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PILLAR 3

STATE OF THE ART

SUSFOODBEL
Transitioning to healthy diets from sustainable food systems in Belgium: Priority policy actions and their multiple sustainability impacts

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[Introduction]

Globally, food systems contribute to 25-30% of greenhouse gas (GHG) emissions and most of biodiversity loss. They use 40% of the earth's surface and 70% of freshwater resources and are a major polluter of terrestrial and aquatic systems. In Belgium about 20% of total GHG emissions are linked to the food system (including 10% due to agricultural production). Creating sustainable healthy diets will be key to transition to a carbon-neutral society in Belgium. In this project, such diets will be defined using the EAT Lancet planetary health diet recommendations adapted to the Belgian context. This project will identify, using novel tools and processes, priority policies impacting on the food environment (i.e. the interface where people interact with the wider food system to acquire and consume foods), and their dietary trajectory scenarios (i.e. reducing animal protein intakes, increasing fruit and vegetable intakes, among others) to shift towards sustainable healthy diets in Belgium. The project will measure multiple sustainability impacts of transitioning from current diets to (more) sustainable healthy diets, as well as the contributions of the identified priority policies and dietary trajectory scenarios to realize such a transition. Sustainability impacts will include environmental impacts (i.e. ecosystem quality, human health, resource depletion) and diverse social and socioeconomic impacts (i.e. consumer's diets, diet cost and affordability, health and health inequalities, and health care costs and expenditures). Concrete policy recommendations will be formulated for the federal Government, taking into account their estimated sustainability impacts, as well as diverse implementation considerations (i.e. consumers' acceptability, barriers and enablers to policy implementation, synergies and trade-offs across actors, policy domains and governance levels and (in)coherences across policy actions identified). The tools and processes used in the project, such as the food policy index, the business impact assessment on population nutrition and the environment and a tailor-made LCA-based sustainability impact assessment framework can support the federal Government to track progress over time on the transition to sustainable healthy diets and to estimate the different sustainability impacts of future proposed policies.

[State of the art]

Globally, we know from a range of international studies that food systems across the entire value chain contribute to 25-30% of greenhouse gas (GHG) emissions and most of biodiversity loss. They use 40% of the earth's surface and 70% of freshwater resources and are a major polluter of terrestrial and aquatic systems (1) (2) (3) (4). We have already crossed four planetary boundaries, in which respect we operate beyond the Earth's carrying capacity (5). A recent study has linked the projected population growth, within the current food system, to an additional 50% - 90% increase in environmental impact (6). Environmental pollution increases the risk of certain non-communicable diseases (NCDs) (7).The majority of GHG emissions due to the global food system are related to livestock production, and a minor, but growing, share from food distribution and retail (8) (9). In Belgium about 20% of GHG emissions are due to the food

system (including 10% due to agricultural production)(10) (8). A sustainable food system should deliver food security and nutrition for all in a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised (11). Clearly, the current Belgian food system does not yet comply with this conception of sustainability.

Sustainable healthy diets promote all dimensions of health and wellbeing, have low environmental impact, and are accessible, affordable, safe, equitable, and culturally acceptable (12).

The EU *Farm to Fork Strategy* (13), which is at the heart of the EU Green Deal (14), aims to make Europe the first climate-neutral continent by 2050. It recognizes links between healthy people, healthy societies and a healthy planet, and is central to achieve the Sustainable Development Goals (SDG) (13). In Belgium, the federal long-term vision for sustainable development specifies that ' *in 2050 diets will not have a negative impact on health, nor on the environment due to healthy food products, an integrated agricultural production and less food waste*' (15). The transition to a carbon neutral society will not happen without a significant shift in people's diets, as producers are limited in how far they can reduce impacts (16,17). While 20% of food produced in the EU is wasted, half of EU adults are now overweight (13). In Belgium, NCDs, of which most are diet-related, account for the largest part of the disease burden (87% of all deaths and 85% of Disability-Adjusted Life Years (DALYs) in 2019) and disproportionally affect disadvantaged groups (18) (19) (20). The related SDG target 3.4 (reducing premature mortality due to NCDs for people <65years by 25% by 2030) likely won't be met (21). While the total economic burden of NCDs in Belgium is yet to be estimated, Sciensano estimated that €3.3 billion (representing 13.5% of public health care costs) annually is spent on the direct costs of overweight and obesity (22). Suboptimal diet is a key preventable cause of obesity and NCDs (4) (23). Belgian diets do not meet (inter)national dietary guidelines (12) (24) (2). Less than 10% of Belgians meet the recommended fruit and vegetable intakes (25), mean intake of legumes and meat substitutes is low (4g/day) (25), and Belgians consume on average 111g/day of meat (25) (of which 66g/day of processed meat (25) while the Superior Health Council (SHC) recommends intakes of max 30g/week (24)). In addition, on average one third of daily energy intake is from ultra-processed food products in Belgium, with highest intakes among young children (3-9 years)(26).

The contributions of dietary factors to the NCD burden have not yet been estimated in Belgium, but a framework has been developed by Sciensano as part of the Belgian national Burden of Disease (BeBOD) study (27). Using EFSA's Comprehensive Database, 12 food groups were previously ranked by the DALYs from NCDs in 16 countries, including Belgium (28). Health effects of higher adherence to plant-based diets in Belgium were previously estimated, but focused on specific diets (i.e. Mediterranean diet) only (29). Globally, adopting healthy, plant-based diets could avert over 10 million annual deaths (2) while climate-induced changes in diets and weight status could cause over 500 000 deaths by 2050, largely due to risk factors related to low fruit and vegetable consumption (30).

Socioeconomic factors, such as education and income, are a main driver of dietary inequalities (31). Food cost and affordability are key determinants of dietary habits, especially for the lowest income groups (32).

Sciensano previously estimated that healthy diets are significantly more expensive than current Belgian diets across age groups (33) (34) (35) (36). For example, for adults, diets meeting guidelines for vegetables were 20% and for fruits 10% more expensive than diets not meeting those guidelines (34), and diets with a larger caloric share of ultra-processed foods were significantly cheaper than those with a lower contribution of these products, while the opposite was found for unprocessed and minimally processed foods (33). The cost of more sustainable diets in Belgium has not yet been estimated. A few global studies compared affordability of sustainable diets across world regions (37) (38) (39). In some European countries, the environmental impact of diets (40) (41) (42) (43) (44) (45) (46), and the potential impact of fiscal policies to stimulate sustainable diets (47) (48), has been estimated. For example, adhering to Dutch dietary guidelines was found to lower the environmental impact of diets (49). However, meeting both dietary and selected environmental targets required substantial decreases (<33%) in beef, pork, cheese, snacks, and butter consumption and increased intake (>150%) of legumes, fish, nuts, vegetables and soy products (50).
In the UK, diets with a 57 % reduction in GHG emissions have been found sufficiently affordable, of nutritious quality and hence achievable across income groups (44). Usually higher intakes of healthy foods improve environmental sustainability, but ultra-processed foods high in sugar, salt and/or saturated fats may have relatively low environmental impacts (51) (52).

The Global Syndemic Lancet report highlighted that obesity, food insecurity and climate change have common drivers and solutions (1). Triple-duty policies are needed to tackle what the report coins as '*The Global Syndemic*' (1). Supporting governments in the specifics and prioritization of such policies is important (53). At the EU level, the Common Agricultural Policy is the main policy in terms of budget spent, but nutritional and environmental objectives are also dealt with in various other laws and at national and regional levels. For example, fiscal policy is mainly a national competence. The EU *Farm to Fork Strategy* (13), including the ambition to build an EU-wide legislative framework for sustainable food systems, has the potential to provide the overarching policy frame that is required, but still includes diverse challenges (54) (55) (56) (57). A Healthy Food Environment Policy Index (Food-EPI) (58) has been developed by the International Network for Food and Obesity/NCDs Research, Monitoring and Action Support (INFORMAS) to assess, through engagement with stakeholders and experts, the extent of implementation of recommended food environment policies. The outputs of the Food-EPI include an evidence document on food environment policies implemented, a scorecard on extent of implementation of policies and a set of recommendations (59). The Food-EPI has been implemented in more than 40 countries (excluding Belgium). Food environments are defined as the physical, economic, political, and sociocultural contexts in which consumers engage with the food system (11) (60). Food environments include aspects related to food reformulation, labeling, marketing, prices, retail, procurement, and availability in various settings (58). Sciensano previously evaluated, using the Food-EPI (61), government policies impacting on food environments at the EU level (62) (63) and across 11 European countries (64), extracting key priorities for future implementation to create healthy food environments. These assessments did not include policies related to environmental sustainability (65)(66)(61)(67)(68)(69)(59)(62)(70)(63). Because the Food-EPI only focuses on reducing diet-related NCDs, the coordinator is currently developing a novel food policy

index to evaluate governments' efforts to create sustainable healthy diets supported by a grant from IDRC (71).

Despite the negative impacts of current diets on health and the environment, transnational food companies have been remarkably profitable (72). These companies actively perpetuate poor diets by marketing unhealthy foods (73). Furthermore, through corporate political activities, the food industry blocks or stagnates public policies to prevent NCDs (74,75) or to reduce red and processed meat consumption (76). Food companies shape the market and influence consumers' dietary choices through the types and nutritional composition of the food they produce as well as through their choice of suppliers, production methods, packaging and marketing practices, among others. As part of the Farm to Fork Strategy (13) an EU code of conduct for responsible business and marketing practices (77) was recently developed to stimulate companies to make commitments, focusing among others on food environments: reformulating foods in line with guidelines for sustainable healthy diets, adapting marketing strategies taking into account the needs of the most vulnerable groups, and ensuring that food price campaigns do not undermine citizens' perception of the value of food.
Sciensano recently assessed, using the Business Impact Assessment on Obesity and Population Nutrition (BIA-Obesity)(78), the nutrition-related commitments and practices from the largest Belgian food companies in four sectors: packaged food manufacturers, non-alcoholic beverage manufacturers, supermarkets and quick service restaurants (79) (80). Sixty % of companies participated actively in data collection. The BIA-Obesity scores were rather poor; especially efforts to reduce unhealthy food marketing and to improve healthy food accessibility were found limited. All companies received tailored recommendations to improve their commitments and practices (81). Similar assessments were conducted in France (82) and at the European level (83). An evaluation of the Australian BIA-Obesity found that companies perceived benchmarking as helpful to provoke improvements in their commitments and practices (84). Supported by an IDRC grant (71) environmental sustainability indicators were developed (BIA-Sustainability). The environmental sustainability-related commitments and practices from the companies previously assessed and complemented with the largest companies in the catering sector, are currently being analyzed.

In the SUSFOODBEL project, we will repeat the BIA-Obesity, and enrich it with indicators evaluating the protein transition (going from 60/40 animal-based/plant-based protein to 40/60 in favor of plant-based protein). This new focus follows from the importance of reducing animal-based protein in our diets both from an environmental sustainability as from a health point of view.

Apart from governments and the industry, consumers are also an important stakeholder in the transition to healthy, sustainable diets. Consumers' food choices and their resulting dietary patterns are determined by drivers across different levels (85). Here, a distinction is usually made between individual factors (the micro-level), social factors (meso-level) and societal factors (macro-level). While considerable amount of research has already been conducted on factors across these levels, the need for multi-level approaches, including the consideration of trade-offs and synergies, is becoming increasingly apparent. Different policy measures can

be used to induce change in consumer behaviour across these levels. To support policymakers, a number of empirical studies have been conducted in Belgium. Most of the research on this topic, conducted in Belgium, has focussed mainly on the individual level, adopting a goal-directed perspective. For instance, some studies evaluated the potential effect of labels such as Nutri-Score and Eco-Score, demonstrating the risk of information-overload linked to the display of multiple labels at the same time (86–90). However, more stringent policy interventions in Belgium in have received remarkably little attention in the scientific literature. A practical explanation for this is that it is usually very difficult, if not impossible, to set up experiments with fiscal- or restrictive measures in real market environments. This makes it difficult to consider an integrated policy approach. In a virtual supermarket environment, however, these hurdles could to some extent be eliminated, while preserving realistic testing environments with representative food products and retail prices. A virtual supermarket keeps track of time spent shopping, products purchased, shopping budget and total expenditures. All data is digitally stored and automatically sent to a web server (91). A Dutch validation study showed that food purchasing behaviour in the virtual supermarket is comparable to real-life food purchasing behaviour (92).

Besides behavioural effectiveness, determinants of public acceptance of policy interventions have widely been studied. An integrative framework has recently been developed for the anticipation of this acceptance, incorporating public desire for governmental support (93). An application of such a systematic framework to the integral set of policy interventions in the food environment has, to the best of our knowledge, not yet been applied in Belgium. However, the eventual implementation of policy measures strongly depends on this public acceptance. It is therefore useful to provide insights, by means of a large survey.

To measure the impact of dietary trajectory scenarios and priority policies, life cycle thinking is often used. This approach includes the economic, environmental, and social consequences of a product or process throughout its life. This is based on theory and aims to explore ways to enhance and minimize the effects of goods and services throughout their entire life cycle, starting from the extraction of raw material, through processing stages, transformation , distribution, use and, end-of-life (94). Environmental-Life Cycle Assessment (LCA) refers to the compilation and evaluation of all the emissions and resources used in relation to a particular product or service (95). Traditionally it considers indirect environmental impacts on three endpoints, i.e. ecosystem quality, natural resources, and human health (95) (96). Among the LCA tools, E-LCA is the most developed, rests on a broad scientific consensus, and is standardized in ISO 14044:2006. International guidelines are available (97) (98) (99) and E-LCA is supported by professional software (SimaPro, GaBi, OpenLCA) and several databases (ecoinvent, Agri-footprint, World LCA database). Some databases specific to food products, such as the French database Agribalyse, are also available. Practical implementation may still pose some challenges due to lack of reliable data, or technical challenges such as allocation and weighting (97) (100).Traditional E-LCA considers indirect environmental impacts affecting human health (among also ecosystem quality and resource depletion) (101). However, sustainability impact assessment requires a broader scope including direct impacts on consumers (i.e. health impact of current less healthy diets) (102). As the endpoint human health (i.e. indirect impacts from particulate matter exposure) is expressed in disability-adjusted life years (DALYs), this metric can be

combined with the direct impact of diets on human health (also expressed in DALYs) that can be estimated using the BeBOD framework.

There has not been a systematic E-LCA on the entire Belgian food system or population diet. A recent modeling study from WWF, however, using the EFSA's European Food Consumption database, showed that diets meeting both environmental and nutritional targets could reduce the carbon footprint of the diet of a Belgian family of four from 16.7 kg CO2-eq/day to 8.0 kg CO2eq/day (103). Previous studies assessed environmental impacts of production of specific foods (104) (105) (106) (107) (108) (109) (110) (111) (112) (113) and university meals (88) (114).

For the SUSFOODBEL project, we aim to create a framework to measure multiple sustainability impacts of transitioning from current diet to sustainable healthy diets. The framework will be developed based on the UNEP-SETAC framework for LCA (115), other existing frameworks (e.g., H2020 REPAIR) and taking advantage of knowledge acquisition in running projects (e.g., H2020 GLOPACK, H2020 ORIENTING). This is a widely recognized and recommended approach for conducting LCA. This work was achieved thanks to the association of the United Nation Environmental Program and the Society of Environmental Toxicology and Chemistry. It offers a standardized, comprehensive, and scientifically rigorous approach that supports informed decision-making, facilitates comparisons, and promotes sustainability across various industries and sectors. Existing frameworks focus on impact assessment of specific products or services in some sectors with a few assessing impacts of scenarios at national level for some sectors such as energy or transport, however not for population diets (116). There is currently no life cycle inventory database available specifically for Belgium. To calculate the impacts we will therefore rely on other existing databases, such as Agribalyse (117) and Ecoinvent (96). A careful selection of impact categories and methods for a holistic assessment needs to be done, based on ISO 14044:2006, and starting from those included by the European Commission ILCD Handbook (97), the European Commission JRC Product Environmental Footprint method (98) and Environmental FootPrints Pilot work (120), and the UNEP Guidance for Life Cycle Impact Assessment Indicators (99).Some specific recommendations for analyses related to the environmental impact of food also exist and will be taken into account(121). Some specific LCA methods such as ReCiPe can be used. ReCiPe is a Life Cycle Impact Assessment method, which translates emissions and resource extractions into different environmental impact scores by means of so-called characterization factors. The characterization factors represent the impact intensity of a substance relative to a common reference substance for an environmental footprint impact category. For example, in the case of calculating climate change impacts, all greenhouse gas emissions inventoried are weighted in terms of their impact intensity relative to CO2, which is the reference substance for this category. (For example, the characterization for methane equals 25 CO2 equivalents compared to the 1 CO2 equivalent of 1 CO2).There are two mainstream ways to derive characterization factors, i.e. at midpoint and endpoint level. ReCiPe calculates 17 midpoint and 3 endpoint indicators. Midpoint indicators focus on single environmental problems, such as climate change or acidification. Endpoint indicators show the environmental damage to higher aggregation levels. Converting midpoints to endpoints simplifies the

interpretation but increases uncertainty of results. Regarding the measurement of direct biodiversity impacts, there is the problem of immaturity of existing methods and the lack of international consensus on this topic (122). However, multiple impact categories have an indirect effect on biodiversity, e.g. climate change, water use, eutrophication, acidification, eco-toxicity, and land use. Of these, land use is perhaps the one single stressor having a major impact on habitat degradation and potential biodiversity loss (123). Ongoing research in the H2020 Orienting project, on including biodiversity impacts in LCA, will be followed.

Aims

The aim of the project is to provide policy options to the federal government to support its federal health and nutrition plan (under construction). These policy recommendations are grounded on a measure of impacts to our food system and to our health of transitioning to sustainable healthy diets – as defined in the EAT recommendations[1].

The key objectives are:

1) To identify priority policies and their dietary trajectory scenarios based on a novel food policy index, a business impact assessment on population nutrition and the environment, a representative consumer survey and consumer experiments;
2) To develop and apply a tailor-made LCA-based sustainability impact assessment framework to assess multiple sustainability impacts of selected priority policies and dietary trajectory scenarios;
3) To conduct, for the priority policies, a systemic exploration of trade-offs and synergies across actors, policy domains and governance levels, and of in(coherences) across those priority policies.

Expected impact

Food systems and their health, economic, environment and sociocultural outcomes are high on the sustainable development agenda. The project will contribute, among others, to the goals set out in the EU Green Deal (European Farm to Fork Strategy) (13) and the related Code of conduct for responsible food business practices (77)), the climate convention and the Paris Climate Agreement, the Sustainable Development Goals, the UN Decade of Action on Nutrition (2016-2025), the Belgian One Health Network (BEOH) and the WHO's NCD action plan (124). It will also contribute to the federal nutrition and health plan (under development) and the strategic federal long term vision for sustainable development (2050)(15), in particular the following goals:

[1] The report aimed to address the challenges of providing nutritious food for a growing global population while minimizing the environmental impact of food production. They introduced a concept called the "Planetary Health Diet," which is designed to promote both human health and environmental sustainability. It suggests that a healthy and sustainable diet should mainly consist of plant-based foods while including modest amounts of animal-source foods.

- *Everyone will have access to safe, healthy and nutritious food.*
- *The social and environmental impact of our modes of food production and consumption will be significantly reduced.*

The project will be valuable for updating the Superior Health Council food-based dietary guidelines (FBDG)(24) to better incorporate sustainability aspects taking into account specific evidence for Belgium. The current FBDG, updated in 2019, include some sustainability considerations but have not performed any modelling or analyses using Belgian data to derive recommendations for healthy sustainable diets. Aligning FBDG with the latest evidence on the wider social and environmental implications of dietary choices is primordial for enabling policy coherence and the formulation of policies to address public health as well as environmental sustainability. A recent global analysis quantitatively analyzed the health and environmental implications of 85 FBDGs internationally (for Belgium only the regional FBDG and not the latest national FBDG were taken into account) and showed that about one third of national FBDG (29, 34%) were incompatible with the agenda on NCDs (124), and most (57 to 74, 67% to 87%) were incompatible with the Paris Climate Agreement and other environmental targets.
Adoption of the EAT-Lancet planetary health diet recommendations (2) within FBDG was associated with 34% greater reductions in premature mortality, more than three times greater reductions in GHG emissions, and general attainment of the global health and environmental targets (125).

Concrete policy recommendations will be formulated for the federal Government, taking into account their estimated sustainability impacts, as well as diverse implementation considerations (i.e. consumers' acceptability, barriers and enablers to policy implementation, synergies and trade-offs across actors, policy domains and governance levels and (in)coherences across policy actions identified). It is anticipated that this project will result in a proposal for a national agenda with concrete priority actions to create healthy diets from sustainable food systems.

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