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Fiscal policies to promote environmentally sustainable food production and consumption: A scoping review protocol

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BACKGROUND

Climate change has been declared a public health emergency by the World Health Organization (World Health Organization, 2021). The effects of climate change have already begun to have increasingly dire consequences on food security, dietary quality, and human health and disease (IPCC, 2019). Concurrently, two other major diet-related health challenges—obesity and undernutrition—are on the rise and are expected to be compounded by climate change via impacts to food and agriculture, transportation, urban design, and land use (Swinburn et al., 2019).

The global food system can play a key role in addressing all three of these major and intersecting global health challenges. Currently, it is estimated that the global food system contributes to approximately one-third of global greenhouse gas emissions (Crippa et al., 2021). However, if radically transformed, our food system can play a key role in both mitigating climate change and contributing to long-term population and planetary health. Therefore, it is critical to investigate how a major global transition towards healthier and environmentally sustainable eating behaviors and food systems can be achieved in the coming decades.

Among various strategies, implementing fiscal policies such as food taxes and subsidies has been suggested as one approach to make this transition (Fanzo, 2021; T. Searchinger et al., 2019; T. D. Searchinger et al., 2020). A recent United Nations report found that nearly 90% of the \$540 billion in global subsidies (e.g., fiscal support for sugar, beef, milk, rice) given to farmers every year are harmful to both human health (i.e., higher chronic disease risk) and planetary health (i.e., higher greenhouse gas emissions, increased deforestation) (FAO et al., 2021). The report further suggests that repurposing agricultural support (i.e., subsidies) can drive a transformation towards healthier, more sustainable, and more equitable food systems (FAO et al., 2021).

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The objective of this scoping review is to examine food taxes and subsidies and their environmental outcomes by incorporating evidence from the peer-reviewed literature and evidence from the non-peer-reviewed or ‘grey’ literature, including policy documents/briefs, research reports, and white papers. The scoping review questions are:

1. What food taxes and subsidies have been studied in the context of environmentally sustainable food production or consumption?
2. What types of environmental outcomes were reported?
3. At what various levels (e.g., food production-, food outlet-, consumer-level) were the policies implemented?

METHODS

Inclusion Criteria

The following inclusion criteria will be used to select studies:

Concept

The core concept examined by this scoping review is the content and nature of any food tax or subsidy¹ that has been proposed or implemented with the intention of promoting pro-environmental food production or consumption (i.e., food production or consumption that is relatively favorable for the environment in comparison with behavior that serves the same primary function) and its impact on environmental outcomes. Further, this scoping review will

¹ Food tax refers to the imposition of compulsory levies on individuals or organizations for a specific food product, food group, or agricultural commodity. Food subsidy refers to a direct or indirect payment to individuals or organizations from the government (or a targeted tax cut) for a specific food product, food group, or agricultural commodity.

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identify the various levels at which the fiscal policies were implemented (e.g., food production-, food outlet-, consumer-level).

Type of Studies

We will include observational (prospective and retrospective cohorts, cross-sectional, longitudinal, ecologic), experimental (randomized, non-randomized), and modelling studies. We will exclude reviews, meta-analyses, qualitative studies, commentaries, conference abstracts, and study protocols. Articles will be restricted by year of publication, from 2010 to present.

Type of Participants

In this scoping review, there are no exclusion criteria for the type of participants that can be included in the studies. Individuals, groups, communities, countries, or regions may be included.

Type of Policies

The criteria for including a study in this scoping review are that it:

- i. is either an empirical or modelling study;
- ii. examines a tax or subsidy on:
 - a. a specific food product, such as rice, soybeans, beef;
 - b. a specific food group, such as animal-based foods, grains, dairy;
 - c. a specific agricultural commodity (i.e., crops and livestock) produced with the intention of becoming a source of food, such as corn, sugar cane, cattle; or
 - d. a specific food product, food group, or agricultural commodity as defined by its relation to its environmental impact (i.e., climate tax on food), such as food

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groups with above average greenhouse gas emissions or crops that require high land and water use; and

- iii. assesses the effect of the tax or subsidy on at least one environmental outcome, such as change in greenhouse gas emissions, air pollution, biodiversity, or land use.

General agricultural subsidies or food taxes will be excluded. Subsidies for agricultural inputs such as seeds, fertilizers, pesticides, herbicides, animal feed, drugs, machinery, and fuel that aim to improve agricultural productivity will be excluded.

Context

The context includes any setting where food taxes or subsidies that aim to promote pro-environmental food production or consumption have been proposed or implemented (e.g., in specific cities, countries, food outlets). There will not be any exclusion based on geographic location.

Sources

The sources of information will include quantitative data from any existing literature (e.g., primary research studies). These studies may be published in academic journals or may be published in grey literature such as policy documents/briefs, research reports, white papers, and dissertations. Studies that report on proposed or hypothetical legislation may be included as long as they meet the eligibility criteria described elsewhere. We will exclude reviews, meta-analyses, qualitative studies, commentaries, conference abstracts, and study protocols.

Search Strategy

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The search strategy includes three primary steps.

First, an initial search was conducted by a research librarian in Scopus between September and October 2021. This search used key terms focused on three areas: food production or consumption (e.g., eating, diet, food), environmental outcomes (e.g., greenhouse gas, climate, carbon), and fiscal policies (e.g., tax, subsidy) (see Appendix I). The text words contained in the title and abstract of retrieved papers and the subject indexing terms used to describe the articles were analyzed by the librarian and the first author.

Second, the librarian and the first author developed the full search strategy using all identified keywords and index terms (where appropriate) selected from the first search in the following databases between October and December 2021: PubMed, Scopus, Web of Science Core Collection, and EconLit. The full search strategy will be executed and the retrieval of records will be completed in January 2022.

We will also seek grey literature such as policy documents/briefs, research reports, and white papers from online databases including Policy Commons, The World Bank Open Knowledge Repository, and OECD iLibrary; websites of government agencies and relevant non-profit organizations such as the Food and Agricultural Organization of the United Nations, World Resources Institute, World Wildlife Fund, TABLE, and International Food Policy Research Institute; and expert opinion through an iterative process.

Lastly, the reference list of the documents included in the review will be searched for additional sources (i.e., backward citation chaining). We will also conduct forward citation chaining via Citation Chaser, which uses the Lens bibliographic database.

Complete search strategies for the searches in PubMed, Scopus, Web of Science Core Collection, EconLit, and Policy Commons are included in Appendix II.

Studies published in the English language will be considered for inclusion in the review. Articles with English language abstracts and full text in other languages will not be included, but those relevant to the research question will be presented in a supplemental table for the benefit of future researchers. Furthermore, this review aims to provide a summary of the literature from approximately the last decade; therefore, only articles that have been published from 2010 to present will be considered for inclusion.

Screening and Data Extraction

The article screening process and the extraction of quantitative data will be carried out using Covidence, an online software tool for title/abstract screening, full-text screening, and data extraction. Each article retrieved by our search strategy will be independently reviewed by two reviewers to determine eligibility at two separate stages: the title and abstract screening stage and the full-text screening stage. Any eligibility discrepancies will be resolved by the first author.

Similarly, two reviewers will extract data independently, and disagreements will be resolved by discussion and consensus with the first author. The following information will be extracted from all included studies:

1. Study authors: the first and last names of the study authors;
2. Author affiliations: the organizations or institutions that the authors report to be affiliated with;
3. Author geographical locations: the countries that the authors report to be affiliated with;
4. Study electronic publication year: the year that the study was published electronically;

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5. Study aim: the study's research aim or objective;
6. Study geographical location and scale: the geographical area where the study took place and the geographical scale at which the policy was implemented or modelled (local, regional, national, or international);
7. Sample size: the number of individuals (or other relevant units of analysis) that were included in the study;
8. Study design: the methods and procedures used to collect and analyze data in the study (observational, experimental, or modelled);
9. Policy (type, dose, duration): a description of the fiscal policy or policies, including the type of policy (tax, subsidy, or combination), whether it was implemented or modelled, the numerical rate of the tax and/or subsidy, and the length of time between when the policy was implemented and when the environmental outcome was measured;
10. Environmental outcome: the reported environmental outcome and how it was measured;
11. Other outcomes: health and economic outcomes (if reported) and how they were measured;
12. Main result: the reported association between the policy and the environmental outcome;
13. Policy administrator: the actor(s) in charge of policy implementation; and
14. Policy recipient: the actor(s) who were the target of the policy implementation.

Study authors will not be contacted for additional information.

Presenting the Data

Data extraction results will be presented primarily in tabular form (see Appendix III).

Additionally, graphical figures may be used to further represent and synthesize the findings.

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APPENDIX I: Keyword areas for search strategies

Keyword Areas	Details
Food production or consumption	food OR foods OR diet OR diets OR dietary OR eating OR agricultur* OR farm* OR livestock OR meat
Environmental outcomes	environment* OR climate OR "greenhouse gas*" OR "fossil fuel*" OR sustainability OR sustainable OR "land use" OR "cropland use" OR "water use" OR "bluewater use" OR biodiversity OR pollution OR emission* OR carbon OR methane OR nitrogen OR phosphorus OR "nitrous oxide"
Fiscal policies	tax OR taxes OR taxation OR subsidy OR subsidies OR subsidize

APPENDIX II: Search strategies for included databases

Search strategy for the Scopus database

(TITLE-ABS-KEY(food OR foods OR diet OR diets OR dietary OR eating OR agricultur* OR farm* OR livestock OR meat) AND TITLE-ABS-KEY(environment* OR climate OR "greenhouse gas*" OR "fossil fuel*" OR sustainability OR sustainable OR "land use" OR "cropland use" OR "water use" OR "bluewater use" OR biodiversity OR pollution OR emission* OR carbon OR methane OR nitrogen OR phosphorus OR "nitrous oxide") AND TITLE-ABS-KEY(tax OR taxes OR taxation OR subsidy OR subsidies OR subsidize)) AND PUBYEAR > 2009

Search strategy for the PubMed database

((((food [tiab] OR foods [tiab] OR diet [tiab] OR diets [tiab] OR dietary [tiab] OR eating [tiab] OR agricultur* [tiab] OR farm* [tiab] OR livestock [tiab] OR meat [tiab] OR "Diet, Food, and Nutrition"[Mesh])

AND (environment* [tiab] OR climate [tiab] OR "greenhouse gas*" [tiab] OR "fossil fuel*" [tiab] OR sustainability [tiab] OR sustainable [tiab] OR "land use" [tiab] OR "cropland use" [tiab] OR "water use" [tiab] OR "bluewater use" [tiab] OR "biodiversity" [tiab] OR pollution [tiab] OR emission* [tiab] OR carbon [tiab] OR methane [tiab] OR nitrogen [tiab] OR phosphorus [tiab] OR "nitrous oxide" [tiab] OR climate change[mh] OR carbon footprint[mh]))

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AND (tax [tiab] OR taxes [tiab] OR taxation [tiab] OR subsidy [tiab] OR subsidies[tiab] OR subsidize[tiab] OR taxes[mh] OR "Financing, Government"[Mesh:NoExp]))

AND (("2010/01/01"[Date - Publication] : "3000"[Date - Publication]))

Search strategy for the Web of Science Core Collection (as Licensed at Yale University*)

((TS=(food OR foods OR diet OR diets OR dietary OR eating OR agricultur* OR farm* OR livestock OR meat)) AND TS=(environment* OR climate OR "greenhouse gas*" OR "fossil fuel*" OR sustainability OR sustainable OR "land use" OR "cropland use" OR "water use" OR "bluewater use" OR biodiversity OR pollution OR emission* OR carbon OR methane OR nitrogen OR phosphorus OR "nitrous oxide")) AND TS=(tax OR taxes OR taxation OR subsidy OR subsidies OR subsidize)

Date restrictions: 2010-01-01 to 3000-01-01

*Sub-datasets and corresponding coverage timespans of Web of Science Core Collection used in this review:

Indexes	Index Full Names	Date Coverage (stated year to present)
AHCI	Arts and Humanities Citation Index	1975
BKCI-SSH	Book Citation Index – Social Sciences & Humanities	2005

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BKCI-S	Book Citation Index – Science	2005
CCR-EXPANDED	Current Chemical Reactions	1985
ESCI	Emerging Sources Citation Index	2015
IC	Index Chemicus	1993
CPCI-SSH	Conference Proceedings Citation Index – Social Sciences & Humanities	1991
CPCI-S	Conference Proceedings Citation Index – Science	1991
SCI-EXPANDED	Social Sciences Index Expanded	1900
SSCI	Social Sciences Citation Index	1900

Search strategy for the EconLit database

(ti(food OR foods OR diet OR diets OR dietary OR eating OR agricultur* OR farm* OR livestock OR meat) OR ab(food OR foods OR diet OR diets OR dietary OR eating OR agricultur* OR farm* OR livestock OR meat) OR MAINSUBJECT.EXACT("Food; Beverages; Cosmetics; Tobacco; Wine and Spirits (L66)") OR MAINSUBJECT.EXACT("Agricultural Policy; Food Policy (Q18)"))

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AND (ti(environment* OR climate OR "greenhouse gas*" OR "fossil fuel" OR "fossil fueled" OR "fossil fuelled" OR "fossil fuels" OR sustainability OR sustainable OR "land use" OR "cropland use" OR "water use" OR "bluewater use" OR biodiversity OR pollution OR emission* OR carbon OR methane OR nitrogen OR phosphorus OR "nitrous oxide") OR ab(environment* OR climate OR "greenhouse gas*" OR "fossil fuel" OR "fossil fueled" OR "fossil fuelled" OR "fossil fuels" OR sustainability OR sustainable OR "land use" OR "cropland use" OR "water use" OR "bluewater use" OR biodiversity OR pollution OR emission* OR carbon OR methane OR nitrogen OR phosphorus OR "nitrous oxide") OR MAINSUBJECT.EXACT("Climate; Natural Disasters; Global Warming (Q54)"))

AND (ti(tax OR taxes OR taxation OR subsidy OR subsidies OR subsidize) OR ab(tax OR taxes OR taxation OR subsidy OR subsidies OR subsidize) OR MAINSUBJECT.EXACT("Taxation, Subsidies, and Revenue: General (H20)") OR MAINSUBJECT.EXACT("Taxation and Subsidies: Efficiency; Optimal Taxation (H21)") OR MAINSUBJECT.EXACT("Taxation and Subsidies: Externalities; Redistributive Effects; Environmental Taxes and Subsidies (H23)") OR MAINSUBJECT.EXACT("Taxation, Subsidies, and Revenues: Other Sources of Revenue (H27)") OR MAINSUBJECT.EXACT("Business Taxes and Subsidies including sales and value-added (VAT) (H25)") OR MAINSUBJECT.EXACT("Taxation and Subsidies: Incidence (H22)") OR MAINSUBJECT.EXACT("Taxation and Subsidies: Other (H29)"))

Date restrictions: 2010-01-01 to 3000-01-01

Search strategy for the Policy Commons database

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Title: food OR foods OR diet OR diets OR dietary OR eating OR agricultur* OR farm* OR livestock OR meat

Title: tax OR taxes OR taxation OR subsidy OR subsidies OR subsidize OR “fiscal polic*”

Year: 2010 to present

Language: English

Publication type: Report, Discussion paper/Working paper, Journal article, Article, Brief, White paper

APPENDIX III: Extraction of findings

Study authors, affiliations, countries	Study publication year	Study aim(s)	Study geographical location and scale	Sample size	Study design	Policy (type, dose, duration)	Environmental outcome(s)	Other outcome(s)	Main result	Policy administrator	Policy recipient