSurement Tool to Assess Reviews (Shea et al., 2007). AMSTAR assesses the degree to which review methods avoided bias by evaluating the methods against 11 distinct criteria. Each item on AMSTAR is rated as yes (clearly done), no (clearly not done), can’t answer, or not applicable. Disagreements regarding scores will be resolved through discussion and consensus. A review that adequately meets all of the 11 criteria is considered to be a review of the highest quality. For this overview we will consider reviews that achieve scores of between 8 to 11 high quality; scores of 4 to 7 medium quality; and scores of 0 to 3 low quality. The review quality assessment will be used to interpret the results of reviews when synthesized in this overview and in the formulation of conclusions.

Data synthesis
Descriptive summaries about the efficacy of the interventions will be generated.
**Results**

Among other tables, a matrix showing the connection between the interventions and the four dimensions of the integrated framework will be included:

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Inclusive economic development</th>
<th>Environmental Sustainability</th>
<th>Inclusive Social Development</th>
<th>Peace and Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example 1</td>
<td>✓</td>
<td>✓</td>
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Among other sections, there will be a sub-heading for each of the four dimensions of the integrated framework – which will include a description (and quantitative data where available) of the impact of the interventions.
Figure 2. Systematic review selection flow chart

- Records identified through database searching (n = )
- Additional records identified through other sources (n = )

Records after duplicates removed (n = )

Records screened (n = )

- Records excluded (n = )

Full-text articles assessed for eligibility (n = )

- Full-text articles excluded, with reasons (n = )

Additional systematic reviews identified through hand searching of reference lists of included systematic reviews (n = )

Systematic reviews included (n = )
References
UN System Task Team 2012. Realizing the future we want for all. Report to the Secretary-General. New York: UN System Task Team on the Post-2015 UN Development Agenda, United Nations
### Appendix 1 – Detailed search strategy

**PubMed**

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</tr>
</thead>
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</tr>
<tr>
<td>#2</td>
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<td>2583091</td>
</tr>
<tr>
<td>#3</td>
<td>Search (&quot;systematic review&quot;[Title/Abstract]) OR &quot;meta-analysis&quot;[Title/Abstract]</td>
<td>78597</td>
</tr>
<tr>
<td>#4</td>
<td>Search #1 AND #2 AND #3</td>
<td>698</td>
</tr>
<tr>
<td>#5</td>
<td>Search #1 AND #2 AND #3 Filters: Humans</td>
<td>547</td>
</tr>
<tr>
<td>#6</td>
<td>Search #1 AND #2 AND #3 Filters: Publication date from 1997/01/01 to 2013/12/31; Humans</td>
<td>534</td>
</tr>
<tr>
<td>#7</td>
<td>Search ((((((disease[Title/Abstract]) OR burden[Title/Abstract]) OR incidence[Title/Abstract]) OR prevalence[Title/Abstract]) OR mortality[Title/Abstract]) OR morbidity[Title/Abstract]) OR health$[Title/Abstract] Filters: Publication date from 1997/01/01 to 2013/12/31; Humans</td>
<td>2007236</td>
</tr>
<tr>
<td>#8</td>
<td>Search #6 AND #7 Filters: Publication date from 1997/01/01 to 2013/12/31; Humans</td>
<td>366</td>
</tr>
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</table>