Methodology for Comparing Citation Database Coverage of Dataset Usage

Findings

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Report Summary

What Is the Issue?

Federal datasets play an important role in supporting research across a range of disciplines. Measuring how these datasets are used can help evaluate their impact and inform future data investments. Agencies like the US Department of Agriculture (USDA) track how their datasets are referenced in research papers and disseminate data usage statistics through platforms like *Democratizing Data's* Food and Agricultural Research Data Usage Dashboard and NASS's 5 W's Data Usage Dashboard. These tools rely on identifying *dataset mentions*[1] in published research to develop usage statistics. Beyond reporting usage statistics, this type of analysis can also provide information about the research topics where federal datasets are applied. Understanding where federal datasets are applied helps characterize their disciplinary reach, including use in areas such as food security, nutrition, and climate, which are inherently multidisciplinary. This informs future work on identifying alternative datasets that researchers use to study similar questions across fields.

The process of identifying dataset mentions in academic research output has two requirements. First, citation databases provide structured access to large volumes of publication metadata, including titles, abstracts, authors, affiliations, and sometimes full-text content. Second, tracking dataset usage requires developing methods that scan publication text for dataset mentions. It is feasible to systematically identify where specific datasets are referenced across a broad set of research outputs by applying machine-learning algorithms to publication corpora collected from citation databases, allowing for scalable search and retrieval of relevant publications where datasets are mentioned. The accuracy of dataset tracking depends on the scope of research output we can access and analyze. However, different databases curate content (i.e., research output) in different ways - some focus on peer-reviewed journals while others include preprints and technical reports - and dataset tracking requires reliable citation data from citation databases.

This report presents a methodology for identifying dataset mentions in research publications across various citation databases. In doing so, we compare publication, journal, and topic coverage across Scopus, OpenAlex, and Dimensions [forthcoming] as primary sources. The purpose is to establish a consistent set of statistics for comparing results and evaluating differences in dataset tracking across citation databases. This allows for insights into how publication scope and indexing strategies influence dataset usage statistics.

[1] A dataset mention refers to an instance in which a specific dataset is referenced, cited, or named within a research publication. This can occur in various parts of the text, such as the abstract, methods, data section, footnotes, or references, and typically indicates that the dataset was used, analyzed, or discussed in the study.

How Was the Study Conducted?

Three citation databases are compared: Elsevier's Scopus, OurResearch's OpenAlex, and Digital Science's Dimensions.ai.

1. **Scopus** charges for access to its citation database. It indexes peer-reviewed, including journal articles, conference papers, and books, and provides metadata on authorship, institutional affiliation, funding sources, and citations. For this study, Scopus was used to identify dataset mentions through a two-step process: first, Elsevier executed queries against the full-text ScienceDirect corpus and reference lists within Scopus; second, publications likely to mention USDA datasets were filtered based on keyword matching and machine learning models.
2. **OpenAlex**, an open-source platform, offers free metadata access. It covers both traditional academic publications and other research outputs like preprints and technical reports. In this study, we used two approaches to identify dataset mentions in OpenAlex: a full-text search, which scans publication metadata fields such as titles and abstracts for references to USDA datasets,[2] and a seed corpus search, which starts with a targeted set of publications based on journal, author, and topic criteria, then downloads the full text of each paper to identify mentions of USDA datasets.[3]
3. **Dimensions**, developed by Digital Science, is a citation database that combines free and subscription-based access. It indexes a range of research outputs, including journal articles, books, clinical trials, patents, datasets, and policy documents. Dimensions also links publications to grant and funding information. For this study, publications in Dimensions that reference USDA datasets were identified by **Add Rafael's text**. To maintain consistency with the criteria applied to Scopus and OpenAlex, the study focuses only on publications classified as journal articles.

To compare how these databases track dataset usage, we focus on six USDA datasets commonly used in agricultural, economic, and food policy research:

1. Agricultural Resource Management Survey (ARMS)
2. Census of Agriculture (Ag Census)
3. Rural-Urban Continuum Code (RUCC)
4. Food Access Research Atlas (FARA)
5. Food Acquisition and Purchase Survey (FoodAPS)
6. Household Food Security Survey Module (HHFSS)

[2] Full-text search in OpenAlex refers to querying the entire database for textual mentions of dataset names within titles, abstracts, and other fields.

[3] The seed corpus search involves selecting a targeted set of publications based on journal, author, and topic filters. Full-text PDFs are downloaded and analyzed to identify mentions of USDA datasets not captured through metadata alone.

These datasets were selected for their policy relevance, known usage frequency, and disciplinary breadth. We developed seed corpora for each dataset to identify relevant publications, then used those corpora to evaluate database coverage, topical scope, and metadata consistency.

What Did the Study Find?

Accurate tracking of dataset mentions relies heavily on how publications are indexed across citation databases. For two citation databases – Scopus and OpenAlex – carefully constructed seed corpora were needed to track dataset mentions.

Preview of Results from Database Comparison:

1. Across databases, there is limited publication overlap between citation databases. For example:

- Less than 10% of DOIs typically appear in both Scopus and OpenAlex in any combination.
- 51.8% of Food Access Research Atlas DOIs appear only in Scopus.
- 60.9% of Household Food Security Survey Module DOIs appear only in Scopus.
- 78.5% of ARMS DOIs appear only in OpenAlex Full Text.

2. Journal coverage by source (Scopus or OpenAlex) varies significantly by dataset:

- Scopus recovers the most publications MORE HERE.
- OpenAlex "Full Text" recovers the most publications MORE HERE.
- OpenAlex "Seed Search" identifies the most publications MORE HERE.

3. Topical coverage reflects the varied policy and disciplinary relevance of each dataset:

- ARMS: Research citing this dataset emphasizes agricultural management, accounting, and environmental topics.
- The Census of Agriculture: Research mentioning this dataset has a wide breadth, spanning accounting and environmental applications.
- Food Access Research Atlas: Publications focus on food security, public health, and urban planning.
- The Food Acquisition and Purchase Survey: This dataset is mentioned in studies of consumer behavior, nutrition economics, and household spending.
- The Household Food Security Survey Module: Research mentioning this dataset frequently cites topics such as food insecurity, poverty, and social policy evaluation.
- The Rural-Urban Continuum Code: Research citing this dataset includes rural classification, regional planning, and spatial analysis.

Key Takeaway: These patterns suggest that relying on a single citation database may undercount dataset usage, and may also obscure variation in the types of research topics being conducted with each dataset.

How to Use This Report

The report is preliminary in nature. It provides an initial approach to characterizing dataset mentions about food and agriculture research datasets in research papers reported in various databases, specifically Scopus, OpenAlex, and Dimensions. It includes procedures for:

- Identifying publication coverage across citation databases
- Cross-referencing publications between datasets
- Analyzing research themes and institutional representation

The methodology produced these reusable components:

- Code repository for data cleaning and standardization
- Data schemas by citation database
- Standardized institution tables using IPEDS identifiers

The methods described can be applied to evaluate other citation databases such as Web of Science, Crossref, and Microsoft Academic, to name a few.

1 Project Background

Tracking how federal datasets are used in academic research has been a priority for agencies such as the U.S. Department of Agriculture (USDA). *Democratizing Data's* Food and Agricultural Research Data Usage Dashboard was created to support this effort by reporting on dataset usage through citation analysis. The platform was developed to ingest publication metadata from Scopus, a proprietary citation database, to identify and count publications that reference USDA datasets. Scopus offers reliable metadata and a structured indexing system, bu it is costly to access and does not fully align with goals around open science and public transparency.

As interest in open-access infrastructure has grown, OpenAlex, a free and open-source citation database developed by OurResearch, has emerged as a potential alternative. OpenAlex claims broad coverage of research outputs, including journal articles, preprints, conference proceedings, and reports. Replacing Scopus with OpenAlex could lower operational costs for federal agencies and align with broader efforts to promote open data ecosystems. However, transitioning platforms raises important questions about data reliability, coverage completeness, and potential trade-offs in representation.

To support an informed decision about this transition, a systematic comparison was conducted across three citation databases—Scopus, OpenAlex, and Dimensions—to assess their relative strengths and weaknesses for tracking dataset mentions in agricultural and food systems research. Dimensions, a third database developed by Digital Science, offers a hybrid model combining free and subscription-based access and was included to provide a broader benchmark across commercial and open platforms.

Initial comparisons between Scopus and OpenAlex revealed unexpected differences in coverage, with notable gaps in publication indexing and metadata quality. These patterns suggest that simply substituting one citation source for another could lead to incomplete or biased tracking of dataset usage, potentially affecting public reporting and research visibility. This project responds to those concerns by developing a structured, reproducible methodology for evaluating database coverage across multiple dimensions: publication metadata, journal inclusion, dataset topic area, institutional affiliation, and authorship.

1.1 Project Objective

This report presents a method for tracking how six key USDA datasets (Table 1) are cited in research using Scopus, OpenAlex, and Dimensions. It identifies where each dataset appears, which topics they are used in, which authors and institutions are most active, and how these patterns vary depending on the citation database. The findings support more accurate measurement of dataset use and help guide future data preservation and investment decisions.

1.2 Specific Aims

1. **Evaluate differences in publication coverage across citation databases.** Measure the extent to which Scopus, OpenAlex, and Dimensions capture research publications that reference USDA datasets. Identify how publication inclusion varies across platforms.
2. **Compare journal indexing and scope.** Compare the journals indexed by each database and examine how differences in journal coverage influence visibility of dataset-linked research.
3. **Analyze topic coverage.** Examine the research areas where USDA datasets are mentioned. Identify patterns in topic classification and assess how different citation databases support subject-level tracking of dataset usage.
4. **Evaluate author representation.** Compare how author names are recorded across platforms, including the completeness of author metadata and potential implications for attribution and visibility.
5. **Examine institutional representation.** Evaluate how each platform captures and standardizes institutional affiliations. Pay particular attention to differences in coverage for Minority-Serving Institutions (MSIs), land-grant universities, and other public or underrepresented institutions.
6. **Develop a reproducible methodology for cross-platform comparison.** Create a generalizable workflow for comparing citation databases, including steps for record linkage, deduplication, author and institution standardization, and identification of dataset mentions.

The methodology described in this report provides a systematic approach for comparing publication coverage where federal datasets are mentioned across citation databases. The scope of work includes comparing publication coverage across Scopus, OpenAlex, and Dimensions. For more information on each citation database, refer to this Appendix. These methods can be applied to other citation databases as alternatives to current data sources.

2 Data Collection

The core objective of this study is to evaluate publication coverage across citation databases, focusing on how well Scopus, OpenAlex, and Dimensions index research relevant to food and agricultural research. A targeted strategy was used to identify publications referencing USDA datasets, aligning with federal agency efforts to monitor and report on dataset usage. This approach enables a consistent entry point for comparison across platforms while also providing insight into the topics where federal datasets are applied and the use of complementary or alternative data sources.

To support this analysis, a structured inventory of USDA data assets was developed, drawing from records produced by the Economic Research Service (ERS) and the National Agricultural Statistics Service (NASS). From this broader inventory, six datasets were selected for detailed comparison based on known usage, policy relevance, and disciplinary breadth: the Census of Agriculture, Agricultural Resource Management Survey (ARMS), Food Acquisition and Purchase Survey (FoodAPS), Food Access Research Atlas (FARA), Rural-Urban Continuum Code (RUCC), and the Household Food Security Survey Module (HFSSM). The set of data assets, their producing agencies, and descriptions are presented in Table 1.

Table 1: List of USDA Data Assets

Dataset Name	Produced By	Description
Census of Agriculture	NASS	Conducted every five years, it provides comprehensive data on U.S. farms, ranches, and producers.
Agricultural Resource Management Survey (ARMS)	ERS	A USDA survey on farm financials, production practices, and resource use.
Food Acquisition and Purchase Survey (FoodAPS)	ERS	A nationally representative survey tracking U.S. household food purchases and acquisitions.
Food Access Research Atlas (FARA)	ERS	A USDA tool mapping food access based on store locations and socioeconomic data.
Rural-Urban Continuum Code (RUCC)	ERS	A classification system distinguishing U.S. counties by rural and urban characteristics.
Household Food Security Survey Module	ERS	A USDA survey module used to assess food insecurity levels in households.

Researchers reference datasets in inconsistent ways—using acronyms, abbreviations, alternate spellings, or related URLs. To capture these variations, we created a structured list of dataset–alias pairs, called *dyads*. This Appendix provides the full list of dyads used to search for mentions of each USDA dataset across Scopus, OpenAlex, and Dimensions. This list ensures consistent and comprehensive identification of dataset mentions in research publications.

Using these dyads, we applied tailored search strategies across each citation database to identify

relevant publications for all six datasets. These included a seed search in Scopus, a full-text metadata search in OpenAlex, a seed corpus approach in OpenAlex based on targeted filtering of journals, authors, and topics followed by full-text analysis, and a full-text search in Dimensions. Each search strategy is described in detail in the following sections.

2.1 Scopus Approach

The first citation database used is Scopus, a publication catalog managed by Elsevier. Ideally, direct Scopus API access would have been used to query full publication text for mentions of USDA datasets. However, the project did not have access to the Scopus API. Only Elsevier, serving as a project partner, was able to execute queries within the Scopus environment. Consequently, the dataset mention search relied on outputs provided by Elsevier rather than independent querying.

Because of these constraints, a seed corpus approach was applied. First, Elsevier matched the names and aliases of all USDA datasets against full-text records available through ScienceDirect and reference sections of Scopus publications published between 2017 and 2023. This initial step identified journals, authors, and topics most likely to mention USDA datasets. A targeted search corpus was then constructed, narrowing the scope to approximately 1.45 million publications. These included various document types—articles, reviews, short surveys, notes, conference papers, chapters, books, editorials, letters, data papers, errata, and tombstones. For the purposes of this comparative report, only articles are considered.

Several methods were used to identify mentions of USDA datasets in Scopus publications. First, a reference search was conducted, using exact-text matching across publication reference lists to capture formal citations of datasets. Second, full-text searches were performed using machine learning models applied to publication bodies, identifying less formal mentions of datasets. Third, machine learning routines developed through the 2021 Kaggle competition were applied to the full-text corpus to improve detection of dataset mentions, including instances where references were indirect or less structured. Details about the three machine learning models used are available here.

Because direct access to full publication text was not available, Elsevier shared only the extracted snippets and limited metadata. Manual validation, aided by the use of keyword flags (e.g., "USDA," "NASS"), confirmed whether identified mentions accurately referred to the targeted datasets. To manage validation costs, only publications with at least one U.S.-based author were reviewed.

Full documentation of the Scopus search routine, including query construction and extraction procedures, is available at the project's report website.

2.2 OpenAlex Approach

The second citation database used is OpenAlex, an open catalog of scholarly publications that provides public acess to metadata and, when available, full-text content for open-access publications via its API. Unlike Scopus, which provides controls access to licensed content, OpenAlex indexes only open-access publications or those for which open metadata has been made available by publishers.

Two methods were used to identify USDA dataset mentions in OpenAlex: a full-text search and a seed corpus approach. Both Both methods focused on peer-reviewed journal articles published between 2017 and 2023 and restricted the dataset to final published versions, excluding preprints and earlier drafts to avoid duplication across versions.

2.2.1 Method 1: Full-Text Search

This method relied on querying OpenAlex's full-text search index using combinations of dataset aliases (e.g., alternate names, acronyms) and institutional flag terms (e.g., "USDA," "NASS"). The combination of dataset alias and flag terms ensured that retrieved publications made an explicit connection to the correct data source. A "true" dataset mention was recorded only when at least one alias and one flag term appeared in the same publication, increasing the precision of captured dataset mentions.[4]

Queries were implemented using the `pyalex` Python package[5], which manages API requests and enforces OpenAlex's usage rate limits. The search used the `search` and `filter` endpoints, targeting English-language, open-access articles or reviews published after 2017. Results were returned in JSON format based on the OpenAlex Work object schema, including fields for publication metadata, authorship, journal, concepts, citations, and open access status. Each record included metadata fields such as:

- `display_name` (publication title)
- `authorships` (authors and affiliations)
- `host_venue.display_name` (journal)
- `doi` (digital object identifier)
- `concepts` (topics)

[4] This procedure increased the likelihood of capturing genuine dataset references rather than incidental matches to individual words. Initial drafts of the query incorrectly included terms like "NASS" and "USDA" in the alias list. This was corrected to ensure that aliases strictly referred to dataset names, and flag terms referred to organizations.

[5] `Pyalex` is an open-source library designed to facilitate interaction with the OpenAlex API; see https://help.openalex.org/hc/en-us/articles/27086501974551-Projects-Using-OpenAlex for more information. The package manages request formatting and automates compliance with OpenAlex's "polite pool" rate limits, which restrict the number of requests per minute and impose backoff delays. Pyalex introduced automatic pauses between requests, with a default `retry_backoff_factor` of 100 milliseconds, to ensure stable and continuous retrieval. This setup enabled systematic querying while adhering to OpenAlex's usage policies.

- `cited_by_count` (citation counts)
- `type` (publication type, e.g., "article")
- `publication_year` (year article was publish)
- `language` (language, English only)
- `is_oa` (open access)

The code used to implement this querying and filtering process is publicly available here **ADD FILES**.

2.2.1.1 Limitations of Full-Text Search Method

Although the OpenAlex API provides access to full-text search, limitations in content ingestion affect result completeness. OpenAlex receives publication text through two primary ingestion methods: PDF extraction and n-grams delivery.

In the PDF ingestion method, OpenAlex extracts text directly from the article PDF. However, the references section is not included in the searchable text. References are processed separately to create citation pointers between scholarly works, meaning that mentions of datasets appearing only in bibliographies are not discoverable through full-text search.

In the n-grams ingestion method, OpenAlex does not receive the full article text. Instead, it receives a set of extracted word sequences (n-grams) from the publisher or author. These n-grams represent fragments of text—typically short sequences of one, two, or three words—which are not guaranteed to preserve full continuous phrases. As a result, complete dataset names may be broken apart or omitted, reducing the likelihood that search queries match the intended aliases.

These ingestion and indexing limitations affect the completeness of results when relying solely on OpenAlex full-text search. Mentions of USDA datasets that appear either exclusively in references or are fragmented within n-grams may be missed. To address these limitations, an alternative search method was developed based on constructing a filtered seed corpus of publications for local full-text analysis.

2.2.2 Method 2: Seed Corpus

To overcome the limitations of the full-text metadata search, a seed corpus approach was developed. This method created a filtered subset of publications for local full-text analysis, targeting likely mentions of USDA datasets.

Selection criteria for the seed corpus included:

- English-language publications
- Works published between 2017-2023
- Publication Type = articles

- Open-access publications only

To focus the sample, we used results from the initial OpenAlex full-text search to identify the top 25 journals, authors, and topics most frequently associated with USDA dataset mentions. For each entity, we computed a *Full-Text Search Count*, which is the number of publications where USDA datasets were explicitly mentioned in the full text. This metric reflects how often each topic, journal, or author has appeared in USDA dataset–relevant research.

We then filtered the broader OpenAlex catalog to include all publications—regardless of whether they mentioned a dataset—linked to these top-ranked entities. This allowed us to build a more focused but expansive corpus for local text search. By narrowing to 25 entities per category, we prioritized relevance while managing scale. This process generated a structured set of JSON files containing publication metadata and links. The Python script used to flatten and process these files is provided in this Appendix. **ADD FILES**

Example: Census of Agriculture

To illustrate this process, consider the tables created for the Census of Agriculture dataset—Table 4 (top 25 topics), Table 5 (top 25 journals), and Table 6 (top 25 U.S.-affiliated authors). Each table contains two columns:

- **Full-Text Search Count**: Number of publications from the OpenAlex full-text search that mention the dataset and are linked to the given topic, journal, or author
- **Total Count**: Total number of publications in OpenAlex associated with that topic, journal, or author, regardless of dataset mention

The *Full-Text Search Count* helps us identify which entities are most directly associated with USDA dataset use. For instance, if a topic like "Impact of Food Insecurity on Health Outcomes" has 78 dataset-related publications. This count reflects how often USDA datasets were mentioned within the full text of publications associated with a particular entity. Meanwhile, the *OpenAlex Total Count* shows the broader publication volume for that topic—in this case, over 78,000—providing context on how prominent the topic is within the full OpenAlex database. In this sense, the Full-Text Search Count serves as a rough proxy for market penetration, or how frequently a dataset appears within a given research area relative to the total volume of publications.

The Full-Text Search Count reflects how often USDA datasets are explicitly mentioned within a specific research area, while the Total Count represents the overall volume of publications linked to that topic, journal, or author. The large gap between these counts was a key reason for developing the seed corpus approach: even within high-relevance entities, many publications may reference datasets in ways not captured by OpenAlex's full-text search.

By downloading and analyzing the full texts of all publications linked to the entities in the second column, we applied our own string-matching logic to detect mentions that OpenAlex's indexing may have missed, particularly in reference sections or when dataset names were

fragmented. This allowed us to validate and extend OpenAlex search results using a consistent and transparent local method.

This approach has several implications. It increases the relevance of the corpus by focusing on publications where USDA datasets are actively cited, rather than broadly associated with a topic. It also reduces processing demands by avoiding the need to download all potentially relevant PDFs. However, by prioritizing high-visibility entities from the initial search, the method may introduce selection bias and miss less frequently cited but still relevant work. The trade-off reflects a practical balance between analytical depth and operational feasibility.

For the Census of Agriculture, the resulting seed corpus included approximately 1.77 million unique publications. About 35% of full texts were successfully downloaded, yielding an estimated 625,000 documents for local analysis. Full-text searches on this subset improved detection of dataset mentions beyond what OpenAlex's native indexing allowed.

Despite the benefits, limitations remain. Full-text availability was constrained by broken or inaccessible links, and processing the corpus was computationally intensive. Future work may require distributed processing or more refined filters to improve efficiency.

The table below summarizes primary differences between the Full-Text Search and Seed Corpus methods. The Full-Text Search provides broader initial coverage, but it is limited by indexing constraints and lack of reference section access. The Seed Corpus narrows the search space but allows for deeper, locally controlled analysis of full-text content, including citations.

Table 2: Key Differences Between OpenAlex Full-Text Search and Seed Corpus

Feature / Criterion	Full-Text Search	Seed Corpus
Searchable Sample	OpenAlex API where `has_fulltext = true`	Curated list based on known users/sources
Source of text	Article body or word/phrase snippets where `fulltext_origin = n-grams`	Any part of publication conditional on available PDF download
Reference sections indexed?	No	Yes. Will include publications that reference datasets in citations.
Full text required? (`has_fulltext`)	Yes	Not required
Open access required? (`is_oa`)	No	Yes. Method requires downloading the full PDF version of the article.
Selection criteria	None imposed *a priori*	Journal/topic/author targeting
Resulting sample	Broad, but with limitations	Narrower, given the target search criteria

2.3 Dimensions

To identify publications mentioning USDA datasets, we used the Dimensions.ai API, following the same general methodology applied in Scopus and OpenAlex. We reused the same dataset aliases, institutional flag terms, and overall search criteria to ensure consistency across sources. The search covered scholarly publications from 2017 to 2023 and was restricted to works authored by at least one researcher affiliated with a U.S.-based institution.

Dimensions queries are written using a structured Domain Specific Language (DSL). We constructed boolean queries that combined multiple dataset aliases (e.g., "NASS Census of Agriculture", "USDA Census", "Agricultural Census") with institutional identifiers (e.g., "USDA", "NASS", "U.S. Department of Agriculture"). As with Scopus and OpenAlex, both a dataset alias and an institutional flag term were required to appear in each result. These terms were grouped using `OR` within each category and then combined with an `AND` across categories. For example:

> ("NASS Census of Agriculture" OR "Census of Agriculture" OR "USDA Census of Agriculture" OR "Agricultural Census" OR "USDA Census" OR "AG Census") AND (USDA OR "US Department of Agriculture" OR "United States Department of Agriculture" OR NASS OR "National Agricultural Statistics Service")

We implemented this process using the `dimcli` Python library, which provides a streamlined interface to the Dimensions.ai API and automates result pagination. A significant advantage of this approach is the capability of the Dimensions.ai platform to manage complex searches directly, resulting in precise results and reduced computational overhead. By executing these queries directly through the API, we avoided the technical complexity associated with downloading and locally processing large amounts of textual content. Moreover, the Dimensions.ai API results can be automatically structured into an analysis-ready DataFrame format. This simplified data structure greatly facilitated our subsequent validation, data integration, and analytical workflows.

To maintain methodological consistency with Scopus and OpenAlex, the following filters were applied to the search:

- English-language publications
- Works published between 2017-2023
- Document types: articles, chapters, proceedings, monographs, and preprints
- Author affiliations: Publications were filtered to include only those authored by researchers affiliated with at least one U.S.-based institution.

For comparability with the Scopus and OpenAlex samples, only publications classified as "articles" were retained for final analysis. This restriction reduces duplication across versions (e.g., preprints, proceedings) and reflects our focus on peer-reviewed scholarly output.

For each article, we retrieved metadata including title, authors, DOI, journal, abstract, publication date, citation counts, subject classifications, and links. These fields supported topic-level analysis, author and institution mapping, and validation of dataset mentions.

Using Dimensions.ai provided two main technical advantages. First, because the platform supports full-text query execution natively, we avoided the need to download or parse external files. Second, the API responses were easily converted into analysis-ready DataFrames, which simplified downstream validation and integration with other sources.

Overall, the Dimensions.ai approach aligned with our methods for Scopus and OpenAlex, enabling consistent identification of USDA dataset mentions across all three platforms.

2.4 Data Processing

To produce a consistent count of unique publications referencing each USDA dataset, we consolidated records from three sources-Scopus, OpenAlex, and Dimensions-each of which identified publications through a different mechanism, described above.

For each source, publication-level metadata, including DOIs, journal titles, ISSNs (when available), and source-specific topic classifications was extracted. DOIs were standardized (e.g., removing URL prefixes, `https://doi.org/`) for consistent matching across sources. Duplicate DOIs within each source were removed. All DOIs compared in this report are associated with publications classified as document type = 'article' and were published between 2017 and 2023.

3 Results

The aims described in Section 1.2 guide the development of a methodology for comparing citation databases, focusing on four areas:

1. **Publication tracking:** Comparing how each platform captures publications within indexed journals
2. **Journal coverage:** Determining which journals each platform indexes
3. **Topic scope:** Evaluating the research areas of publications that cite USDA datasets
4. **Author and institutional affiliation:** Determining how each platform records institutional information

Processed publication metadata was then merged across sources using the cleaned DOI-ISSN pairs as the common identifier. Each publication was tagged with binary indicators showing whether it appeared in Scopus, OpenAlex Full Text, OpenAlex Seed, or some combination

thereof. When metadata overlapped (such as journal titles or publication years), Scopus information was prioritized, when available, given its relatively higher metadata quality, followed by OpenAlex Full Text, OpenAlex Seed, and then Dimensions.[6]

This process ensured that each publication was counted once, even if it appeared in multiple sources. The final dataset includes a deduplicated set of DOIs, along with harmonized metadata and source indicators. The number of unique publications referencing each dataset is shown in Table 3.

Table 3: Unique Publications with Metadata across Sources

Dataset Name	Number of Unique Publications
ARMS	1,611
Census of Agriculture	6,206
Food Access Research Atlas	639
Food Acquisition and Purchase Survey	839
Household Food Security Survey Module	1,537
Rural-Urban Continuum Code	2,431

All code used to clean, deduplicate, and merge records is provided in the GitHub repository.

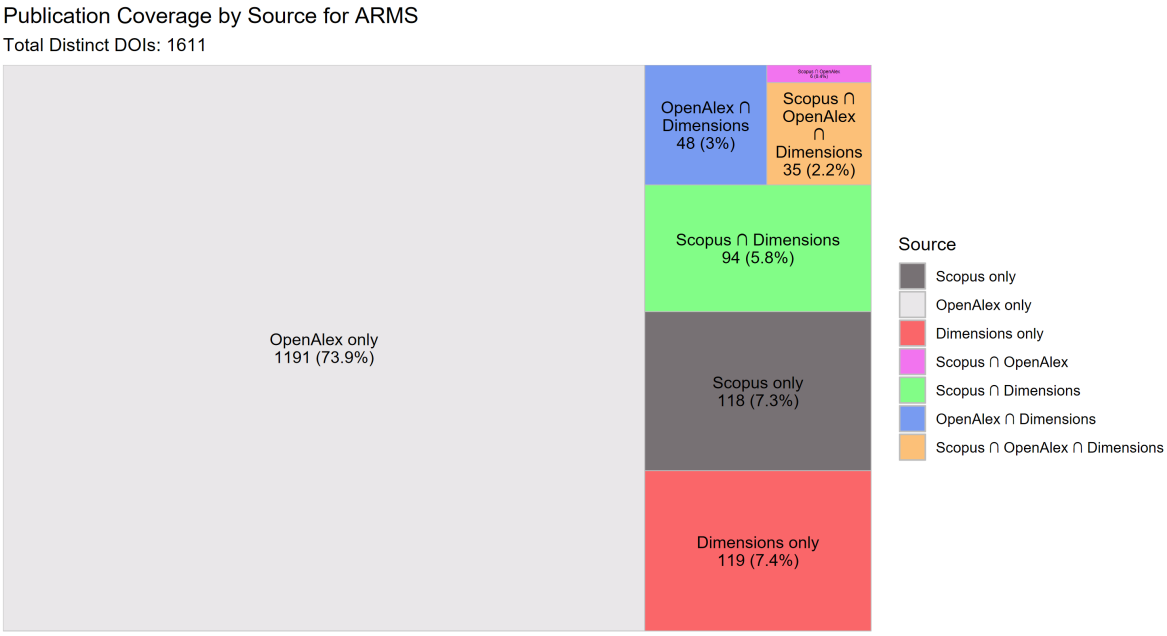
3.1 Publication Coverage

An objective of this report is to understand differences in publication coverage across Scopus and OpenAlex. Specifically, this section asks: (1) how many and which publications referencing USDA datasets appear in each citation database, and (2) how many and which journals publishing these articles overlap between the two sources. In addition, the analysis evaluates whether the different search strategies used in OpenAlex—the full-text metadata search versus the seed-corpus approach—yield substantially different sets of results.

For each of the six USDA datasets featured in this study, a treemap visualization is presented to summarize publication coverage across the citation databases. Because two search strategies were applied to OpenAlex, the results distinguish publications identified separately. Each treemap groups publications into mutually exclusive categories based on their presence in one or more of the data sources: Scopus, OpenAlex Full Text, OpenAlex Seed Corpus, Dimensions. The size of each box is proportional to the number of distinct DOIs in that group, providing a visual summary of the relative coverage across sources. For example, a large "Scopus only" segment indicates a high number of publications indexed exclusively in Scopus, while overlapping segments (e.g., "Scopus OA Seed") reflect shared coverage between platforms.

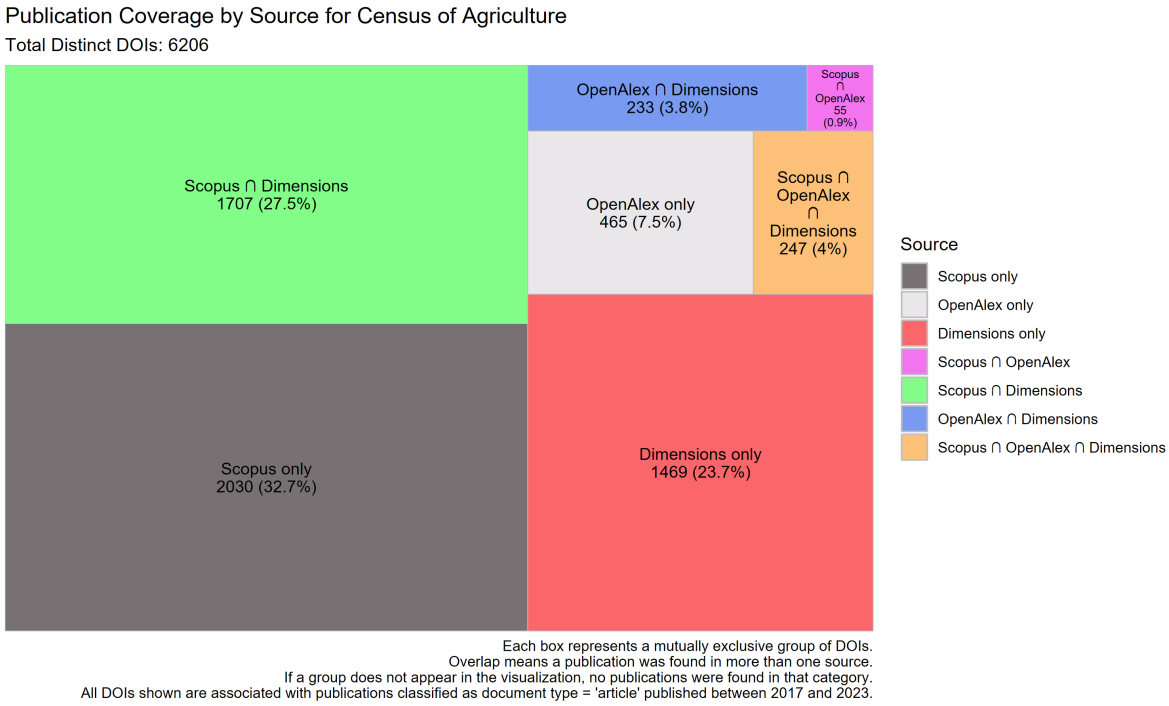
[6] In cases where a publication appeared in more than one source, manual and programmatic checks confirmed that metadata values, such as journal titles and publication years, were consistent across sources. No conflicting values were detected.

ARMS Financial and Crop Production Practices

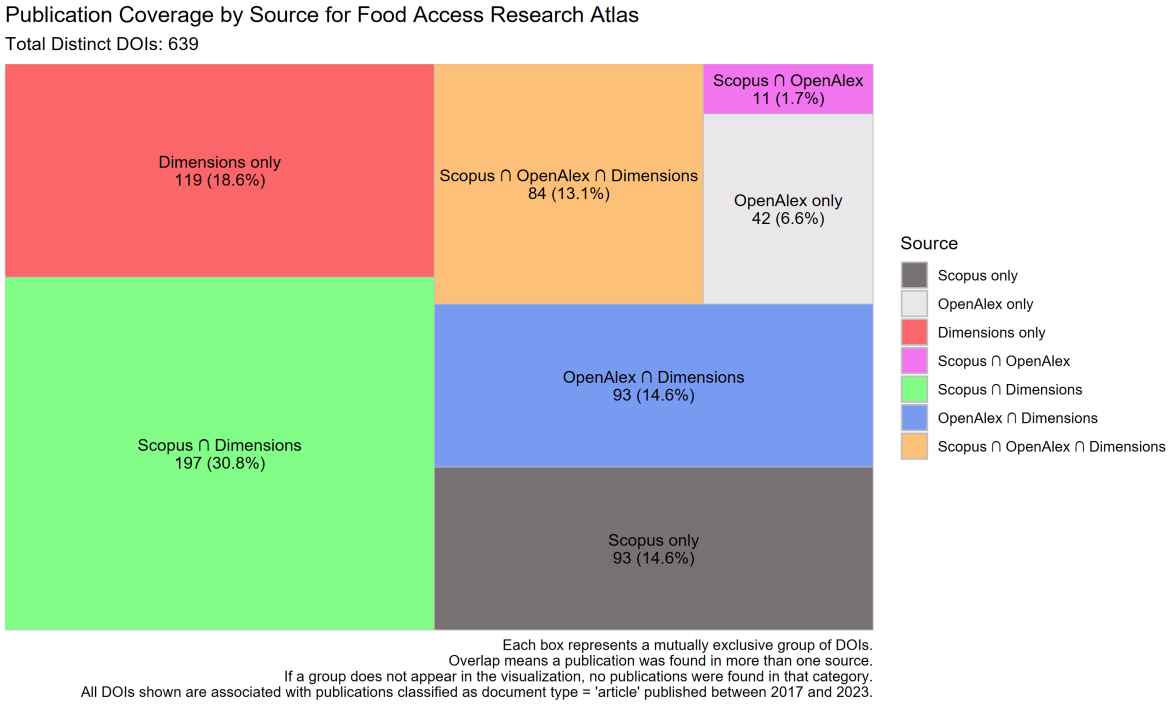


Each box represents a mutually exclusive group of DOIs.
Overlap means a publication was found in more than one source.
If a group does not appear in the visualization, no publications were found in that category.
All DOIs shown are associated with publications classified as document type = 'article' published between 2017 and 2023.

The Census of Agriculture



Food Access Research Atlas



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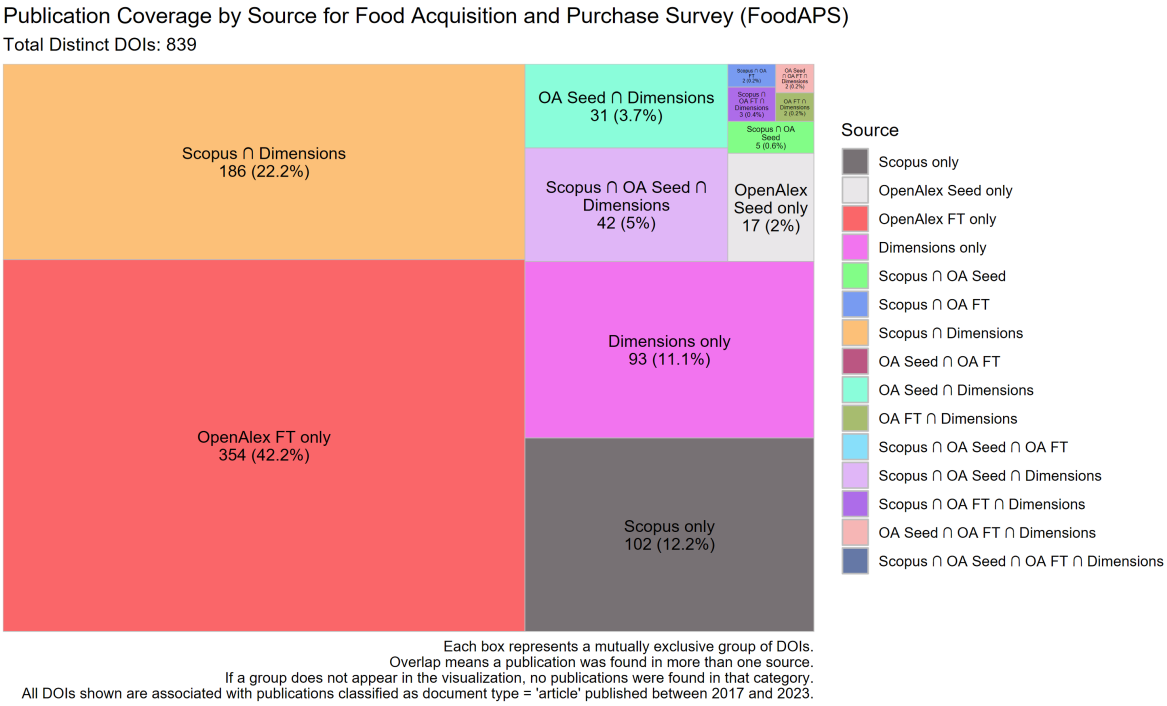
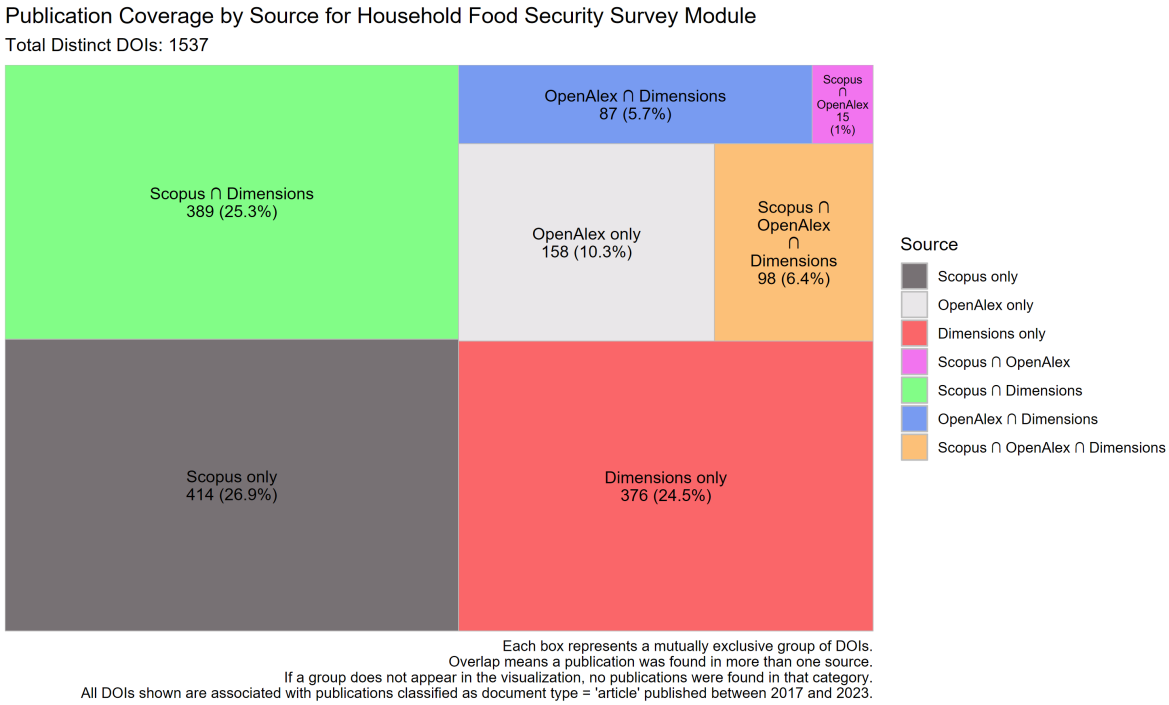
All DOIs shown are associated with publications classified as document type = 'article' published between 2017 and 2023.

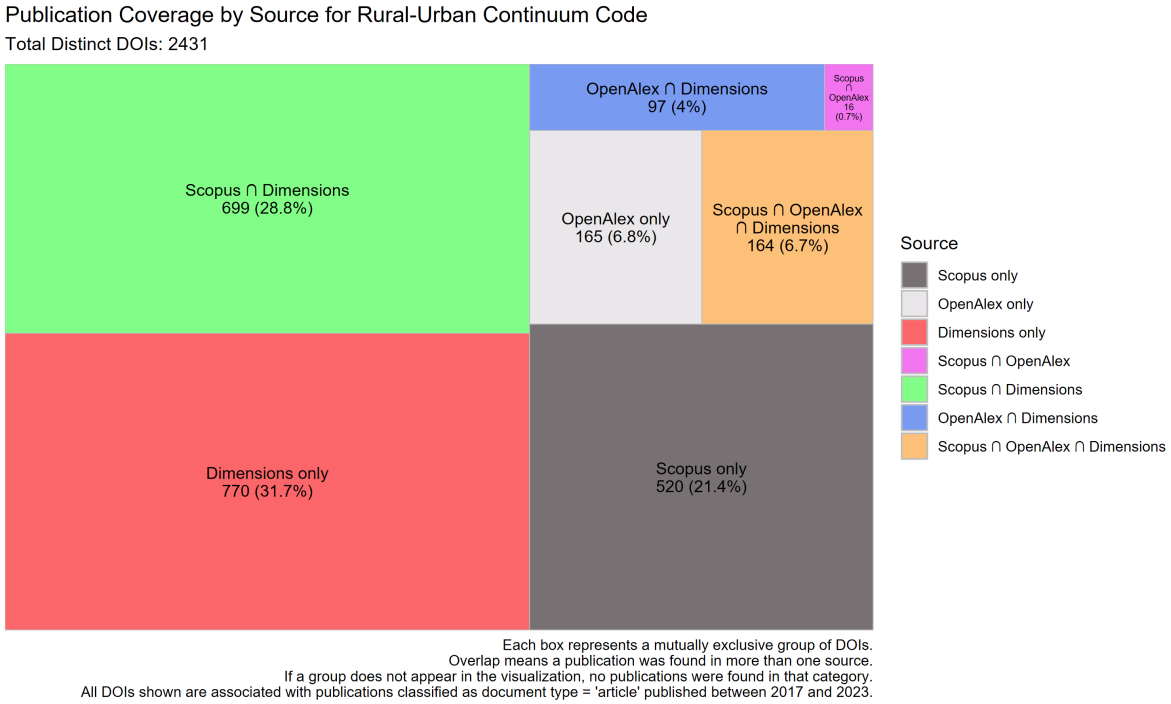
The Food Acquisition and Purchase Survey (FoodAPS)



The Household Food Security Survey Module



Rural-Urban Continuum Code



3.2 Journal Coverage

Now that we have compared journal coverage across the two citation databases, we next examine the publications within journals that are indexed in both Scopus and OpenAlex. We report these results for the full-text search approach and the seed-corpus approach in OpenAlex.

ARMS Financial and Crop Production Practices

The Census of Agriculture

Food Access Research Atlas

The Food Acquisition and Purchase Survey (FoodAPS)

The Household Food Security Survey Module

Rural-Urban Continuum Code

3.3 Publication Topics

ARMS Financial and Crop Production Practices

The Census of Agriculture

Food Access Research Atlas

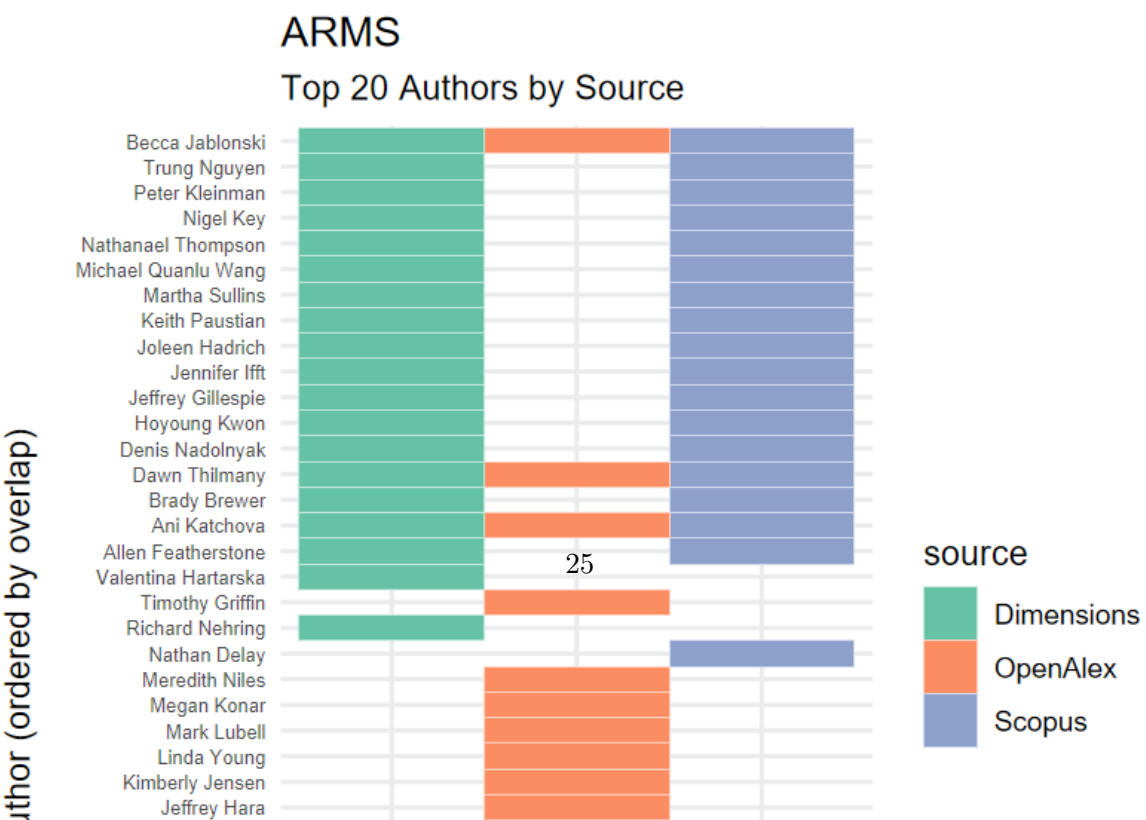
The Food Acquisition and Purchase Survey (FoodAPS)

The Household Food Security Survey Module

Rural-Urban Continuum Code

3.4 Author Comparison

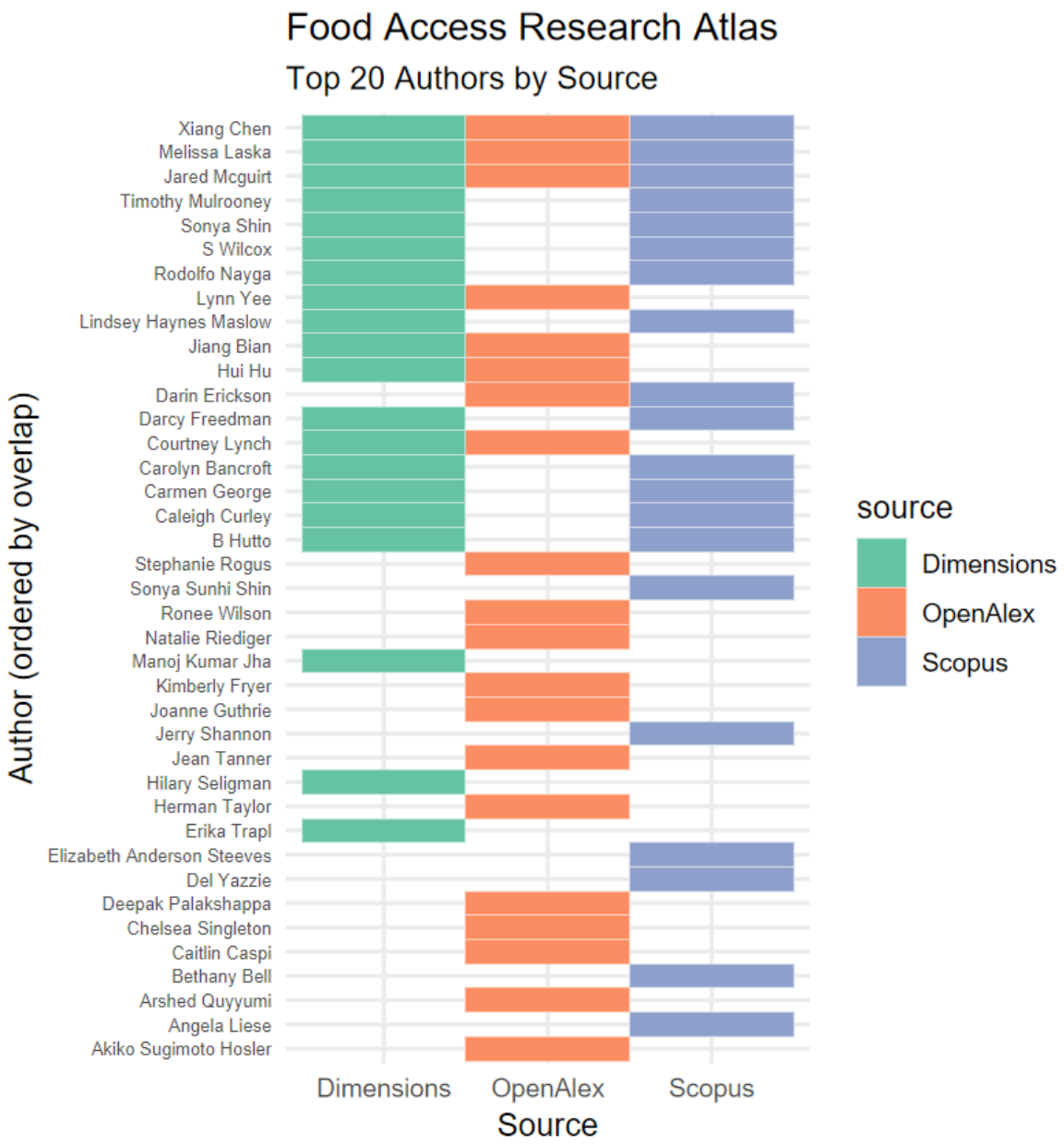
ARMS Financial and Crop Production Practices



The Census of Agriculture

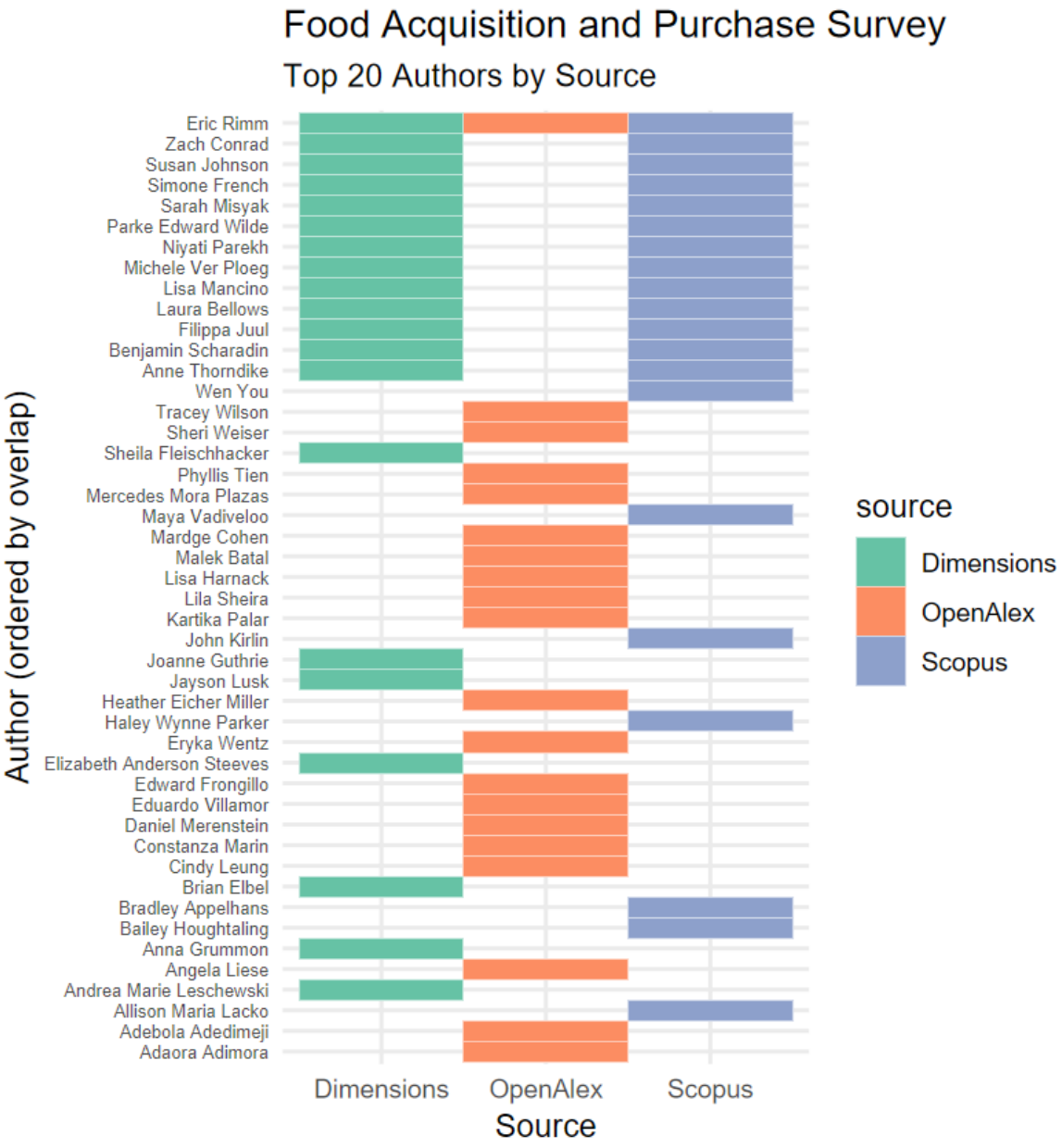
This figure shows the top 20 authors by publication count for each source. Differences in author rankings reflect how platform-specific indexing affects who appears as a leading user of a dataset—that is, researchers who most frequently publish work referencing or using it. According to Scopus, this dataset has been used by 13351 distinct authors; OpenAlex identifies 4735 distinct users; and Dimensions includes 11332.

Food Access Research Atlas



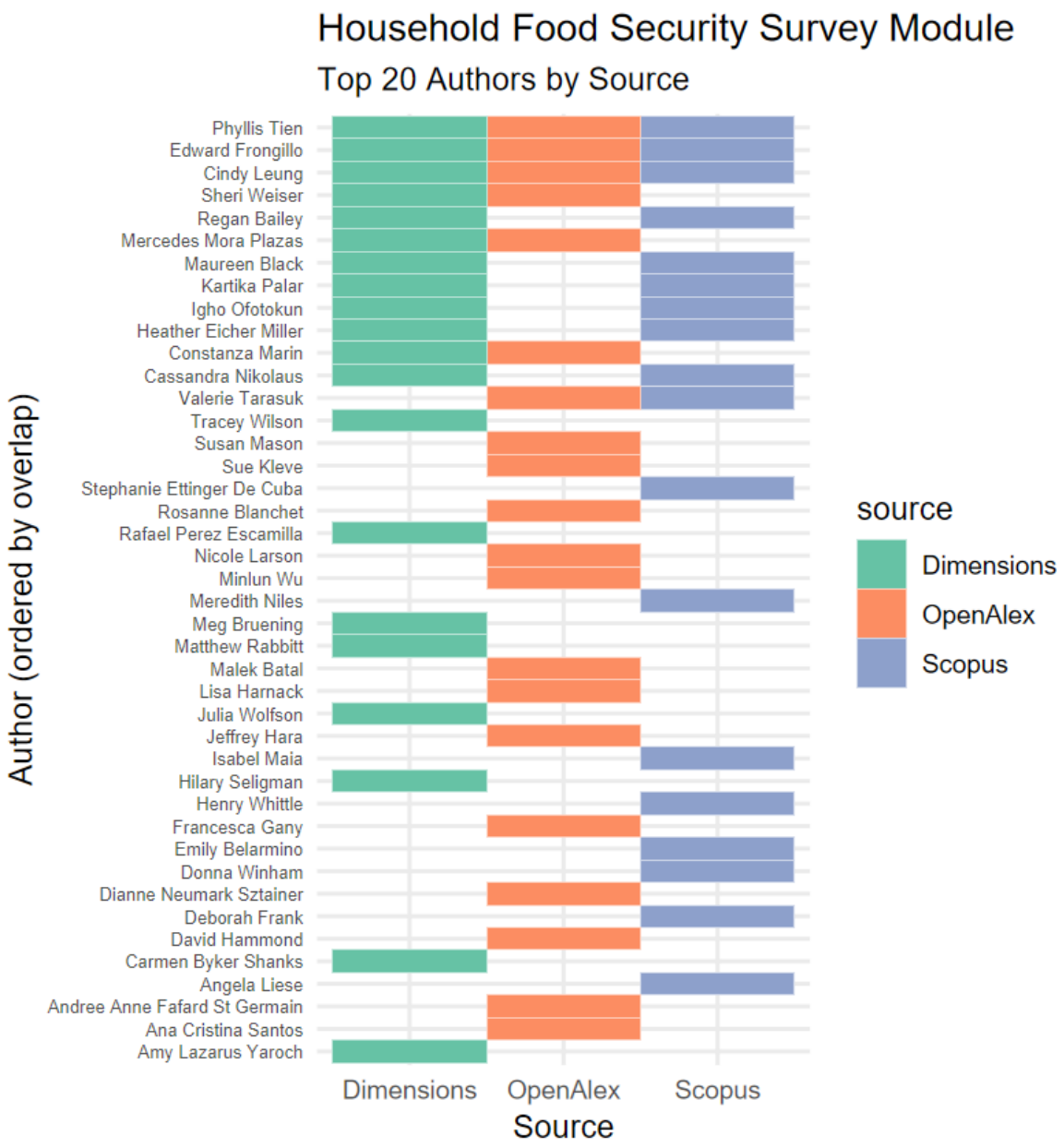
This figure shows the top 20 authors by publication count for each source. Differences in author rankings reflect how platform-specific indexing affects who appears as a leading user of a dataset—that is, researchers who most frequently publish work referencing or using it. According to Scopus, this dataset has been used by 1610 distinct authors; OpenAlex identifies 1154 distinct users; and Dimensions includes 2013.

The Food Acquisition and Purchase Survey (FoodAPS)



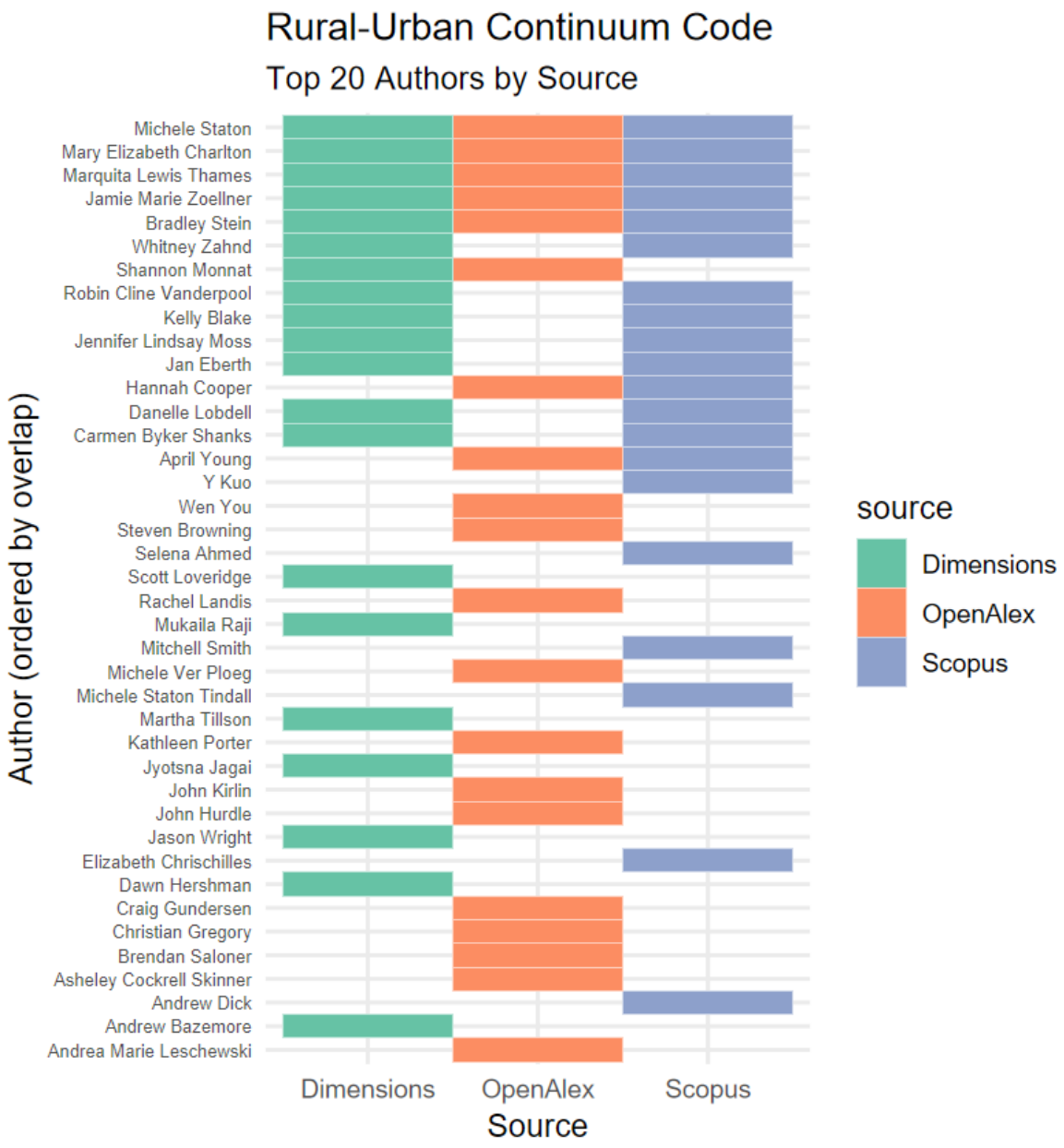
This figure shows the top 20 authors by publication count for each source. Differences in author rankings reflect how platform-specific indexing affects who appears as a leading user of a dataset—that is, researchers who most frequently publish work referencing or using it. According to Scopus, this dataset has been used by 1126 distinct authors; OpenAlex identifies 1849 distinct users; and Dimensions includes 1029.

The Household Food Security Survey Module



This figure shows the top 20 authors by publication count for each source. Differences in author rankings reflect how platform-specific indexing affects who appears as a leading user of a dataset—that is, researchers who most frequently publish work referencing or using it. According to Scopus, this dataset has been used by 3549 distinct authors; OpenAlex identifies 1660 distinct users; and Dimensions includes 3192.

Rural-Urban Continuum Code

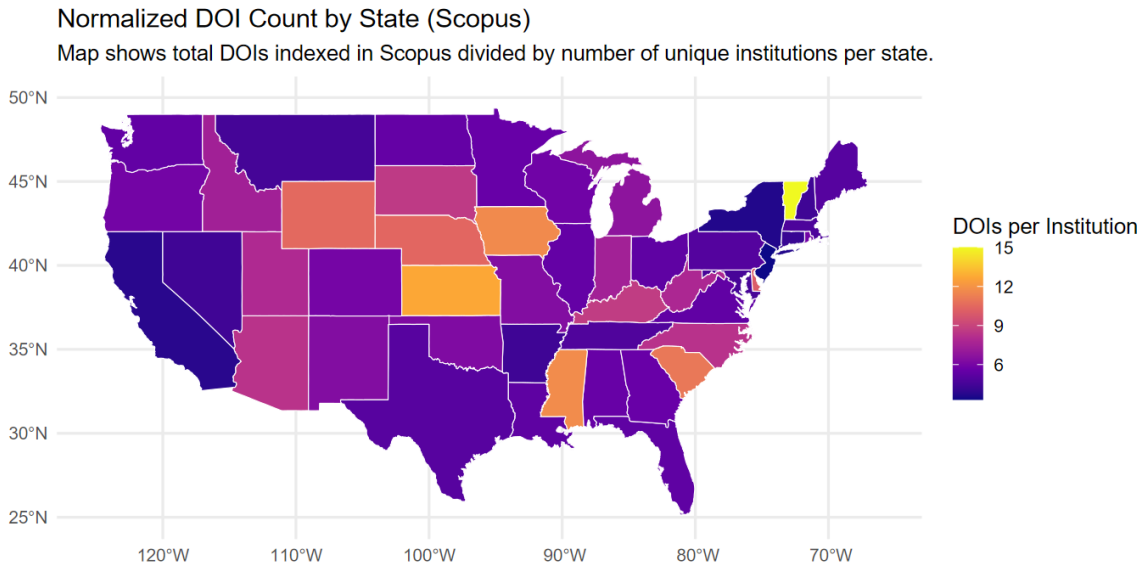


This figure shows the top 20 authors by publication count for each source. Differences in author rankings reflect how platform-specific indexing affects who appears as a leading user of a dataset—that is, researchers who most frequently publish work referencing or using it. According to Scopus, this dataset has been used by 6921 distinct authors; OpenAlex identifies 1881 distinct users; and Dimensions includes 7624.

3.5 Institutional Comparison

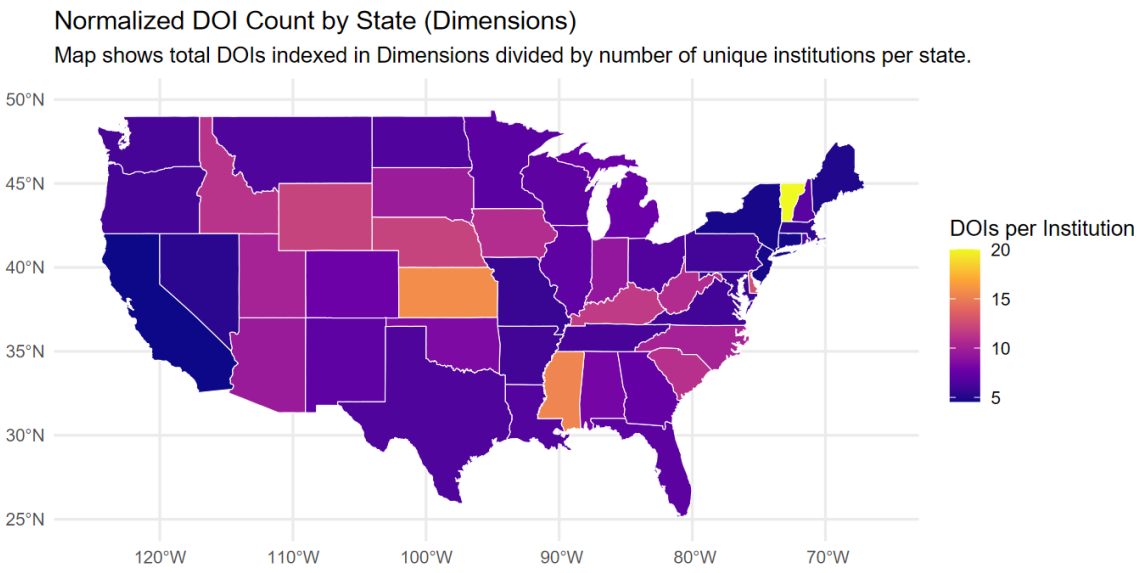
In addition to examining dataset mention coverage, the report also evaluates differences in institutional representation across Scopus, OpenAlex, and Dimensions. Each of the featured citation databases represent some portion of the global research landscape, yet their inclusion criteria and institutional coverage may vary. The purpose of this analysis is to assess which institutions are represented in each source.

3.5.1 Scopus



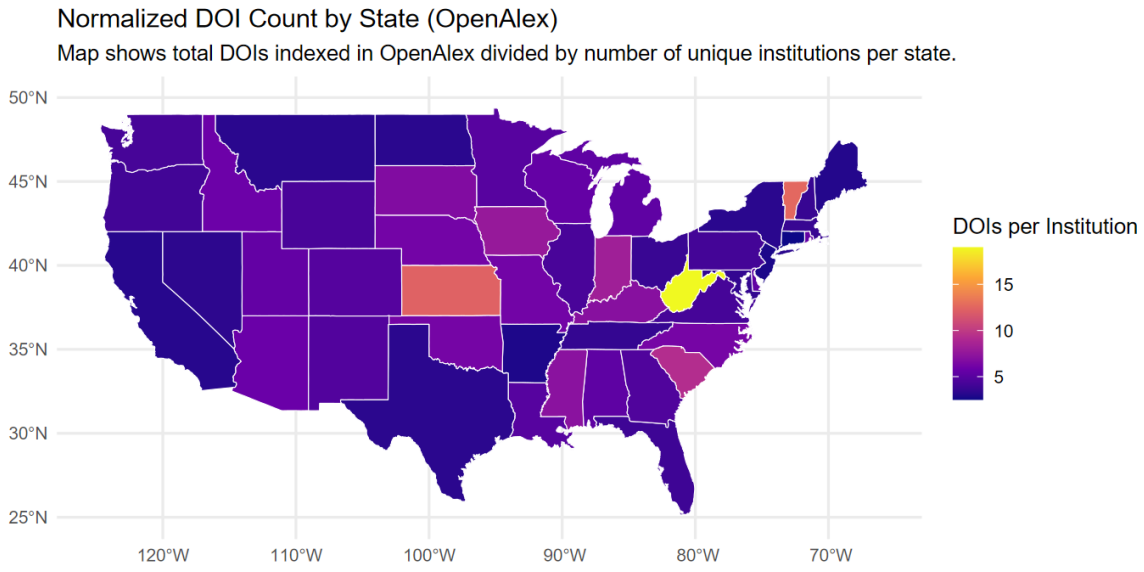
State DOI totals reflect Scopus-indexed publications and are normalized by the number of institutions in each state with at least one publication indexed in this source. How to read: State (total DOIs; total institutions). California (474; 126), District Of Columbia (447; 75), New York (343; 95), North Carolina (339; 41), Maryland (327; 72), Texas (317; 63), Massachusetts (287; 61), Pennsylvania (285; 58), Illinois (272; 50), Virginia (257; 48), Georgia (223; 40), Michigan (221; 33), Florida (211; 40), Ohio (211; 40), Colorado (202; 34), Iowa (186; 16), Wisconsin (186; 32), Minnesota (161; 29), Kentucky (156; 18), Washington (156; 29), Indiana (141; 19), Missouri (139; 22), Tennessee (139; 29), Arizona (133; 16), Kansas (127; 10), Oregon (112; 19), Alabama (105; 19), Nebraska (104; 10), Connecticut (99; 24), South Carolina (99; 9), Utah (95; 12), Arkansas (86; 20), Mississippi (82; 7), Oklahoma (75; 12), Louisiana (68; 13), New Jersey (66; 20), South Dakota (60; 7), Vermont (60; 4), Idaho (59; 8), Montana (58; 13), New Mexico (57; 9), North Dakota (49; 9), Rhode Island (47; 8), Maine (45; 9), New Hampshire (43; 10), Delaware (40; 4), West Virginia (39; 5), Hawaii (23; 6), Wyoming (21; 2), Nevada (13; 3), Alaska (4; 4)

3.5.2 Dimensions



State DOI totals reflect Dimensions-indexed publications and are normalized by the number of institutions in each state with at least one publication indexed in this source. How to read: State (total DOIs; total institutions). District Of Columbia (715; 102), California (648; 142), New York (508; 107), Maryland (499; 87), North Carolina (484; 48), Texas (468; 72), Massachusetts (423; 78), Illinois (415; 58), Pennsylvania (399; 66), Virginia (381; 63), Florida (358; 51), Georgia (338; 46), Michigan (313; 41), Colorado (294; 38), Ohio (287; 43), Wisconsin (271; 38), Indiana (250; 27), Iowa (250; 23), Washington (247; 40), Minnesota (244; 35), Tennessee (237; 38), Arizona (201; 21), Kentucky (196; 17), Missouri (187; 33), Nebraska (180; 15), Kansas (173; 11), Oregon (165; 27), Alabama (161; 20), South Carolina (154; 14), Connecticut (146; 31), Mississippi (138; 9), Oklahoma (134; 16), Utah (132; 13), Arkansas (120; 20), New Jersey (109; 23), Louisiana (107; 16), Vermont (100; 5), South Dakota (87; 9), New Mexico (79; 11), Idaho (78; 7), Montana (78; 12), New Hampshire (69; 10), North Dakota (66; 10), Maine (59; 12), Rhode Island (59; 9), West Virginia (54; 5), Delaware (51; 4), Hawaii (39; 6), Wyoming (36; 3), Nevada (26; 5), Alaska (13; 4)

3.5.3 OpenAlex



State DOI totals reflect OpenAlex-indexed publications and are normalized by the number of institutions in each state with at least one publication indexed in this source. How to read: State (total DOIs; total institutions). California (392; 128), District Of Columbia (385; 76), New York (298; 94), Maryland (289; 83), North Carolina (238; 38), Massachusetts (216; 59), Pennsylvania (205; 50), Illinois (198; 46), Texas (186; 58), Georgia (185; 40), Virginia (184; 44), Michigan (174; 33), Wisconsin (160; 29), Colorado (155; 32), Florida (155; 40), Washington (140; 33), Ohio (137; 37), Minnesota (133; 27), Iowa (131; 17), Indiana (122; 15), Tennessee (119; 34), Missouri (104; 17), Kansas (98; 8), Kentucky (98; 14), Nebraska (92; 15), Arizona (87; 15), Oregon (85; 21), Oklahoma (81; 13), Alabama (79; 15), South Carolina (74; 8), Vermont (63; 5), Connecticut (60; 24), Utah (60; 11), Mississippi (57; 8), New Jersey (53; 19), Arkansas (48; 17), South Dakota (47; 7), Louisiana (44; 9), Idaho (41; 7), Montana (38; 12), New Hampshire (36; 10), New Mexico (33; 7), Rhode Island (33; 6), Maine (27; 9), North Dakota (19; 6), West Virginia (19; 1), Delaware (16; 3), Hawaii (13; 6), Nevada (13; 4), Wyoming (13; 3), Alaska (4; 2)

4 Conclusion

This report compares the coverage of publications and journals referencing the Census of Agriculture across Scopus and OpenAlex, using two approaches for identifying relevant OpenAlex publications: a full-text search and a seed corpus approach.

Using the full-text search in OpenAlex, we found relatively limited overlap with Scopus. Only 9.2% of publications and 9.2% of journals referencing the Census of Agriculture appeared in both databases, with Scopus identifying a substantially larger share of relevant works. These results suggest that relying solely on OpenAlex's full-text search may miss a significant number of dataset mentions.

Applying the seed corpus approach to OpenAlex improved overlap with Scopus and provided a more structured way to capture publications associated with known journals, authors, and

topics. However, the percentage of overlapping publications referencing the Census of Agriculture is lower at 6.42% even though there is a slightly higher percentage of shared journals at 10.73%.

Comparing the overlap between the two OpenAlex methods reveals differences in underlying samples. Only 20.8% of full-text search publications were also found in the seed corpus set, and 28.9% of seed corpus publications matched those found in the full-text search. Journal-level overlap was somewhat higher, with 137 journals shared between the two methods (representing approximately 50–55% overlap across the two pools).

It is important to note that the full-text search and seed corpus approaches represent two distinct sampling methods within OpenAlex. The full-text search attempts to identify dataset mentions directly from the body of text available for a subset of publications, while the seed corpus approach relies on pre-selected journals, topics, and authors more likely to reference the Census of Agriculture. As a result, the pools of publications identified by each method are not strictly comparable: they are drawn from different underlying subsets of OpenAlex's catalog. This context is important for interpreting differences in coverage and citation intensity across the two approaches.

Tables

Table 4: Top 25 Topics by First Run Count

Topic ID	Topic Name	Full-Text Search Count	Total Count
T11610	Impact of Food Insecurity on Health Outcomes	549	78661
T10010	Global Trends in Obesity and Overweight Research	272	111686
T11066	Comparative Analysis of Organic Agricultural Practices	247	41275
T12253	Urban Agriculture and Community Development	222	27383
T10367	Agricultural Innovation and Livelihood Diversification	186	49818
T11464	Impact of Homelessness on Health and Well-being	175	101019
T12033	European Agricultural Policy and Reform	137	88980
T10841	Discrete Choice Models in Economics and Health Care	126	66757
T10596	Maternal and Child Nutrition in Developing Countries	116	118727
T11898	Impacts of Food Prices on Consumption and Poverty	113	29110
T11259	Sustainable Diets and Environmental Impact	109	45082
T11311	Soil and Water Nutrient Dynamics	84	52847
T10235	Impact of Social Factors on Health Outcomes	81	86076
T10439	Adaptation to Climate Change in Agriculture	77	27311
T11886	Risk Management and Vulnerability in Agriculture	73	44755
T10226	Global Analysis of Ecosystem Services and Land Use	71	84104
T10866	Role of Mediterranean Diet in Health Outcomes	70	76894
T10969	Optimal Operation of Water Resources Systems	70	97570
T10330	Hydrological Modeling and Water Resource Management	69	132216
T11753	Forest Management and Policy	60	75196
T12098	Rural development and sustainability	54	62114
T10111	Remote Sensing in Vegetation Monitoring and Phenology	52	56452
T10556	Global Cancer Incidence and Mortality Patterns	49	64063

Topic ID	Topic Name	Full-Text Search Count	Total Count
T11711	Impacts of COVID-19 on Global Economy and Markets	49	69059
T12724	Integrated Management of Water, Energy, and Food Resources	47	40148

Table 5: Top 25 Journals by First Run Count

Journal ID	Journal Name	Full-Text Search Count	Total Count
S2764628096	Journal of Agriculture Food Systems and Community Development	57	825
S115427279	Public Health Nutrition	51	3282
S206696595	Journal of Nutrition Education and Behavior	41	3509
S15239247	International Journal of Environmental Research and Public Health	39	59130
S4210201861	Applied Economic Perspectives and Policy	39	647
S10134376	Sustainability	35	87533
S5832799	Journal of Soil and Water Conservation	34	556
S2739393555	Journal of Agricultural and Applied Economics	34	329
S202381698	PLoS ONE	30	143568
S124372222	Renewable Agriculture and Food Systems	30	426
S200437886	BMC Public Health	28	18120
S91754907	American Journal of Agricultural Economics	28	876
S18733340	Journal of the Academy of Nutrition and Dietetics	27	5301
S78512408	Agriculture and Human Values	27	938
S110785341	Nutrients	25	30911
S2764593300	Agricultural and Resource Economics Review	25	247
S4210212157	Frontiers in Sustainable Food Systems	23	3776
S63571384	Food Policy	20	1069
S69340840	The Journal of Rural Health	20	749
S4210234824	EDIS	18	3714
S19383905	Agricultural Finance Review	18	327
S119228529	Journal of Hunger & Environmental Nutrition	17	467
S43295729	Remote Sensing	14	33899
S2738397068	Land	14	9774
S80485027	Land Use Policy	14	4559

Table 6: Top 25 Authors by First Run Count Table

Author ID	Author Name	Full-Text Search Count	Total Count
A5016803484	Heather A. Eicher-Miller	15	140
A5024975191	Edward A. Frongillo	13	351
A5055158106	Becca B.R. Jablonski	12	60
A5047780964	Meredith T. Niles	11	200
A5076121862	Sheri D. Weiser	10	241
A5068812455	Cindy W. Leung	10	170
A5062679478	J. Gordon Arbuckle	10	68
A5015017711	Jeffrey K. O'Hara	10	27
A5081656928	Whitney E. Zahnd	9	147
A5002438645	Phyllis C. Tien	8	244
A5035584432	Angela D. Liese	8	172
A5027684365	Dayton M. Lambert	8	110
A5081012770	Linda J. Young	8	51
A5008463933	Catherine Brinkley	8	34
A5030548116	Michele Ver Ploeg	8	33
A5056021318	Nathan Hendricks	7	320
A5024248662	Adebola Adedimeji	7	137
A5002732604	Julia A. Wolfson	7	137
A5038610136	Christopher N. Boyer	7	115
A5044317355	Daniel Merenstein	7	113
A5006129622	Carmen Byker Shanks	7	103
A5060802257	Tracey E. Wilson	7	102
A5050792105	Jennifer L. Moss	7	90
A5032940306	Lisa Harnack	7	89
A5024127854	Eduardo Villamor	7	84