PRIDE-C

Predicting Infectious Diseases via Environment and Climate

Forecasting diseases in DHIS2 and R

Organization: NGO Pivot, Madagascar Ministry of Health
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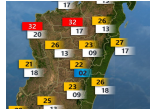
MEASURE

Respiratory Infection

Malaria
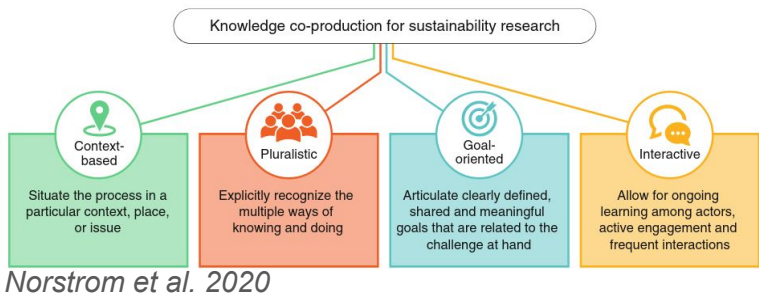
Diarrheal Disease

Case notifications of childhood diseases
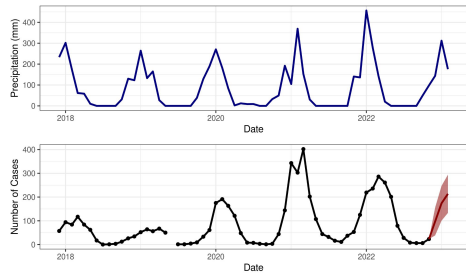
Remotely-sensed climate variables

FORECAST

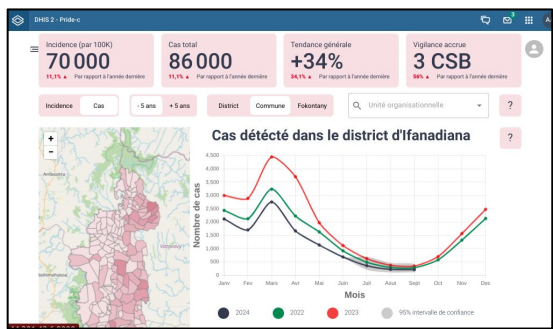Co-produce models via participatory workshops

Ensemble prediction models

Knowledge co-production for sustainability research

Context-based — Situate the process in a particular context, place, or issue

Pluralistic — Explicitly recognize the multiple ways of knowing and doing

Goal-oriented — Articulate clearly defined, shared and meaningful goals that are related to the challenge at hand

Interactive — Allow for ongoing learning among actors, active engagement and frequent interactions

Norstrom et al. 2020

INFORM

Co-develop open-source software with developers and end-users

ASSESS

Difference-in-Difference Analysis
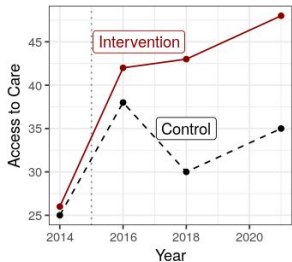
Quantity
Visitation rates

Timeliness
Cases diagnosed in 24 hrs

Quality
Cases correctly diagnosed

Burden
Incidence Rates

Evaluate decision making processes

Open-source R package to implement forecasting workflow

Data Processing

import_data
- Import data from DHIS2

prep_data
- Lag predictors
- Normalize predictors
- Impute missing predictors
- Create spatial structure

split_cv_rolling
- Create multiple cross-validation sets containing assessment/ analysis splits (cv_set)
- Uses rolling origin splits

Model Training

tune_*
- Split into tune/test via temporal stratification
- Tune hyperparameters

fit_*
- Split into tune/test via temporal stratification
- Tune hyperparameters

eval_performance
- Evaluate on assessment and analysis data via multiple metrics

inv_variables_*
- Variable importance via permutation
- counterfactual/pdp plots

Forecasting

ensemble_forecast
- Create forecast for one cv_set using ensemble of models based on weights

export_forecast
- Export forecast to DHIS2

Learn more about the PRIDE-C R package on our website:

https://pivot-madagascar.github.io/PRIDEC-package/

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