

# Health indicators of **sustainable agriculture, food and nutrition security**

in the context of the Rio+20 UN Conference on Sustainable Development

**Initial findings from a WHO Expert Consultation: 17 – 18 May 2012**

## **Key messages:**

Many food-related diseases and conditions – including undernutrition, micronutrient deficiency, and obesity as well as food safety risks and farmworker health – are interlinked. Sustainable food policies that place the promotion and protection of health at the core of strategies from the farm field to the dinner plate can help advance the provision of sustainable, quality foods for all, across the supply chain and the human life-cycle.<sup>1</sup> Health indicators that can be used to monitor progress include:

- **Health outcomes:** prevalence of anaemia in women of reproductive age; prevalence of stunting in children under 5 years; and prevalence of obesity in children under 5 and in adults.
- **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.

## **1. Linkages between agriculture, food and nutrition policies and public health**

Sustainable food and agriculture policies aim to improve the efficiency of agricultural production systems while at the same time preserving the diverse ecosystem services upon which the world's food supply depends (e.g. agricultural lands, soil nutrients, forests and oceans, climate regulation, and biodiversity, etc.) These twin objectives are central to the health goals of ending hunger/undernutrition and achieving long-term food and nutrition security for all.<sup>2</sup>

**Current patterns of food production and consumption are associated with a number of significant public health concerns:**

- **Undernutrition** is the cause of more than one-third of under-five mortality.<sup>3</sup>
- **Prevalence and transmission** of certain water-borne, vector borne, and zoonotic diseases as well as excessive agro-chemical exposures among 2 billion farm workers and their families/communities.

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<sup>1</sup> Schutter OD. *Report submitted by the Special Rapporteur on the right to food, Olivier De Schutter*. New York City, United Nations Human Rights Council, 2011 (<http://www.unscn.org/en/announcements/conferences/?id=650>).

<sup>2</sup> Food and nutrition security means equitable access for all people to high quality food rich in micronutrients and containing the minimum amount of additives and chemical residues (e.g. pesticides, fertilizers, hormones, antibiotics, etc.) needed to ensure optimal production without compromising human health.

<sup>3</sup> Black R et al. Maternal and child undernutrition: global and regional exposures and health consequences. *Lancet*, 2008,371 (9608):243-260.

- **Increased obesity-related disease** is problematic because a significant proportion of the global population consumes more than the recommended intake of saturated fats and protein, largely due to overconsumption of animal products.<sup>4,5</sup> Some 80% of the obesity burden falls on low and middle income countries.<sup>6</sup>
- **Health and equity issues** are associated with insecure livelihoods and tenure of small holders/tenant farmers who produce much of the world's food, a significant proportion of which are women.

In terms of sustainability, the negative effects of changing temperatures and precipitation on agricultural production, food security, and undernutrition in developing countries has been described as the largest single negative impact of climate change on global health.<sup>7</sup> Livestock accounts for most of agriculture's climate footprint, with industrial beef production generating significantly more greenhouse gases (GHGs)/per grams of protein produced than plant-based alternatives (soy, wheat) as well as certain fish and fowl.<sup>8</sup>

There is also growing diversion of plant-based cereals/protein sources to livestock production – roughly one-third of the world's cereal harvest in 2005 was fed to livestock.<sup>9</sup> Yet, animal-sourced foods are also an essential source of income, food security, and essential proteins and micronutrients for many of the world's poor.

Global trends point to many synergies or points of convergence between policies that support more sustainable food production and health-oriented aims of reducing obesity and malnutrition as well as hunger. While the potential for improving health in association with sustainable agriculture may appear substantial, food systems are highly complex. In this context, health-related indicators can provide a robust measure of the extent to which sustainable development policies yield optimal benefits for health, development, and environmental sustainability.

## 2. Core health indicators that can monitor progress and identify success

The following is a table of proposed indicators to monitor and measure the extent to which sustainable agriculture policies contribute to health and well-being. The proposed indicators can track 1) health outcomes, 2) adequate diverse and healthy diets, and 3) health and health equity aspects of food policies such as adherence to international standards on the use of harmful drugs and chemicals in food

<sup>4</sup> *Diet, nutrition and the prevention of chronic diseases*. Report of a joint FAO/WHO Expert Consultation, WHO Technical Report Series 916. Geneva, World Health Organization, 2003 (<http://www.fao.org/DOCREP/005/AC911E/AC911E00.HTM>).

<sup>5</sup> Note: WHO/FAO dietary guidelines (WHO/FAO, 2003) recommended saturated fat intakes of less than 10% of total energy, and protein intakes amounting to 10-15% of total energy. For an average 65kg woman, this is approximately 40-54g protein a day, and for a man 48-66g.

<sup>6</sup> *Global health risks: mortality and burden of disease attributable to selected major risks*. Geneva, World Health Organization, 2009.

<sup>7</sup> McMichael A, Campbell-Lendrum D. Climate change. In: Ezzati M et al., eds. *Comparative quantification of health risks: global and regional burden of disease due to selected major risk factors*, Geneva, World Health Organization, 2004.

<sup>8</sup> Carlsson-Kanyama A and González A D. Potential contributions of food consumption patterns to climate change. *American Journal of Clinical Nutrition*, 2009, 89 (suppl):1704S–9S.

<sup>9</sup> *The state of food and agriculture: livestock in the balance*. Rome, Food and Agriculture Organization, 2009.

production (internationally and locally). Adequate food and nutrition policies have been given significant importance because of the current millennium development goal 1: eradicate extreme poverty and hunger by 2015.

**1. Health outcomes related to nutritional status that can measure health outcomes directly affected by access to food (quantity) and by quality of food consumed.**

Purpose of indicator – health issue to be monitored	Proposed indicators
Anaemia is associated with increased risk of maternal mortality. Iron deficiency anaemia is the most prevalent micronutrient deficiency that reduces work capacity of individuals and entire populations, with serious consequences for the economy and national development.	<ul style="list-style-type: none"> <li>▪ Prevalence of anemia in women of reproductive age;</li> </ul>
Stunting is the result of long-term nutritional deprivation and often results in delayed mental development, poor school performance, and reduced intellectual capacity.	<ul style="list-style-type: none"> <li>▪ Prevalence of stunting in children under 5 years;</li> </ul>
Childhood obesity is associated with a higher probability of obesity in adulthood. Excess weight and obesity are major determinants of many noncommunicable diseases, including coronary heart disease and stroke, and increased risks of cancer and diabetes.	<ul style="list-style-type: none"> <li>▪ Prevalence of obesity in children under 5 and in adults.</li> </ul>

**2. Quality and type of food available as a determinant of food security and nutritional status**

Purpose of indicator – health issue to be monitored	Proposed indicators
The prevalence of high saturated-fat diets is linked to cardiovascular disease and increased obesity risks, <sup>10</sup> and in the case of red meat, increased risk of colorectal cancer as well as association with total mortality. <sup>11,12,13,14,15</sup> Most saturated fat is from animal sources; <sup>16</sup> substitution with other types of dietary fat and protein (e.g. nuts, fish, poultry) has been linked to reduced coronary heart disease risks. <sup>17</sup> Red meat production requires significantly more GHG emissions per protein unit produced than protein sources such as soy/wheat as well as certain types of fish and fowl. <sup>18</sup>	<ul style="list-style-type: none"> <li>▪ % of total daily energy intake from saturated fats; and % of total daily energy intake from protein in adults;<sup>19,20</sup></li> </ul>

<sup>10</sup> *Diet, nutrition and the prevention of chronic diseases*. Report of a joint WHO/FAO expert consultation. Technical report series 916. Geneva, World Health Organization, 2003 (<http://www.fao.org/DOCREP/005/AC911E/AC911E00.HTM>).

Purpose of indicator – health issue to be monitored	Proposed indicators
To measure access to adequate protein sources, whether they are animal, fish, or vegetable-based;	<ul style="list-style-type: none"> <li>Protein supply - (crops, livestock, fish) grams/capita/per day;<sup>21</sup></li> </ul>
To measure access to a diverse diet – important to prevention of malnutrition and to a healthy micronutrient balance that can help prevent nutrition-related noncommunicable diseases;	<ul style="list-style-type: none"> <li>WHO Household Dietary Diversity Score (HDDS);<sup>22</sup></li> </ul>
To measure food safety as well as market/institutional capacity to ensure food safety;	<ul style="list-style-type: none"> <li>Prevalence of food borne diseases; and incidence of foodborne disease outbreaks;</li> </ul>
To measure quality of food, and presence of bacteria (pathogenic or resistant to antibiotics), additive and other substances (e.g. pesticides, hormones, antibiotics) in food. Compliance with regulations on microbiological food safety and pesticide residues are also proxy measures of excessive farm worker exposures.	<ul style="list-style-type: none"> <li>Proportion of foods marketed (locally or cross-border) that comply with international trade standards for hormone, pesticide, antibiotic residues as well as other chemical microbiological food safety parameters.</li> </ul>

<sup>11</sup> Teresa N et. al. Meat consumption and colorectal cancer risk: dose-response meta-analysis of epidemiological studies. *International Journal of Cancer*, 2002, 98(2):241-256.

<sup>12</sup> *Food, nutrition, physical activity, and the prevention of cancer: a global perspective*. Washington, DC, American Institute for Cancer Research, 2007.

<sup>13</sup> Friel S. et al. Health and climate change: public health benefits of strategies to reduce greenhouse-gas emissions: food and agriculture. *Lancet*, 2009, 374:2016-2025.

<sup>14</sup> Sinha R, Cross AJ, Graubard BI, Leitzmann MF, Schatzkin A. Meat intake and mortality: a prospective study of over half a million people. *Archives of Internal Medicine*, 2009, 169: 562–71.

<sup>15</sup> Pan A et al. Red meat consumption and mortality. *Archives of Internal Medicine*, 2012, 172(7): 555-563.

<sup>16</sup> Note: Animal products are the primary source of saturated fat in developed country diets, although plant-based sources include coconut, palm oil, and cocoa butter.

<sup>17</sup> Hu FB, Manson JE, Willett WC. Types of dietary fat and risk of coronary heart disease: a critical review. *Journal of the American College of Nutrition*, 2001, 20: 5–19.

<sup>18</sup> Note: In terms of grams protein/per unit of GHG emissions required as inputs, beef production yields significantly less protein than whole wheat, herring and soy, or even eggs and chicken meat.

Carlsson-Kanyama A and González A D. Potential contributions of food consumption patterns to climate change. *American Journal of Clinical Nutrition*, 2009, 89 (suppl):1704S–9S.

<sup>19</sup> *Diet, nutrition and the prevention of chronic diseases. Report of a Joint FAO/WHO Expert Consultation*. WHO Technical Report Series 916. Geneva, World Health Organization, 2003(<http://www.fao.org/DOCREP/005/AC911E/AC911E00.HTM>).

<sup>20</sup> Note: WHO/FAO, 2003 recommended saturated fat intakes of less than 10% of total energy intake and protein intakes amounting to 10-15% of total energy intake. For an average 65kg woman, this would translate into approximately 40-54g of protein a day, and for a man 48-66 grams.

<sup>21</sup> Reported by FAO: <http://faostat3.fao.org/home/index.html#VISUALIZ>.

<sup>22</sup> WHO HDDS is a summing up (using 24 hrs recall) of how many of the 12 food groups were consumed by members of the household: Cereals, Fish and seafood, Root and tubers, Pulses/legumes/nuts, Vegetables, Milk and milk products, Fruits, Oil/fats, Meat, poultry, offal, Sugar/honey, Eggs, Miscellaneous. ([www.who.int/entity/nutrition/EB128\\_18\\_backgroundpaper4\\_nutrition\\_indicators.pdf](http://www.who.int/entity/nutrition/EB128_18_backgroundpaper4_nutrition_indicators.pdf)).

### 3. Health and equity impacts of agricultural policies

Purpose of indicator – health issue to be monitored	Proposed indicators
To monitor the presence of agriculture policies that explicitly consider food and nutrition security and health;	<ul style="list-style-type: none"> <li>• Trade negotiations that routinely assess sustainability impacts, including on food security, health, and equity;</li> </ul>
To monitor regulation of food production processes that impact on public health as well as occupational health, e.g. excessive use of agro-chemicals and use of antibiotics as growth promoters;	<ul style="list-style-type: none"> <li>▪ Number of countries that have phased out use of antibiotics as growth promoters;</li> <li>▪ Number of countries implementing national strategies for integrated pest management (IPM);</li> <li>▪ Number of countries monitoring mortality from pesticide poisonings (intentional and unintentional);</li> </ul>
To monitor accountability to the general (and affected) public about environmental, social, and health impacts of agriculture policies.	<ul style="list-style-type: none"> <li>▪ Results of environmental, social and health impact assessments conducted on agricultural policies; plans and projects are accessible to the public.</li> </ul>

### 3. Feasibility of data reporting

Indicators proposed for monitoring health outcomes related to nutritional status (item 1 above) are widely available and included in most national surveillance systems. Similarly, many of the indicators proposed for monitoring quality of food available as a determinant of food and nutritional security (item 2 above) are also already collected and reported as part of existing health information systems. The collection of data in relation to indicators proposed for monitoring the effectiveness of policies in promoting health and equity considerations will require the establishment of new reporting structures.

### 4. Cross-cutting issues for further consideration

#### Equity

The health impacts of agricultural policies are often disproportionately borne by the most vulnerable populations. Data collection systems therefore need to allow for a sufficient level of disaggregation of information (e.g. gender, age, etc.) so as to allow for meaningful analysis of impacts of policies on equity and human well-being. In addition, health impact assessment can be a useful tool for examining how health risks and benefits are distributed.

#### Linkages with other sector policies and themes in Rio+20

Many of the human health and environmental sustainability issues relevant to food and agriculture policies are directly relevant to the other sector themes being discussed in the context of Rio+20, for example, water, cities, and energy (particularly in the context of biofuels). Cross-sectoral linkages and common environment and health issues (for example, that might emerge in the context of urban agriculture and spatial planning in cities) should be considered where relevant and to the maximum extent possible.

## Climate change

Climate change will increase the risk of hunger and undernutrition over the next few decades and will challenge the realization of the human rights for health and adequate food. With a change in patterns of extreme events such as heat waves, droughts, floods, and other disasters, vulnerable communities will suffer serious setbacks in terms of food and nutrition security.

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