INTERNATIONAL DIETARY DATA EXPANSION PROJECT

INDDEX24: A Digital Solution for Streamlining Dietary Assessment in Low- and Middle-Income Countries

Jennifer Coates PhD
International Dietary Data Expansion (INDDEX) Project
Associate Professor, Tufts University, Boston, USA

Presented to CEDAR/MRC Epidemiology Unit External Seminar Series
University of Cambridge, UK
July 28, 2020

Outline

1. Introduction to the INDDEX Project
2. Dietary data challenges in low- and middle-income countries
3. INDDEX24 Overview
4. Validation Study Snapshot
5. INDDEX24 Next Steps

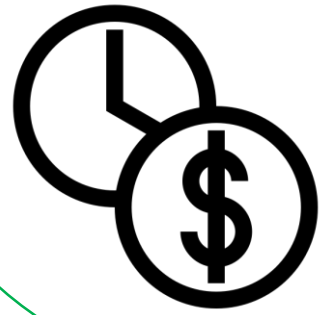
International Dietary Data Expansion (INDDEX) Project Objectives

…of dietary data in low and middle income countries

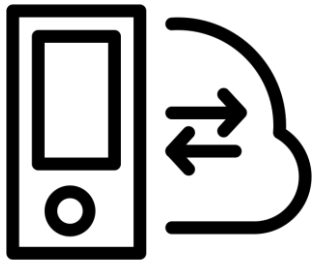
Objective 1: Develop technologies to standardize and streamline the collection and analysis of individual-level dietary data

Routine Individual-level Dietary Data Collection in LMICs is Limited by a Range of Challenges

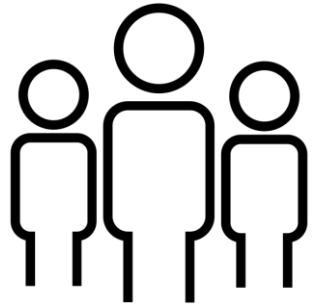
Limited Resources



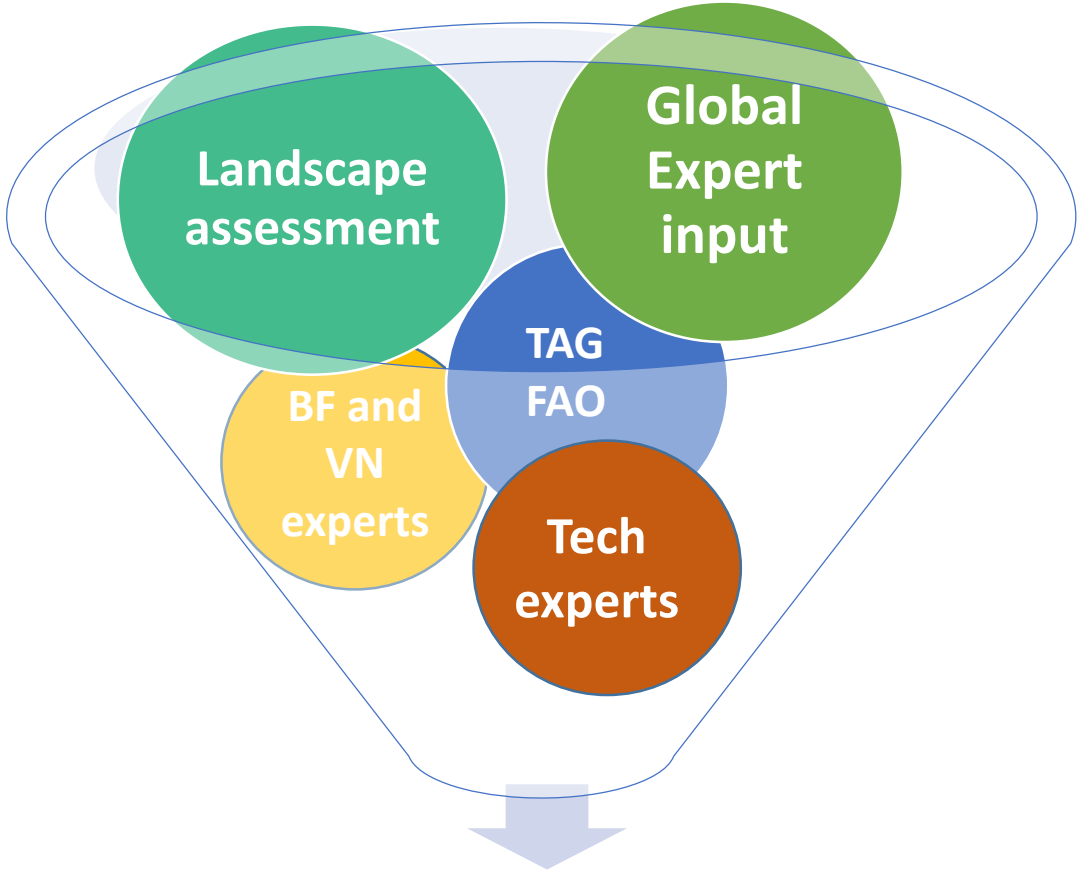
Incomplete Infrastructure



Technical/Methodological Challenges



INDDEX24 Specification Development Process



INDDEX24 Technical Specifications

Burkina Faso

National Institute of Nutrition, Viet Nam

Individual level dietary data are critical for evidence-based decision-making

Priority Technology Needs

1. Prevent “reinventing the wheel” with each new survey
2. Enable adaptability across varied contexts
3. Standardize data collection approaches according to global best practices
4. Streamline data processing and analysis
5. Shorten time and cost required to launch a dietary survey and produce usable dietary data

INDDEX24 Priority Technical specifications	LMIC Bottleneck addressed
1. Tablet-based data collection	Lack of dietary data collection technology
2. Use of multiple-pass 24-hour recall	Lack of standardized approach to 24HR
3. Offline data collection capability	Low internet connectivity
4. Interviewer administered	Low literacy of respondents
5. Contextual adaptability	Lack of accessible and adaptable tools
6. Links to food composition databases	Lack of streamlined data processing
7. Scalable and appropriate for use during national surveys	Limited number of surveys conducted at scale
8. Easy to use	Low technical/technological familiarity
9. Low-cost to adapt	Resource constraints
10. Based on open source code	Need to be openly accessible

REVIEW

Scaling up Dietary Data for Decision-Making in Low-Income Countries: New Technological Frontiers

Winnie Bell, Brooke A Colaiezzi, Cathleen S Prata, and Jennifer C Coates
Friedman School of Nutrition Science and Policy, Tufts University, Boston, MA

ABSTRACT

Dietary surveys in low-income countries (LICs) are hindered by low investment in the necessary research infrastructure, including a lack of basic technology for data collection, links to food composition information, and data processing. The result has been a dearth of dietary data in many

nutrients

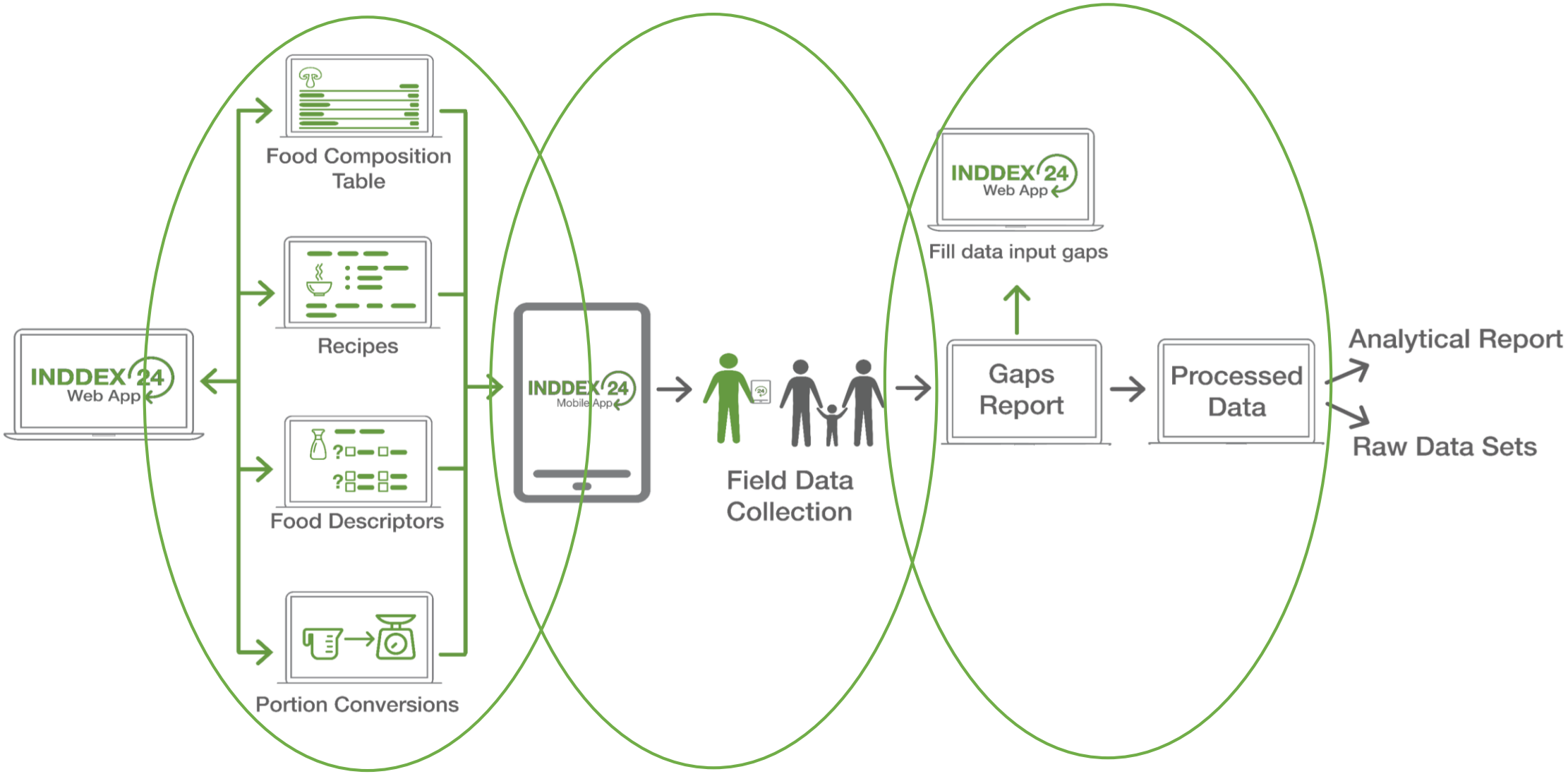
MDPI

Discussion

Overcoming Dietary Assessment Challenges in Low-Income Countries: Technological Solutions Proposed by the International Dietary Data Expansion (INDDEX) Project

Jennifer C. Coates [1,*], Brooke A. Colaiezzi [1], Winnie Bell [1], U. Ruth Charrondiere [2] and Catherine Leclercq [2]

INDDEX24 Dietary Assessment Platform



INTERNATIONAL DIETARY DATA EXPANSION PROJECT

INDDEX24

Web App

- ✓ Centralized, accessible repository of dietary data inputs
- ✓ Links with the mobile app
- ✓ Enables input sharing among users
  - Food composition tables
  - Recipes tables
  - Food descriptors tables
  - Portion conversions tables

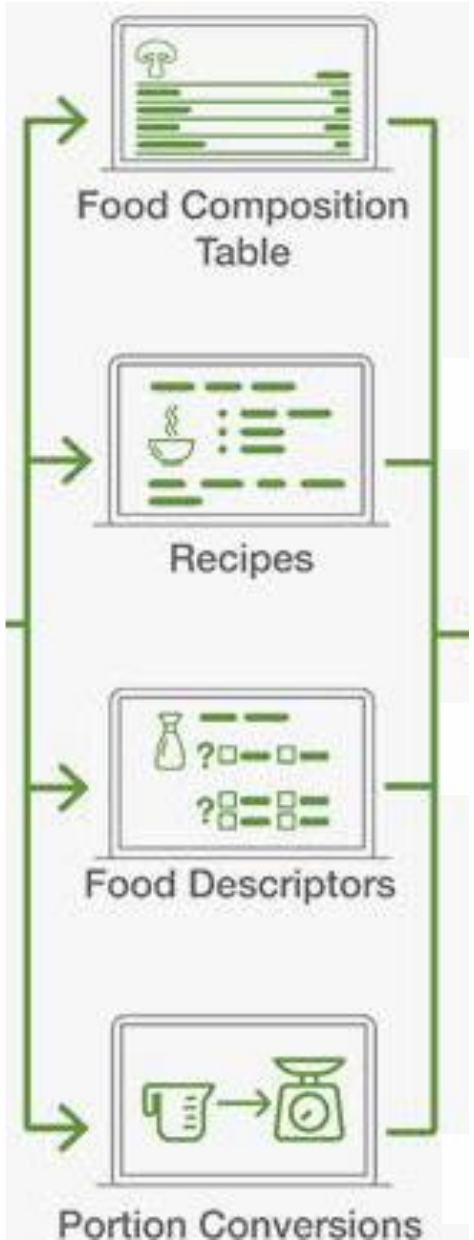
Mobile App

- ✓ Collects 24-hr dietary recall data on tablet or smartphone
- ✓ Interviewer administered
- ✓ Multiple pass method
- ✓ Able to use offline
- ✓ Customizable via linkage with web app
- ✓ Guides interviewers via help/hint text

Analytical Report

- ✓ Generates gaps report to aid food matching and data processing
- ✓ Produces summary statistics:
  - Per nutrient
  - Per FAO/WHO GIFT food group
  - Food and nutrient intakes
  - Allows raw and processed data exports

INDDEX24 Web App Template



152 nutrient components

Foods can be coded with FoodEx2 to support data harmonization

List of recipes, ingredients, and ingredient proportions

List of descriptors used to characterize attributes of the food item

Used as probes in the 24-hour recall survey

Conversion factors

Includes edible portions, and densities

Assign portion estimation aids for survey

Web App Features: Some Highlights

- ✓ Open access platform
- ✓ Users create “workspaces” for their own surveys or repositories of dietary inputs
- ✓ User data can be set to private, read-only, or public (public sharing is encouraged)
- ✓ Users may search for and copy country-specific dietary data inputs to fill gaps in their data or upload their own data using a pre-defined template.
- ✓ Allows for data management online or in Excel

Web App Features: Some Highlights

- ✓ Food and recipe names can be translated in up to 4 languages to support dietary data collection in multiple languages
- ✓ Allows for coding food lists and FCTs with FoodEx2
- ✓ Input data can be seamlessly linked to the INDDEX24 mobile app for dietary intake assessment
- ✓ Analytical reporting features will aid in food matching and produce basic descriptive indicators (e.g. gaps reports, food and nutrient intake summary statistics)

Mobile App Features: Some Highlights

- ✓Allows for repeat recalls to be linked to a respondent, to enable “usual intake” calculations
- ✓Food-specific probes guide interviewers in a consistent manner across a survey
- ✓Allows for real time data monitoring and checking by on-site supervisors and remote data managers
- ✓Instant calories count available for foods consumed as a quick quality check
- ✓Accommodates up to four survey languages at a time (within the same copy of the app)

Mobile App Features: Some Highlights

- ✓Collected survey data are automatically uploaded to secure CommCare server upon connection to internet
- ✓Additional survey modules can be designed in CommCare and administered alongside the diet recall
- ✓Users may access, monitor, and export all survey data through dedicated workspace on the CommCare HQ platform.

INDDEX24 Validation Study Objectives (2019)

- Assess the relative accuracy of the INDDEX24 CAPI 24HR modality compared with the standard PAPI modality for women, using Weighed Food Records (WFR) as the benchmark of accuracy.

- Assess the total and relative costs and cost-effectiveness of producing a clean and analyzable 24HR dataset with INDDEX24 CAPI 24HR compared to a traditional PAPI 24HR.

- Understand survey team impressions of ease-of-use of the INDDEX24 CAPI (compared with the PAPI modality).

INDDEX 24 Validation Study in Viet Nam, Enumerator Feedback

"The biggest impression of [INDDEX24], it is fast and when we finish we do not need to look for codes. And also with standard recipes, we can see ingredients at once."

"The food list and recipe list in the app makes it much easier to search for the exact food. Already matches with the food code. And the data are already entered when we finish the interview. This is a big advantage. Especially for recipes"

"Reviewing information after the interview is easier and more convenient as compared to using pen and paper"

INDDEX 24 Validation Study in Viet Nam, Enumerator Feedback

"It [INDDEX24] is faster and easier and allows us to interact more with the respondents"

"I realize that it, INDDEX24 is easier, faster. It can interact but sometimes it makes the respondent not look at us but at our tablets. They preferred to look at the tablet."

"compared with using pen and paper, I found that using tablet is faster, except with non-standard recipes - then I prefer to use paper because using tablet I need to go back for many steps."

"INDDEX24 guides the enumerators in what to do. It avoids the disadvantages of pen and paper that allows enumerators to be as flexible as they want"

INDDEX 24 Validation Study in Burkina Faso: Enumerator Feedback

"For me, if you are trained on the app and you understand the passes structure, it is not difficult to master it."

"You have to get familiarized to the app so that it become easy to use for you. The more you use it, the more you get skilled and familiar with the app content"

Challenges and Limitations

- **Dietary input data remains a huge bottleneck globally**
  - Under INDDEX Sustain (2020-2022) we intend to make a concerted push to catalyze the web app into a global food reference repository, in partnership with FAO and others.

- **INDDEX24 makes dietary data collection easier, but it is still not easy!**
  - Validation study results will help pinpoint sources of inaccuracy for future betterment
  - We are working on developing user-friendly training and technical assistance packages
  - Future phases of app development will emphasize “optimization” of the software and streamlining software processes.

- **Long-term sustainability isn’t guaranteed**
  - We are working to develop a plan for public launch and scale-up, seeking to maintain accessibility while (likely) needing to levy software subscription fees.
  - Assessing the optimal “long-term institutional home” for INDDEX24

INDDEX Next Steps

- Complete analysis of validation data from Burkina Faso and Viet Nam
- Identify and support early adopters (e.g. Nigeria)
- In collaboration with international partners, agree on parameters for the global food reference repository, and begin to populate the database with official FCTs and other dietary input data using INDDEX24 formatting requirements
- Publicly launch INDDEX24 (early 2021)

INDDEX Team

INDDEX Boston Team

- Jennifer Coates, Principal Investigator
- Beatrice Rogers, Co-Principal Investigator
- Jérôme Somé, Researcher
- Winnie Bell, Researcher
- Brooke Colaiezzi, Researcher
- Sarah Wafa, Researcher
- Cathleen Prata, Senior Program Manager (2015-2020)
- Zachary Gersten, Program Administrator (2015-2018)
- Hallie Perlick, Project Administrator
- Julia Matteson, Project Coordinator
- Mourad Moursi, Diet Assessment Consulting Expert, *Intake*
- Rosalind Gibson, Diet Assessment Consulting Expert

Partners

- United Nations Food and Agriculture Organization (FAO)
- International Food Policy Research Institute (IFPRI)
- Institut National de la Statisque et de la Demographie (Burkina Faso)
- IRSS (Burkina Faso)
- National Institute of Nutrition (Viet Nam)
- Dimagi, Inc.
- Caktus Group

The INDDEX Project is implemented by the Tufts University Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy with funding from The Bill & Melinda Gates Foundation.




Thank You!

Email: INDDEX@tufts.edu
Web: INDDEX.nutrition.tufts.edu
Twitter: @INDDEXProject

The INDDEX Project is implemented by the Tufts University Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy with funding from The Bill & Melinda Gates Foundation.