

Beyond nutrition and agriculture policy: collaborating for a food policy

Derek Stewart^{1,2*}, Anne Kennedy³ and Anthony Pavel⁴

¹*Environmental and Biochemical Sciences, The James Hutton Institute, Dundee DD2 5DA, Scotland, UK*

²*BioForsk Nord-Holt, PO Box 2284, Trømso, Norway*

³*Market and Industry Services Branch, Agriculture and Agri-Food Canada, 1341 Baseline Road, Ottawa, ON, Canada K1A0C5*

⁴*Morgan, Lewis & Bockius LLP, 1111 Pennsylvania Avenue NW, Washington, DC 20004, USA*

(Submitted 7 October 2013 – Final revision received 1 July 2014 – Accepted 9 July 2014)

Abstract

Global interest in food policy is emerging in parallel with mounting challenges to the food supply and the rising prevalence of diet-related chronic health conditions. Some of the foundational elements of food policies are agricultural practices, finite resources, as well as economic burdens associated with a growing and ageing population. At the intersection of these interests is the need for policy synchronisation and a better understanding of the dynamics within local, regional and national government decision-making that ultimately affect the well-being of the populous and the safety, quality, affordability and quantity of the food supply. Policies, synchronised or not, need to be implemented and, for the food industry, this has seen a myriad of approaches with respect to condensing complex nutritional information and health claims. These include front and/or back of pack labelling, traffic light systems, etc. but in general there is little uniformity at the more regional and global scales. This translation of the nutritional and health-beneficial messages accompanying specific products to the consumer will undoubtedly be an area of intense activity, and hopefully interaction with policy makers, as the food industry continues to become a more global industry.

Key words: Oats: Food policy: Nutrition: Agriculture

Consumer choices of lifestyle, diet and food have moved beyond personal preferences and are now societal concerns as the prevalence of diet-related chronic disease has reached epic proportions. According to the Centers for Disease Control and Prevention, obesity affects more than one-third of adults living in the United States⁽¹⁾ – and the trend is not limited to North America but is now presenting itself in both developed and developing nations throughout the world⁽²⁾. In Europe, more than 50% of the adult population is now overweight and adult obesity rates exceed 20% in many European Union (EU) Member States⁽³⁾. Obesity-related conditions include heart disease, stroke, type 2 diabetes and certain types of cancer. These diet-related chronic conditions contribute to escalating health-care costs, declining productivity and waning quality of life for millions of people across the globe^(3,4).

While health-care professionals, governments and advocacy groups acknowledge the role diet plays in the development of chronic disease and want to help consumers make better food choices, efforts to help consumers shift their eating patterns towards healthier choices have had limited

long-term success. Concerns have been raised that agriculture policies and the food industry are not helping these efforts. A lack of understanding and trust between the health sector and the agri-food sector appears to prevent them from collaborating to create opportunities to produce and supply healthier foods acceptable to consumers in order to shift population health outcomes. Considering the global attention being paid to the health and food continuum, such collaborative efforts are logical – yet there remains a hesitancy to partner to ensure sustainable agriculture that contributes to health and well-being, possibly due to the different underpinning drivers for the health and agri-food industry sectors⁽⁵⁾.

Drivers of nutrition policy

Nutrition and the importance of diet on health came to prominence during World Wars I and II, when limited food access and reliance on ration coupons heightened awareness of the consequences of malnutrition and nutrient deficiencies. Health professionals addressed this concern by promoting ways to maximise nutrient intakes, including the promotion

Abbreviations: AAFC, Agriculture and Agri-Food Canada; CAP, Common Agricultural Policy; EU, European Union; FOSHU, Food for Specified Health Uses; MACSUR, Modelling European Agriculture with Climate Change for Food Security; NSLP, National School Lunch Program; QHC, qualified health claims; USDA, US Department of Agriculture.

* **Corresponding author:** D. Stewart, fax +44 844 928 5429, email derek.stewart@hutton.ac.uk

of 'victory gardens' and recommended minimum intakes, particularly for group-feeding situations and ration coupons. With advances in nutrition science and development of nutrition policies, including food fortification, once-common diseases of vitamin deficiency, including pellagra, rickets, scurvy and beriberi, were virtually eliminated⁽⁶⁾. Industrialisation and growing urbanisation in the 1950s and 1960s led to more attention focused on preserving and assuring the safety of the food supply and preventing the adulteration of food products, by using chemical and microbial testing and policies on compositional standards.

In the 1970s, nutrition policy shifted from compositional concerns to clarifying the relationship between nutrition and diet-related chronic diseases. Considerable effort has been expended in identifying and documenting food–health relationships and translating these relationships into nutrition policy statements. In many developed countries, including the United States, Canada and the United Kingdom, dietary guidelines based on epidemiological findings, clinical research and consensus panels are used to shepherd population-based eating patterns. Dietary guidelines encourage consumers to eat more of certain types of foods (such as fruits and vegetables) but less of specific food components (such as saturated fat, *trans*-fat and salt)⁽⁷⁾. In general, these guidelines or policies are drawn up at the national level – there is not a 'joined-up' policy for the EU, for example⁽⁸⁾, although recently an EU Health Policy Forum⁽⁹⁾ has been created to discuss and

initiate a 'policy way forward' focused on promoting good health through various regulatory, fiscal, empowerment and media-based means. It is important to note that all foods contain components the consumption of which is encouraged and others that should be limited.

Labelling tools (such as the mandatory Nutrition Facts Panel in the United States) build on dietary guidelines by helping consumers determine whether foods contain a little or a lot of specific nutrients. These labelling policies are synergistic with public-health awareness campaigns and are intended to assist consumers' food-purchasing decisions. In the United States, health claims were authorised for use on product labels through the Nutrition Labelling and Education Act of 1990. Claims move beyond the factual quantitative content and provide manufacturers with an option to inform consumers of more specific health benefits associated with the food. The wording of the health claim is dependent on the strength of the available scientific evidence substantiating the food–health relationships⁽¹²⁾. For example, a health claim could be generic to all whole grains such as 'whole grains reduce the risk of coronary heart disease' or product specific such as '1 muffin (Xg) with oat bran provides X% of the daily amount of the fibres shown to help lower cholesterol'⁽¹³⁾. In all cases, health claims require the food to meet specific criteria or conditions of use^(12,13,14).

Box 1: An example of national dietary guidelines: the United States

The 2010 US Department of Agriculture (USDA) Dietary Guidelines contain twenty-three specific recommendations to achieve a healthy diet⁽⁷⁾. One example is to replace refined-grain foods with whole-grain foods such as oatmeal and rolled oats, so that at least half of the recommended total grain intake is composed of whole grains. Whole grains are a source of several nutrients and may help manage body weight and reduce the risk of CVD via several constituent-derived means (see Table 1). For example, oatmeal represents a source of K (40 mg) and dietary fibre (3.9 g) and contains modest amounts of Ca (21 mg), Fe (approximately 1.7 mg) and folate (13 µg) in a single 40-g serving; thus oatmeal is considered a nutrient-dense food, given its low energy value (615 kJ (147 kcal))^(8,10).

The Dietary Guidelines are the foundation of almost all federally funded nutrition policies in the United States. Education materials, communication messages, school and other group feeding and assistance programmes such as the Supplemental Nutrition Assistance Program and the Women, Infants and Children Program translate the guidelines into consumer food choices or messages to encourage healthier eating patterns. Foods identified as 'healthy' in the guidelines would be included as a desirable food choice in schools, worksites, assisted-living residences, hospitals and restaurants that are complying with the Dietary Guidelines⁽¹¹⁾.

Box 2: Health claims – United States and United Kingdom

The Food and Drug Administration claims⁽¹⁵⁾

Health claims: soluble fibre from certain foods and risk of CHD (21 Code of Federal Regulations (CFR) 101.81)

Model claim (for oats)

To qualify for the health claim, the whole oat-containing food must provide at least 0.75 g of soluble fibre per serving. The amount of soluble fibre needed for an effect on cholesterol levels is about 3 g/d. Adding whole-oat flour to the list of substances eligible to be the subject of a claim means that many products will qualify for the claim, thus making it possible that oat-containing products could be consumed as many as four times a day. Soluble fibre must be β-glucan from oat bran, rolled oats or oatmeal, or oat flour. Oat bran must contain 5.5% β-glucan and oatmeal and oat flour must contain 4% β-glucan.

The Joint Health Claims Initiative claim⁽¹⁶⁾

Generic health claim: the inclusion of oats as part of a diet low in saturated fat and a healthy lifestyle can help reduce blood cholesterol

Claim relates to whole oats, oat bran, rolled oats and whole-oat flour. β-Glucan soluble fibre may serve as a marker for the oat product that is the subject of the claim where oat bran provides at least 5.5% β-glucan, rolled oats and whole-oat flour and rolled oats (oatmeal) at least 4.0% β-glucan. Products carrying the claim should contain at least 0.75 g β-glucan soluble fibre per serving and state what each serving provides in terms of the 3 g suggested daily intake for effectiveness.



Table 1. Oat-derived health benefits as approved by selected regulatory authorities

	United States	European Union	Other
Reduced risk of CHD	To qualify for the health claim, the whole oat-containing food must provide at least 0.75 g soluble fibre per serving. The amount of soluble fibre needed for an effect on cholesterol levels is about 3 g/d. Adding whole-oat flour to the list of substances eligible to be the subject of a claim means that many products will qualify for the claim, thus making it possible that oat-containing products could be consumed as many as four times a day. Soluble fibre must be β -glucan from oat bran, rolled oats or oatmeal, or oat flour. Oat products such as oat bran, rolled oats and whole-oat flour must contain a minimum of 5.5 % of β -glucan ^(15,65) .	The food constituent, oat β -glucan, which is the subject of the health claim, is sufficiently characterised. The claimed effect is 'oat β -glucan can actively lower/reduce blood LDL and total cholesterol'. The target population was specified by the applicant as the general population, and in particular, people with an increased risk of hypercholesterolaemia. Lowering blood LDL-cholesterol concentrations is a beneficial physiological effect by decreasing the risk of CHD. A cause-and-effect relationship has been established between the consumption of oat β -glucan and lowering of blood LDL-cholesterol concentrations. The following wording reflects the scientific evidence: 'Oat β -glucan has been shown to lower/reduce blood cholesterol. Blood cholesterol lowering may reduce the risk of (coronary) heart disease'. Foods should provide at least 3 g of oat β -glucan per d. This amount can reasonably be consumed as part of a balanced diet. The target population is adults who want to lower their blood-cholesterol concentrations ⁽⁶⁶⁾ .	Australia and New Zealand ⁽⁶⁷⁾ β -Glucan reduces blood cholesterol. The food must contain: (a) one or more of the following oat (or barley) foods: (i) oat bran; (ii) whole-grain oats or (iii) whole-grain barley; and (b) at least 1 g per serving of β -glucan from the foods listed in (a). Canada ⁽¹³⁾ β -Glucan oat fibre (from eligible sources) to a reduced risk of heart disease by lowering blood-cholesterol levels. The food must meet the following qualifying criteria: Contain at least 0.75 g β -glucan oat fibre per reference amount and per serving of stated size from the eligible sources; Contain at least 10 % of the weighted recommended nutrient intake of a vitamin or a mineral nutrient per reference amount and per serving of stated size; Contain 100 mg or less of cholesterol per 100 g of food; Contain 0.5 % or less of alcohol; Contain 480 mg or less of Na per reference amount and per serving of stated size, and per 50 g if the reference is 30 g or less and Meet the definition of 'free of SFA' or 'low in SFA'. In 2002, Sweden became one of the first countries to allow legal health claims on products in Europe. This was initiated in 2003 and focused on 'Primaliv' yoghurt, a combination of yoghurt and muesli with oat β -glucans. The product claimed to 'reduce the blood sugar level after a meal' ⁽⁶⁸⁾ . In an article on Swedish Health Claims and Food, Asp ⁽⁶⁸⁾ reported that 'The expert panel, appointed by the research committee of the Swedish Nutrition Foundation, concluded that the documentation supports a claim that the product lowers, smooths or attenuates the blood glucose level after a meal.'
Increased satiety and postprandial glycaemic responses	The claimed effect is 'carbohydrate metabolism and insulin sensitivity'. The target population is assumed to be individuals who wish to reduce their postprandial glycaemic responses. In the context of the proposed wordings, it is assumed that the claimed effect refers to the reduction of postprandial glycaemic responses. Reduction of postprandial glycaemic responses (as long as postprandial insulinaemic responses are not disproportionately increased) may be a beneficial physiological effect. A cause-and-effect relationship has been established between the consumption of β -glucans from oats and barley and a reduction of postprandial glycaemic responses. The following wording reflects the scientific evidence: 'Consumption of β -glucans from oats or barley contributes to the reduction of the glucose rise after a meal.' In order to obtain the claimed effect, 4 g of β -glucans from oats or barley for each 30 g of available carbohydrates should be consumed per meal. The target population is individuals who wish to reduce their postprandial glycaemic responses ⁽⁶³⁾ .		

It is worth noting that in the United States, following a 1999 court decision (*Pearson v. Shalala*, 164 F.3d 650 (D.C. Cir. 1999)), so-called 'qualified health claims' (QHC) became permitted, allowing for certain claims to be made, with appropriate qualification, based on the level of scientific support for the claim. These QHC present a regulated means for providing consumers with health benefits of a food ahead of broad scientific consensus, which may take many years to achieve. By way of example, in 2004, the Food and Drug Administration authorised the following QHC for walnuts: 'Supportive but not conclusive research shows that eating 1.5 oz/d of walnuts, as part of a low saturated fat and low cholesterol diet and not resulting in increased caloric intake, may reduce the risk of CHD. See nutrition information for fat (and energy) content.' Even with the Food and Drug Administration-mandated qualification, an increase in walnut sales, paralleling that of almonds, was observed following the introduction of the walnut QHC⁽¹⁷⁾.

In Japan, health claims are regulated by the Ministry of Health, Labour and Welfare through the Food for Specified Health Uses (FOSHU) programme, which began in 1991⁽¹⁸⁾. Approval by FOSHU, like the EU system overseen by the European Food Safety Authority, requires effectiveness based on scientific evidence with clinical studies, studies outlining human safety, and a detailed and analytical description of the functional components⁽¹⁹⁾. It is worth noting that the FOSHU system has come in for some criticism, as some of its approved products are sold in the form of confectionery and soft drinks, and this has been viewed as sending a rather mixed message about 'junk food'⁽²⁰⁾.

Recently, 'front-of-pack' statements and symbols are being used to draw additional attention to nutrition information and health claims. For example, the Whole Grains Council (US based, with international affiliates) has developed a wheat-sheaf stamp to help consumers identify products that contain whole grains and fibre⁽²¹⁾. The front-of-pack message is typically much simpler than the longer statements associated with health claims, and this simplification is highlighted as a way forward in the recent review that stated that the presentation of the health claim needs to be clear and unambiguous but that enhancing the communication of scientific evidence to improve consumer understanding of food health claims is also crucial⁽²²⁾. However, there is little uniformity in the front-of-pack labelling, and in the United States, the Food and Drug Administration has issued concern over potential consumer confusion resulting from the many different front-of-pack schemes, such as the now-defunct Smart Choices⁽²³⁾. Health advocates' attempts to simplify nutrition messages so that they resonate with consumers have had only limited success^(24,25). Interestingly, in the United Kingdom, the front-of-pack nutritional labelling issue was the focus of intense debate between the industry and the Food Standards Agency, and through active discussion, there is now a system in place. This identifies the gross nutritional content (energy, fat, saturates, salt and sugars), the contribution (%) of each to the adult reference intake and a traffic light colour coding of green/amber/red identifying the health perspective. A red colour coding means the food or drink is

high in this nutrient and the consumer should try to consume these foods less often or eat them in small amounts. Conversely, a green coding represents a low-nutrient level and is the healthier choice with respect to this component.

In spite of considerable effort trying to raise awareness and knowledge of healthy eating, nutrition policies have had questionable success in encouraging consumers to align their food-selection preferences with dietary recommendations. Rarely is a purchase made based on any single characteristic, such as nutrition (although price is a primary determinant)⁽²⁶⁾. Consumer-purchasing behaviour is complex, involving numerous trade-offs of the attributes desired on a specific shopping occasion. Nutrition must compete with other attributes that align with consumers' values, perceptions or knowledge. Recent global public-opinion surveys identified a shift in preferences towards social consciousness including fair trade, environmental sustainability (green movement), vegetarianism, locally produced, farm-animal welfare and method of production. For example, in 2011, over 20 000 products were launched with sustainability claims/logos – significantly greater than the 1200 products in 2006⁽²⁷⁾. Ensuring consistent definitions and interpretations for environmental or production practices remains a challenge; the Barilla Centre for Food and Nutrition has created the Double Food – Environmental Pyramid model, which is a unique attempt to link well-being with environmental impact⁽²⁸⁾.

While consumers articulate that specific factors are important, the actual purchasing behaviour indicates that price remains a primary consideration both for retail and food service purchases⁽²⁹⁾. Perceptions of value may, however, be more influential than price alone. Value considers the balance between price, quality and how a product fits into a consumer's culture, lifestyle and social consciousness. These issues are well beyond the scope of nutrition policy and tend to be associated with agriculture and economic development policies.

Drivers of agriculture policy

As consumers become more socially conscious, their values and purchasing decisions are able to influence food-production practices and agricultural policy by shifting the market demand. Agricultural policy has, at least since the post-war period, been focused on maximising production yield using new technologies, feeds, fertilisers and varietal selection practices to suit specific land and climate conditions. The need to ensure adequate production is firmly established as agriculture was first required to feed the needs of the immediate family, and then expanded to meet the needs of people living in increasingly larger, urban geographic areas. Agriculture policies vary across countries, but tend to be focused on stabilising production levels and farm incomes to ensure land remains in production by offering protection against production losses for specified perils (such as weather, pests and disease), disaster-relief funds, access to capital to support innovation and market access, as well as research to address production challenges.

Today, in addition to its role in satisfying global food requirements, agriculture remains a source of economic



stimulus and the primary employer for many rural areas and developing countries. However, agriculture has had to contend with the anticipated consequences of climate change, global population expansion (nine billion by 2050), restrictions on water and nutrient inputs and pest management/crop protection, recently summarised by Pretty *et al.*⁽³⁰⁾ outlining the top 100 questions of importance to the future of global agriculture.

Agricultural policy can also influence the production of specific crops through a variety of means. Policies aimed at stabilising production and income can take a number of forms – for example, in the United States, feed grains (such as maize), wheat, rice, soybeans and peanuts are subsidised by the USDA Farms Service Agency's Commodity Credit Corporation⁽³¹⁾. Similarly, price controls of various commodities work to encourage the planting and development of certain crops by providing income stability. Where such programmes exist, funding allocation is a complex mix of economics, politics and influence. In the United States, there has been significant debate over the subsidies directed to maize, which, in addition to feed and food-use subsidies, is eligible for fuel ethanol subsidies under the Energy Policy Act of 2005. Influencing the allocation of such programmes is a difficult and potentially costly task. However, the impact of these programmes cannot be questioned, with approximately eighty million acres of land planted to maize in the United States⁽³²⁾.

With current global economics, many of the price-support programmes with their origins in the 1920s are being re-examined and debated. While there is certainly pressure to reduce agricultural subsidies, reform also presents an opportunity for smarter subsidy and tax programmes as drivers for increased production of healthful grains and foods.

It is clear from Stewart & McDougall⁽¹⁰⁾ that these measures have either failed or not been fully utilised with respect to oats and the associated supply chain, as global oat production fell from 46.9 metric ton in 1961 to 19.6 metric ton in 2010.

In addition to direct subsidy programmes, agricultural policy may be influenced by affiliated government nutrition programmes. In the United States, the National School Lunch Program (NSLP) was created in 1946 after World War II, in part as a direct response to poor nutrition or diet-related health conditions identified in soldiers entering the military during the War. NSLP spent about US \$11 billion in 2011. As NSLP defines what foods are eligible for inclusion, it can be a powerful driver for agricultural and food production. By way of example, NSLP recently implemented requirements for certain amount of whole-grain-rich foods in the programme⁽³³⁾. Nutrition programmes such as NSLP can serve to drive demand for healthy agricultural products and are intended to establish healthy eating preferences later in life.

Additional drivers of agricultural policy, where available, are government research and promotion programmes. The USDA's Agricultural Marketing Service administers the Federal Research and Promotion Programs in the United States, which are authorised by federal legislation and designed to strengthen the position of the industry in the marketplace and to maintain and expand domestic and foreign markets. The programmes are funded by industry assessments, with

Board members nominated by industry and appointed officially by the Secretary of Agriculture. There are currently eighteen Federal Research and Promotion Programs in the United States, for commodities including beef, eggs, honey, peanuts and even popcorn. Notably, in the United States, industry is free to propose the establishment of new Federal Research and Promotion Programs.

Recently in the EU, as part of the push for Horizon 2020⁽³⁴⁾, a different approach has been taken via initiatives called Entrepreneur and Innovation Platform, one of which is focused on 'agricultural productivity and sustainability'⁽³⁵⁾. This initiative embraces agriculture *per se* and is not commodity specific. Its higher aims are to provide a working interface between agriculture, bio-economy, science and others at the EU, national and regional level, ultimately promoting productivity and efficiency of the agricultural sector and ensuring agricultural sector sustainability. The delivery of this is planned to be through a combination of measures such as access to finance and business services and the development and deployment of an innovation policy, most likely by public–private partnerships.

These programmes, both US and EU, act to build relationships with food service organisations, manufacturers and other programmes and end users in order to help promote and grow the market for the relevant commodity.

However, food production is no longer focused on domestic markets. A major paradigm shift has been local access to foods that were produced globally. Oranges, for example, are no longer an exotic gift limited to Christmas time but are now available globally, 12 months of the year. The influx of imported foods from countries with varying standards of living and food-safety protocols makes it difficult for locally produced foods to compete on price alone. Shifts in the export/import trade balance also influence domestic food policy. While some areas are focused on applying modern biotechnology to maximise the yield per acre to meet population projections^(36,37), the Common Agricultural Policy (CAP) in Europe favours conventional practices; concern over market access in Europe is influencing global food-production practices⁽³⁸⁾. However, CAP reform is in hand with the recent statement by Dacian Cioloş⁽³⁹⁾, European Commissioner for agriculture and rural development, highlighting a new direction within CAP for agriculture in terms of food safety, climate change, growth and jobs in rural areas, while ensuring that it will strengthen the position of farmers within the sustainable food-production chain. This is supported in the EU by horizon scanning by pan-European research programmes such as Modelling European Agriculture with Climate Change for Food Security (MACSUR)⁽⁴⁰⁾, which is consolidating national efforts on agriculture and climate-change modelling with the aim of synergistic outputs and strategies for long-term sustainability.

Furthermore, the UK recently launched a UK Agritech Strategy⁽⁴¹⁾, which highlights sustainable intensification (sustainable agricultural intensification is defined as producing more output from the same area of land while reducing the negative environmental impacts and at the same time increasing contributions to natural capital and the flow



of environmental services⁽⁴²⁾ in combination with the translation of scientific innovation, including modern genetic and breeding approaches, to improve the quality, sustainability, resilience and yield-led profitability of crops as a way forward.

Socially conscious consumers are examining agricultural production practices and increasing the demand for attributes such as organic, antibiotic-free or environmentally sustainable, creating niche markets for these products. However, the ability to increase production beyond this level is limited by consumer reluctance or inability to pay more for these products. These costs are often associated with consumer demands that contribute to agricultural practices that actually decrease yield per hectare, and add expenses tied to various types of certifications (such as organic, locally grown and sustainability assessments). A 2012 survey by the Conference Board of Canada indicates that even the most affluent consumers who indicate that they value sustainable production were reluctant to pay even 10% more for these products⁽⁴³⁾. This carries over to food service as well; restaurant patrons across all income levels were only willing to pay slightly more for local (community defined) and sustainable ingredients (without federal definition or acceptable statements).

The conflict between what consumers say they want and what they purchase also applies to healthy foods. Food manufacturers are frequently accused by health professionals of not offering healthier food choices. However, attempts to introduce new 'better-for-you' foods frequently fail, despite financial investments in product development, marketing and advertising. If food producers and manufacturers are to be encouraged to focus on health over other product attributes, then they need to be convinced that there is a viable market for these products. A 2013 survey suggests that only two-thirds of Americans read the nutrition facts table (67%) and only half read ingredient lists or cooking instructions (52 and 45%, respectively)⁽⁴⁴⁾. It goes without saying that health attributes alone will not be enough; they must be embedded with organoleptic (taste) attributes that appeal to consumers. Indeed, Winkler⁽⁴⁵⁾ takes this further, and the bull by the horns, by highlighting that some groups of the population are simply not engaged with healthy food, others have different priorities (e.g. sensory) regarding food and some feel this perceived medicalisation of food and associated nutritional advice is overbearing. All of these opinions need to be borne in mind when devising strategies to develop and market a health food product.

One example where agriculture has excelled at introducing health attributes is in the development of a new variety of 'hullless' oats, which offers a wide range of benefits to producers, processors and consumers alike. Developed by Agriculture and Agri-Food Canada (AAFC), this new class of oat, which is both hullless and free of surface-borne hairs, eliminates the need for de-hulling and addresses a major health challenge (skin irritations) faced by growers and processors during harvesting, handling and processing of the grain⁽⁴⁶⁾.

Unique tracking and tracing protocols are applied to hullless oats to ensure identity preservation. Expanding traceability protocols were proposed in a recent submission to the Food and Drug Administration by the Institute of Food

Technologists⁽⁴⁷⁾. Importantly, uncontaminated oats (namely, oats that are not exposed to quantities of other grains such as wheat, barley, rye, triticale and kamut) are suitable for most people with coeliac disease or wheat sensitivities, and greatly expand their food choices⁽⁴⁸⁾. The new lines of oat are stimulating new product-development opportunities, including Campbell's⁽⁴⁹⁾ disaster-relief soup, a Canadian product called Nourish. Although current regulations exclude the product for making a coeliac health claim in Canada, the Canadian Celiac Disease Association supports the consumption of these oats by those presenting with this condition⁽⁵⁰⁾.

Although frequently criticised as marketing rhetoric, access to health claims can stimulate the development of innovative food products with health attributes. A report prepared for the AAFC confirmed that access to health claims resulted in new product development by both small and large manufacturers, typically increasing per-capita consumption initially and can influence production acreage as a result of increased product demand⁽⁵¹⁾. However, the ability to sustain these impacts was product specific and price premiums typically fell over time, making it difficult for manufacturers to recoup their investment in research and product development.

The food industry has been under increasing pressure to reformulate many products to reduce nutritional hazards such as *trans*-fat and Na, introduce healthier product lines and improve the nutritional information available to consumers. In addition, many businesses have responded to pressure to improve their advertising and marketing practices – especially for children – to reduce exposure to messages that feature unhealthy foods⁽⁵²⁾, for example as part of the Responsibility Deal in England⁽⁵³⁾. While voluntary efforts have been recognised as being successful in shifting the food supply to lower the level of *trans*-fat and Na, many health-professional and consumer-advocate groups continue to lobby for a legislative approach that would mandate specific levels for food. This approach is unpopular with some consumers, who find it paternalistic if not draconian – although it is welcomed by others. Furthermore, as more governments experience financial burdens, adding new legislation is unlikely to be forthcoming since the government would assume the enforcement and compliance costs.

Drivers of regulatory policy

Regulatory policy decisions are increasingly being examined for their alignment with broad government directions and leadership decisions, impact on human-resource capacity and infrastructure requirements. For example, Canada's Economic Action Plan focuses on stimulating the economy and balancing the budget, and influences regulatory modernisation efforts to enhance efficiencies, eliminate 'red tape' for business and reduce cumulative regulatory burden⁽⁵⁴⁾. Strategic investments are being used to promote innovation, address regulatory overlap and duplication, and related compliance requirements. Adding issue-specific regulations is unlikely to gain much traction in this environment. Some alternative approaches have been forwarded in the EU by modifying the CAP, such as reducing the subsidy to producers of fatty



products (beef and dairy), increasing the production of monounsaturated and polyunsaturated vegetable oils, increasing the availability of fruit and vegetables to the not-for-profit sector through subsidies, and encouraging the cereal sector to produce food for human consumption⁽⁵⁵⁾. Indeed, oats *per se* may benefit as one element of the proposed CAP reform focuses on crop diversification: a farmer must cultivate at least two crops when his or her arable land exceeds 10 ha and at least three crops when the arable land exceeds 30 ha⁽⁵⁶⁾. In practice, this may mean that main cereal (wheat and barley) growers might choose oats as a third crop to increase their diversification.

When examining regulatory policy, the various administrative, policy and economic goals must be considered. Well-constructed regulatory policies can assist business by setting standards and creating a uniform playing field – of relevance here is the definition of ‘whole grains’, which in the United States is through regulatory guidance. In the United States and Canada, regulatory policy is also informed by (and in certain cases may be initiated at the request of) industry, academia, non-governmental organisations and consumers through notice and consultation. The fact that the development of regulatory policy can (generally) be actively participated in can provide a powerful tool in driving the development of a rubric for the promotion and expansion of healthful foods and ingredients. However, the predictability and timeliness of developing new regulations and particularly legislation are frequently hurdles.

Governments tend to favour a risk-management approach to address policy issues. Risk-management plans are dependent on the availability of information and science to assess the magnitude of risk and the appropriate level of response required to minimise or contain the risk. Because there are always information gaps and levels of uncertainty, engaging consumers in policy debates is an important component of risk management. Selecting the appropriate instrument to achieve the desired policy result is a fundamental requirement of the risk-management plan, as is alignment with international trading partners. Those unfamiliar with policy development may not realise that establishing new legislation or amending existing regulations is last on the list of available options to be considered; before a regulatory approach is used, consideration must first be given to using voluntary policy means such as self-regulation, codes of practice, guidelines, information and education, economic instruments, equivalency agreements and collaborative approaches. Furthermore, prescriptive regulations are being replaced by performance-based regulation, prompted in part by a need to keep pace with emerging science.

Collaborating to develop food policy

In 1981, a landmark report by the Organisation for Economic Cooperation and Development revealed that wealthier populations were not necessarily healthier populations⁽⁵⁷⁾. While many factors contribute to this situation, one that was elevated in this report was the fragmented nature of government policy. Three decades later, others are echoing

the report’s recommendation to put an end to isolated policy development and establish an integrated approach to agri-food and health policies⁽⁵⁸⁾. An integrated agri-food and health policy or ‘food’ policy should seek to improve the health of the country’s population, while strengthening the economic well-being of the agriculture and food sector; a good example of this is the Scottish food and drink policy, *Recipe for Success*, which sees national health and nutrition intimately linked to economic development⁽⁵⁹⁾. However, for this to happen, it will be necessary to change the relationship between stakeholders to accomplish more together.

One of the challenges in working together is that agriculture policy is anchored in economics while nutrition and health policy tends to have a more social perspective leaning. Learning to embrace the logic and vocabulary of each sector is essential if common ground is to be identified.

Developing a win–win–win scenario for population health, agriculture and the consumer is dependent on whether stakeholders can establish trust to accomplish a mutually supportive goal⁽⁶⁰⁾. While consumers’ dietary options depend on what the food industry produces and sells, what the industry produces and sells depends on consumer demand – and the reality of this cyclical relationship is that consumers demand both healthy and unhealthy options⁽⁴³⁾. In order to shift the demand for foods that are part of healthier eating patterns, the health and agri-food sectors need to work collectively to establish a mutually acceptable goal⁽⁵⁾.

Examples of successful collaborations exist. South Australia has developed a 5-year strategic plan that acknowledges agriculture’s economic contributions and encourages new product development that recognises a shift in consumer preferences towards healthier, nutritional and ethical food choices⁽⁶¹⁾. The combined nutrition and health/agricultural sustainability focus has resonated with stakeholders along the future of food-production systems⁽⁶²⁾.

Food industry needs support and recognition for the financial investments associated with new product development and reformulation. A simple shift to include more whole grains in a food product can trigger new supplier arrangements, recipe modifications, nutrient analysis, label modifications and inventory management challenges. Each step requires additional capital and expertise that add to the cost of doing business in a highly competitive sector. Health professionals and consumer advocates need to recognise that the food industry is accepting the full financial burden associated with the development of new, healthier food options that conform to dietary recommendations but may not be acceptable to consumers. Acknowledging the investment risks and working collaboratively to raise consumer demand for nutritionally desirable food choices will encourage industry to expand the category of ‘better-for-you’ products.

In order to shift food production and consumption patterns, industry and agribusiness need to actively collaborate with health professionals, legislators and regulators to develop food policy decisions that can be implemented in a cost-effective and meaningful manner. Agricultural organisations and associations can provide valuable information on

food-production practices, food safety and quality assurance procedures and business-risk management that can be accommodated to promote sustainable change. Considerable effort will be required to construct a dialogue that goes beyond rhetoric and provides clear examples and opportunities to achieve common goals with acceptable transition periods and a range of implementation strategies rather than prescriptive approaches that do not keep pace with scientific and technological innovations. One way to address perceptions that policy approaches are co-opted by lobby groups (representing health coalitions or business interests) is to publicise participant lists, terms of reference and decision-making procedures. Collaborative, transparent research initiatives that address policy gaps are possible, such as those that comply with the CONSolidated Standards of Reporting Trials (2010) Statement⁽⁶³⁾ and respect the responsible conduct of research such as guidelines available from the Canadian Tri-Agency Framework: Responsible Conduct of Research⁽⁶⁴⁾. By exchanging information and building on areas of expertise, synergies can be established that expand consumer access to healthy food choices and shift consumption patterns. Collaborating on research that explores the food–health relationship and consumer behaviour is one obvious place to start.

Conclusion

Years of credible research on agricultural practices and nutrition policy development have addressed specific policy issues but rarely have they been applied to inform broader policy discussions. Unfortunately, nutrition policy has been largely unsuccessful in influencing the consumer behaviour, in part because recommendations focus on isolated nutrients and specific food–health relationship, but largely ignore the social/cultural aspects of eating, regulatory environment and prescribed food standards that guide food selection and availability. Furthermore, agricultural practices have been developed almost exclusively to address economic problems, without adequate consideration for consumer preferences and perceptions or population health. Consumers are frequently overwhelmed by shifting and conflicting information. Greater collaboration and the development of a common goal between the agriculture and health sectors could increase consumer access to a broader range of sustainable food choices that align with the dietary guidelines for healthy eating⁽²⁸⁾. A review of agriculture and nutrition policy approaches is needed to identify new opportunities to develop a synergistic approach that addresses health as well as supports sustainable agriculture.

Acknowledgements

D. S. is part of the QUOATS Consortium (<http://www.quoats.org>) that is jointly sponsored by BBSRC, DEFRA, SG-RESAS, WAG, AHDB and industry partners. D. S. acknowledges grant-in-aid and contract research funding from SG-RESAS for strategic research and MACSUR (<http://www.macsur.eu>) activities, respectively. A. K. is an employee of AAFC.

The views expressed in this article are those of the author(s) and do not necessarily reflect the position or policy of the government of Canada.

The authors' contributions are as follows: A. K. prepared the first draft of the paper. D. S. and A. P. provided international perspective and content for the tables. All authors reviewed and commented on the paper.

A. K. and A. P. do not have any conflicts of interest. D. S. received an honorarium from Quaker Oats Company (a subsidiary of PepsiCo, Inc.) for attending a workshop in May 2012 to discuss the content of the supplement, and The James Hutton Institute received an unrestricted grant from the Quaker Oats Company.

This paper was published as part of a supplement to *British Journal of Nutrition*, publication of which was supported by an unrestricted educational grant from Quaker Oats Co. (a subsidiary of PepsiCo Inc.). The papers included in this supplement were invited by the Guest Editor and have undergone the standard journal formal review process. They may be cited.

The Guest Editor to this supplement is Roger Clemens. The Guest Editor declares no conflict of interest.

References

- Ogden CL, Carroll MD, Kit BK, *et al.* (2012) Prevalence of Obesity in the United States, 2009–2010. *NCHS Data Brief* No. 82 **2012**, 1–8.
- de Onis M, Blössner M & Borghi E (2010) Global prevalence and trends of overweight and obesity among preschool children. *Am J Clin Nutr* **92**, 1257–1264.
- Organisation for Economic Co-operation and Development (OECD) (2012) *Obesity Update 2012*. OECD, Paris, France. <http://www.oecd.org/dataoecd/1/61/49716427.pdf> (accessed September 2013).
- Gotay CC, Katzmarzyk PT, Janssen I, *et al.* (2013) Updating the Canadian obesity maps: an epidemic in progress. *Can J Public Health* **104**, e64–e88.
- Nugent R (2011) *Bringing Agriculture to the Table: How Agriculture and Food Can Play a Role in Preventing Chronic Disease*. Chicago, IL: Chicago Council on Global Affairs.
- Kessler D (1995) The evolution of national nutrition policy. *Annu Rev Nutr* **15**, xiii–xxvi.
- US Department of Agriculture and US Department of Health and Human Services (2010) *Dietary Guidelines for Americans*, 7th ed. USA, Alexandria, USA. <http://www.cnpp.usda.gov/dietaryguidelines.htm> (accessed May 2013).
- Caraher M, Crawley H & Lloyd S (2009) *Nutrition Across the UN: A Briefing Paper*. The Caroline Walker Trust: Abbots Langley, UK. <http://www.cwt.org.uk/> (accessed August 2014).
- European Commission (2013) The EU Health Policy Forum http://ec.europa.eu/health/interest_groups/eu_health_forum/policy_forum/index_en.htm (accessed September 2013).
- Stewart D & McDougall G (2014) Oat agriculture, cultivation and breeding. *Br J Nutr* **112**, S50–S57.
- Beets MW (2011) Nutritional policies and standards for snacks served in after-school programmes: a review. *Public Health Nutr* **14**, 1882–1890.
- FDA (2007) *Guidance for Industry: Evidence-Based Review System for the Scientific Evaluation of Health Claims*. Food and Drug Administration, College Park, USA. <http://www.fda.gov/OHRMS/DOCKETS/98fr/FDA-2007-D-0371-gdl.pdf> (accessed August 2013).

13. Health Canada (2010) *Oat Products and Blood Cholesterol Lowering – Summary of Assessment of a Health Claim about Oat Products and Blood Cholesterol Lowering*. Ottawa: Health Canada.
14. European Commission (2010) Regulation 1926/2006 on nutrition and health claims made on foods. <http://www.efsa.europa.eu/en/topics/topic/nutrition.htm> (accessed January 2013).
15. Food and Drug Administration (2008) §101.81 *Health Claims: Soluble Fiber from Certain Foods and Risk of Coronary Heart Disease (CHD)*, chapter I. Washington, DC: US Access Board (4 January 2008 Edition, 21 CFR).
16. JHCI (Joint Health Claims Initiative), 2006. *Generic Claims–Oats and Reduction of Blood Cholesterol*. JHCI, Leatherhead, UK. <http://webarchive.nationalarchives.gov.uk/nobanner/20130404135254/http://www.jhci.org.uk/approv/Final%20expert%20report%20050606.doc> (accessed August 2014).
17. USDA (2010) *Tree Nuts: World Markets and Trade*. USDA Foreign Agricultural Service, Washington DC, USA. http://www.fas.usda.gov/http/horticulture/Tree%20Nuts/2010_10_TreeNuts.pdf (accessed May 2013).
18. Crowe KM & Francis C (2013) Position of the academy of nutrition and dietetics: functional foods. *J Acad Nutr Diet* **113**, 1096–1103.
19. Shimizu T (2003) Health claims on functional foods: the Japanese regulations and an international comparison. *Nutr Res Rev* **16**, 241–252.
20. International Association of Consumer Food Organisations (1999) *Functional Foods: 21st Century Health Boon or 21st Century Quackery?*. Washington, DC: IACFO.
21. Whole Grains Council (2006) <http://wholegrainscouncil.org/whole-grain-stamp> (accessed June 2013).
22. Nocella G & Kennedy O (2012) Food health claims – what consumers understand. *Food Policy* **5**, 571–580.
23. FDA (2009) *Smart Choices Letter*. <http://www.fda.gov/Food/IngredientsPackagingLabeling/LabelingNutrition/ucm180146.htm> (accessed August 2014).
24. Institute of Medicine (2012) *A Front-of-Package Nutrition Rating Systems and Symbols: Promoting Healthier Choices*. Washington, DC: The National Academies Press. <http://www.iom.edu/Reports/2011/Front-of-Package-Nutrition-Rating-Systems-and-Symbols-Promoting-Healthier-Choices.aspx> (accessed September 2013).
25. Ellen A, Wartella EA, Lichtenstein AH, *et al.* (2013) *Committee on Examination of Front-of-Package Nutrition Rating Systems and Symbols (Phase II)*. Washington, DC: The National Academies Press (Institute of Medicine). http://www.nap.edu/catalog.php?record_id=12957 (accessed September 2013).
26. European Food Information Council (EUFIC) (2005) *EUFIC Review 4/2005, The Determinants of Food Choices*. The European Food Information Council, Brussels, Belgium. <http://www.eufic.org/article/en/expid/review-food-choice/> (accessed August 2014).
27. Mintel (2012) *Global New Products Database*. Mintel Group Ltd London, UK. <http://www.mintel.com/global-new-product-database> (accessed August 2014).
28. Barilla Centre for Food and Nutrition (2012) *Double Pyramid 2012: Enabling Sustainable Food Choices*. Fondazione Barilla centre for Food and Nutrition, Parma, Italy. <http://www.barillacfn.com/en/position-paper/buono-per-te-sostenibile-per-pianeta-modello-doppia-piramide/> (accessed August 2014).
29. International Food Information Council (2013) <http://www.foodinsight.org/foodandhealth2013.aspx> (accessed June 2013).
30. Pretty J, Sutherland WJ, Ashby J, *et al.* (2010) The top 100 questions of importance to the future of global agriculture. *Int J Agric Sustain* **8**, 219–236.
31. USDA (2012) *FY 2012 Budget Summary and Annual Performance Plan*. USDA Washington DC, USA. <http://www.obpa.usda.gov/budsum/FY12budsum.pdf> (accessed August 2014).
32. USDA Economic Research Service (2013) *Background: Corn*. USDA Washington DC, USA. <http://www.ers.usda.gov/topics/crops/corn/background.aspx> (accessed August 2014).
33. Food and Nutrition Service (FNS), USDA (2012) Nutrition standards in the National School Lunch and School Breakfast Programs. Final rule. *Fed Reg* **77**, 4088.
34. European Commission (2011) *Horizon 2020 – The Framework Programme for Research and Innovation. European Commission COM(2011) 808 Final*. Brussels, Belgium. http://ec.europa.eu/research/horizon2020/pdf/proposals/communication_from_the_commission_-_horizon_2020_-_the_framework_programme_for_research_and_innovation.pdf#view=fit&pagemode=none (accessed August 2014).
35. European Innovation Partnership (2012) Agricultural productivity and sustainability. <http://ec.europa.eu/agriculture/eip/> (accessed September 2013).
36. Ingram JSI, Gregory PG & Izac A-M (2008) The role of agronomic research in climate change and food security policy. *Agric Ecosyst Environ* **26**, 4–12.
37. Foley JA, Ramankutty N, Brauman KA, *et al.* (2011) Solutions for a cultivated planet. *Nature* **478**, 337–342.
38. Masip G, Sabalza M, Pérez-Massot E, *et al.* (2013) Paradoxical EU agricultural policies on genetically engineered crops. *Trends Plant Sci* **18**, 312–324.
39. Ciołoş D (2013) *Political Agreement on a New Direction for Common Agricultural Policy*. European Commission: Brussels, Belgium. IP/13/613. http://europa.eu/rapid/press-release_IP-13-613_en.htm (accessed August 2014).
40. Modelling European Agriculture with Climate Change for Food Security (MACSUR). <http://www.macsur.eu/> (accessed August 2014)
41. Willets D, de Mauley R & Greening J (2013) *A UK Strategy for Agricultural Technologies*. London: HM Government.
42. Godfray HC, Beddington JR, Crute IR, *et al.* (2010) Food security: the challenge of feeding 9 billion people. *Science* **327**, 812–818.
43. The Conference Board of Canada (2012) *Improving Health Outcomes: The Role of Food in Addressing Chronic Disease*. Ottawa: The Conference Board of Canada. <http://www.conferenceboard.ca/cfc/research/2012/improvinghealthoutcomes.aspx> (accessed September 2013).
44. International Food Information Council Foundation (2013) *2013 Food & Health Survey: Consumer Attitudes toward Food Safety, Nutrition & Health*. International Food Information Council Foundation, Washington DC, USA. <http://www.foodinsight.org/Content/3840/FINAL%202013%20Food%20and%20Health%20Exec%20Summary%206.5.13.pdf> (accessed August 2014).
45. Winkler J (2013) A brutally pragmatic approach to food. *Br Med J* **346**, 26.
46. Burrows V (2011) Hullless oat development, applications, and opportunities. In *Oats: Chemistry and Technology*, 2nd ed., pp. 31–50 [FH Webster and PJ Wood, editors]. St Paul, MN: American Association of Cereal Chemists.
47. Institute of Food Technologists (2012) *Pilot Projects for Improving Product Tracing along the Food Supply System – Final Report*. Institute of Food Technologists, Chicago, USA. <http://www.ift.org/knowledge-center/focus-areas/food-safety-and-defense/~media/Knowledge%20Center/Focus%20Areas/>

- Traceability/IFT_FDA_ProductTracingPilotsFinalReport.pdf (accessed August 2014).
48. Thompson TN (2004) Gluten contamination of commercial oat products in the United States. *N Engl J Med* **351**, 2021–2022.
 49. Campbell's (2012) *Help Hunger Disappear*. <http://www.campbellsoup.ca/en-ca/alleviating-hunger/help-hunger-disappear> (accessed August 2014).
 50. Rashid M, Butzner D, Burrows V, *et al.* (2007) Consumption of pure oats by individuals with celiac disease: a position statement by the Canadian Celiac Association. *Can J Gastroenterol* **21**, 649–651.
 51. Groenewegen J, Culhane CT, Thompson S, *et al.* (2008) *The Nature and Magnitude of Economic, Business and Market Value Activity Generated by Health Claims along the Agri-Food Value Chain*. Government of Canada, Ottawa. <http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=12356553056543> (accessed January 2013).
 52. Advertising Standards Canada (2010) The Canadian Children's Food and Beverage Advertising Initiative. <http://www.adstandards.com/en/childrensinitiative/default.htm> (accessed May 2013).
 53. Responsibility Deal. <https://responsibilitydeal.dh.gov.uk/> (accessed September 2013).
 54. Treasury Board of Canada Secretariat (2012) *Government Implements One of Many Red Tape Reduction Measures*. Treasury Board of Canada Secretariat, Ontario, Canada. <http://www.reducedtape.gc.ca/heard-entendu/tr/rr-eng.pdf> (accessed August 2014).
 55. Birt C, Maryon-Davis A, Stewart L, *et al.* (2007) *The Impact of the EU Common Agricultural Policy on Public Health*. London: Faculty of Public Health.
 56. European Commission (2013) *CAP Reform – An Explanation of the Main Elements*. European Commission: Brussels, Belgium. (MEMO/13/621) (accessed August 2014).
 57. Organisation for Economic Co-operation and Development (1981) *Food Policy*. Paris: OECD.
 58. Sparling D & Uzea N (2013) *A Different Future for Agriculture – Six Years that Changed Agriculture 2005–2010*. Ivey Business School, London, Canada. <http://sites.ivey.ca/agri-food/files/2012/09/Six-year-brief-in-template-final.pdf> (accessed August 2014).
 59. Scottish Government (2009) *Recipe For Success – Scotland's National Food and Drink Policy*. Edinburgh: Scottish Government.
 60. Sparling D (2012) *A Pathway to a Healthy and Prosperous Future*. London, Ontario: CAPI.
 61. Government of South Australia (2011) *South Australia's Strategic Plan*. Government of South Australia, Adelaide, Australia. <http://saplan.org.au/> (accessed August 2014).
 62. The Government Office for Science, London (2011) *The Future of Food and Farming, Final Project Report*. Government Office for Science, London. <http://www.bis.gov.uk/assets/foresight/docs/food-and-farming/11-546-future-of-food-and-farming-report.pdf> (accessed August 2014).
 63. CONSORT (2010) *CONSORT (CONSolidated Standards of Reporting Trials) 2010 Statement*. <http://www.consort-statement.org/home/> (accessed August 2014).
 64. Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, Social Sciences and Humanities Research Council of Canada (2010) *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans*. Canadian Institutes of Health Research, Ottawa, Canada. http://www.ethics.gc.ca/pdf/eng/tcps2/TCPS_2_FINAL_Web.pdf (accessed August 2014).
 65. FDA (1997) Food Labeling: health claims; oats and coronary heart disease. Final rule. *Fed Reg* **62**, 3583–3601.
 66. EFSA Panel on Dietetic Products, Nutrition and Allergies (2011) Scientific opinion on the substantiation of health claims related to β -glucans from oats and barley and maintenance of normal blood LDL-cholesterol concentrations (ID 1236, 1299), increase in satiety leading to a reduction in energy intake (ID 851, 852), reduction of post-prandial glycaemic responses (ID 821, 824), and 'digestive function' (ID 850) pursuant to Article 13(1) of Regulation (EC) No 1924/2006. *EFSA J* **9**, 2207.
 67. Food Standards Agency Australia and New Zealand (2013) Standard 1.2.7 – nutrition, health and related claims. Federal Register of Legislative Instruments F2013L00054. <http://www.comlaw.gov.au/Details/F2013L00054> (accessed September 2013).
 68. Asp N-G (2002) Health claims within the Swedish Code. *Scand J Nutr* **46**, 131–136.