

Kiwa WISH+
Watershed Interventions for Systems Health Plus



Kiwa WISH+ Decision Support Tool

Instruction Manual

Version 1
July 2026

THE KIWA INITIATIVE IS FUNDED BY :



In partnership with



Overview

The Kiwa WISH+ project supports integrated water resources management approaches that aim to strengthen ecosystem health, climate resilience, and human well-being across rural Melanesian watersheds. As part of the project, an online Decision Support Tool has been developed to support integrated watershed and disease-risk management strategies in Fiji, Solomon Islands, and Papua New Guinea.

The Decision Support Tool predicts infection risk factors for two critically important water-related infectious diseases in the region, leptospirosis and typhoid, and allows users to test how these factors may change under a range of different management intervention scenarios. The Intervention scenarios include a suite of actions, ranging from improvements to household water, sanitation, and hygiene services, to nature-based solutions that manage soil erosion and the spread of contaminated soil and water.

The Decision Support Tool uses Bayesian Belief Network (BBN) models to model key transmission pathways driving leptospirosis and typhoid infections and provide mapped predictions on infection risk factors and overall Infection Risk.

In this Instruction Manual, we provide instructions on how to use the Decision Support Tool and some key considerations for when interpreting results. Please see the Methodology Report for further details on the Bayesian Belief Network modelling methodology.

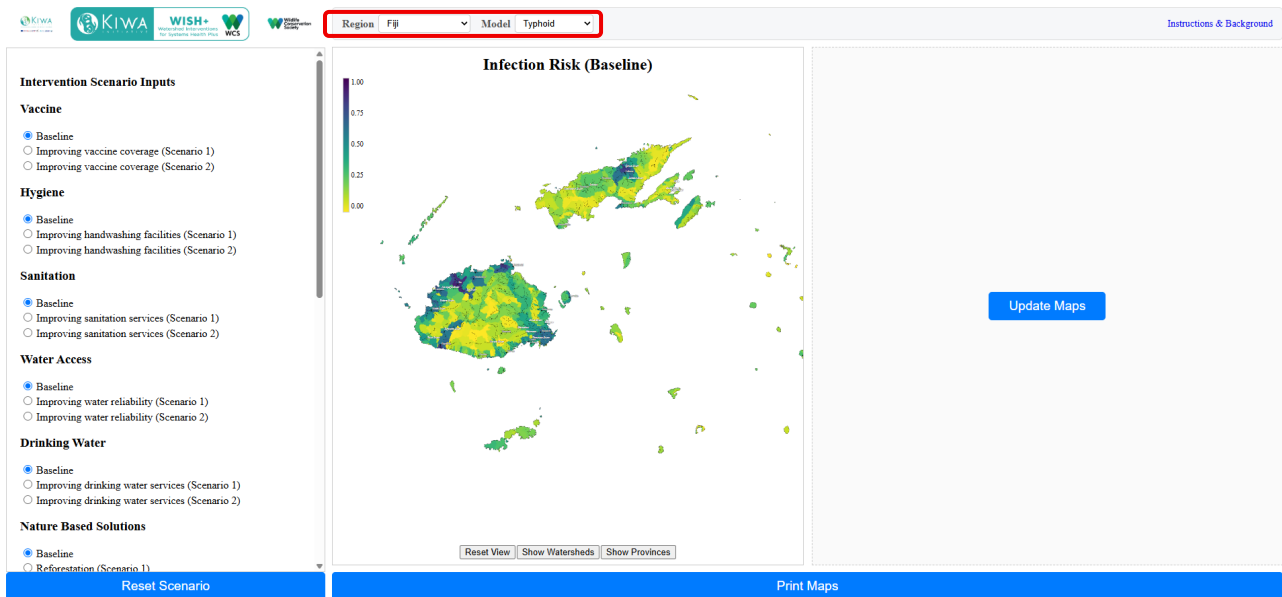
The tool and models behind it were developed in collaboration with the University of Queensland and Bayesian Intelligence, with support from the Kiwa initiative and the Wildlife Conservation Society.

Decision Support Tool: <https://wish.bayesian-intelligence.com/>

How to use the tool

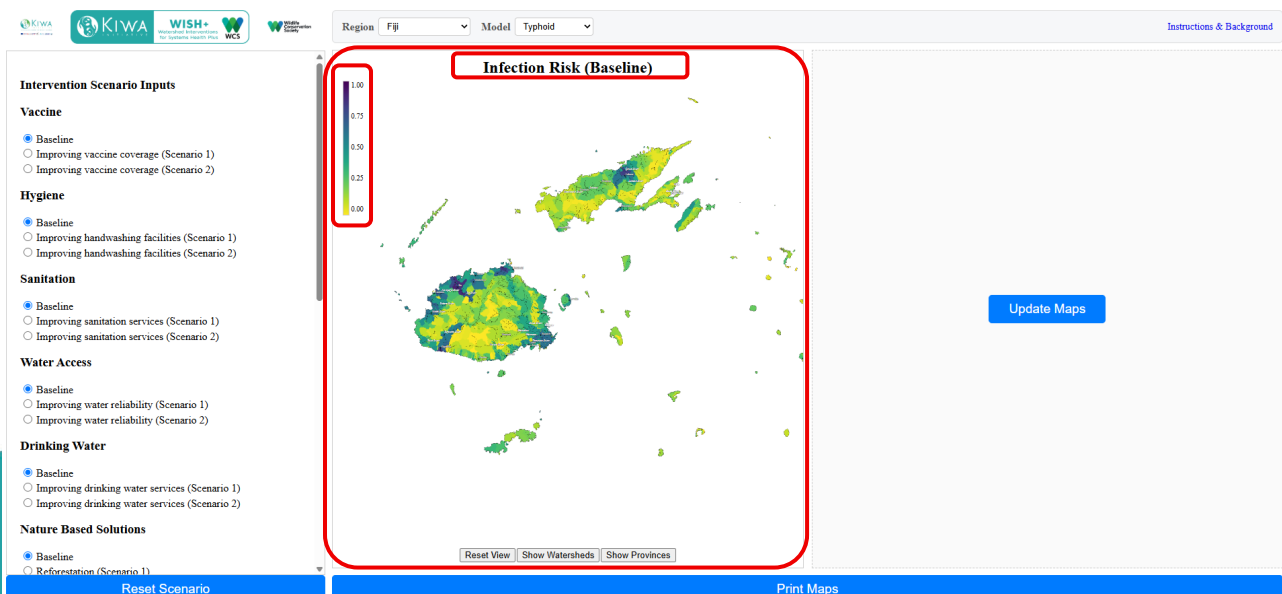
Select the context to view

Select which country to view (either Fiji, Solomon Islands, or Papua New Guinea) and which disease model outputs to view (either Typhoid or Leptospirosis) using the dropdown buttons at the top of the Tool.



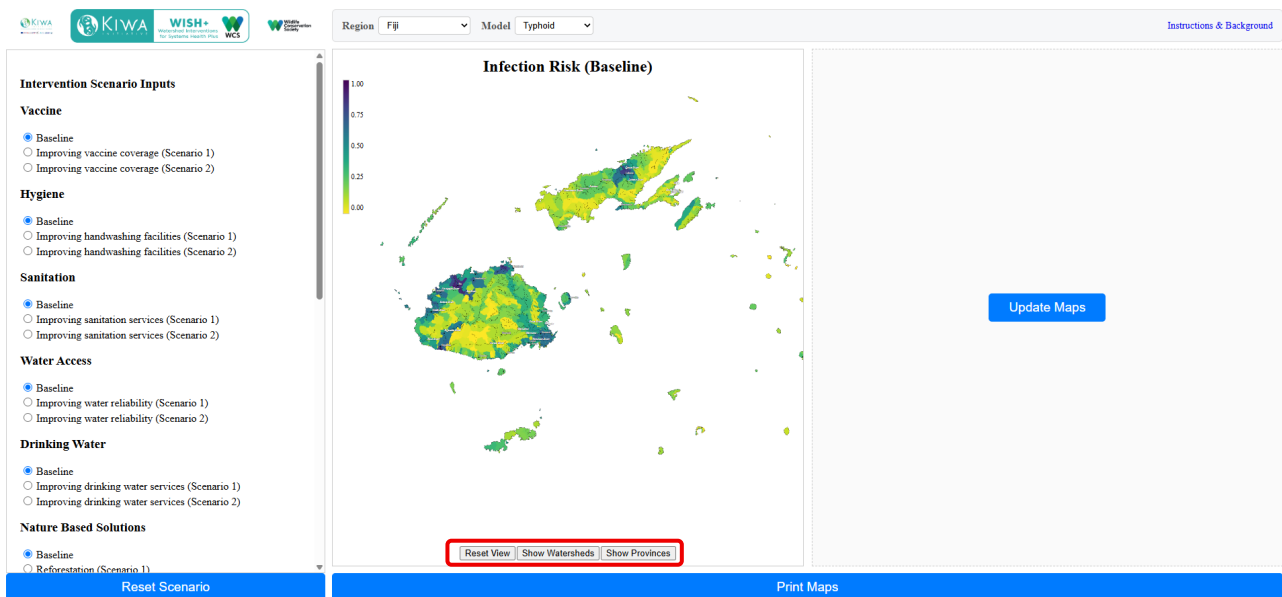
Baseline map

The map on the left always shows predicted outcomes under baseline conditions, i.e., under current conditions without any interventions applied. The outcome variable is labelled within the map title, and the legend on the left shows the spread of outcome values. When first opening the tool, the outcome variable is Infection Risk under baseline conditions, scaled from 1 to 0.



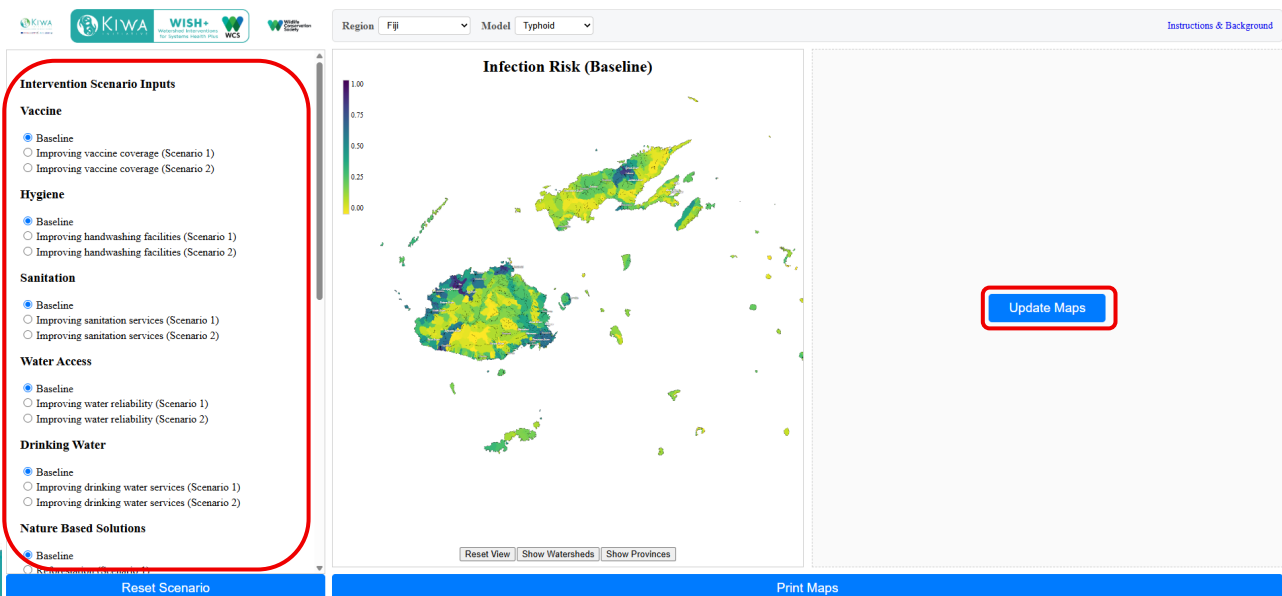
Map views

You can move around the map by clicking, dragging, and scrolling across the Baseline map. At the bottom of the Baseline map are options to *Reset View* which recenters the map, *Show Watersheds* which turns off/on the display of watershed boundaries, and *Show Provinces* which turns off/on the display of Province boundaries for each country.

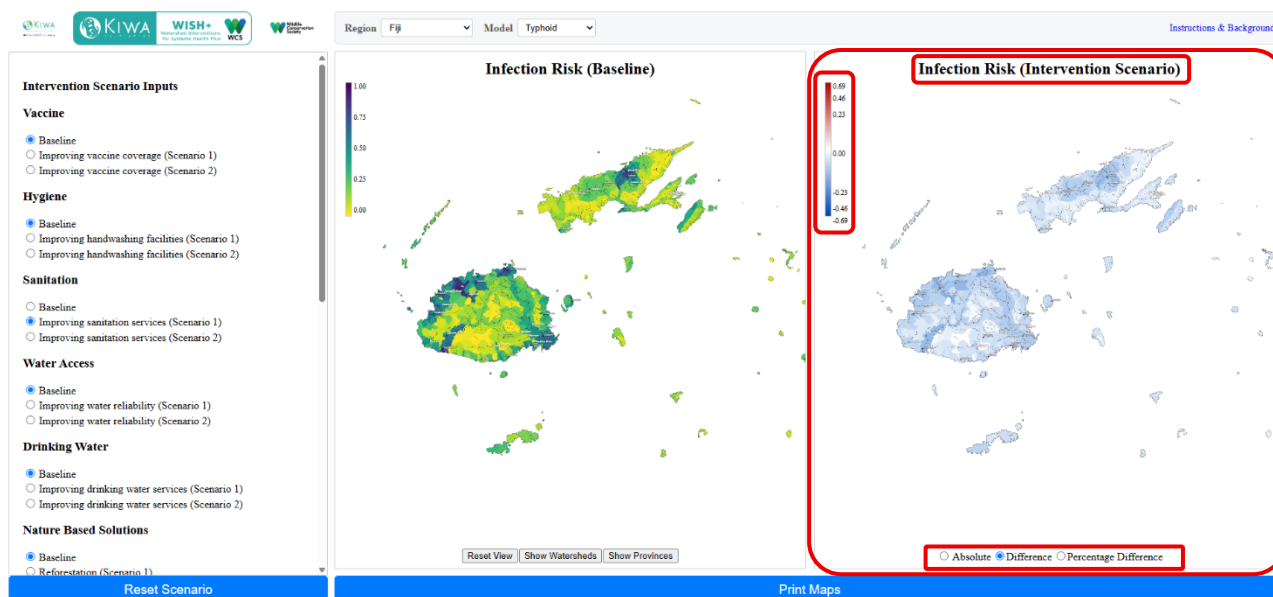


Explore Intervention Scenarios

Explore Intervention Scenario options by scrolling through the panel on the left. Hovering the mouse over an intervention will show a brief description of the Intervention Scenario. Click to select the Scenario(s) you would like to map, and when you've finished your selection, click *Update Maps* on the panel on the right.



When updated, the panel on the right will show an Intervention Scenario map with the predicted result of applying your selected Scenario(s). The outcome variable is labelled within the map title, and the legend on the left shows the spread of outcome values. Use the Baseline map on the left to change the view or zoom extent. Hovering the mouse over an area unit will show its data values. At the bottom of the Intervention Scenario map are different viewing options to explore the influence of applying your selected Scenario(s). Selecting *Absolute* values shows the predicted outcome values under your selected Scenario(s). Selecting *Difference* or *Percentage Difference* shows the difference in outcome values compared against the Baseline.



NOTE: All interventions are aiming to improve disease outcomes, with the exception of the nature-based scenarios relating to Deforestation, which illustrate the consequence of failing to protect forests.

Explore Outcome Variable Options

You can view the different options for outcome variables by scrolling down to the bottom of the panel on the left. This allows you to explore the underlying risk factors that are driving Infection Risk (e.g., contamination load in surface water). The selected outcome variable is displayed in the map title of both the Baseline and Intervention Scenario maps.

The screenshot shows the WISH+ tool interface. On the left, a list of variables is displayed under the heading 'Output Variables'. The variables include: Contamination Load, Contamination Load Ground Water, Contamination Load Humans, Contamination Load Soil, Contamination Load Surface Water, Exposure Ground Water, Exposure Humans, Exposure Soil, Exposure Surface Water, Infection Risk, Transmission, Transmission Ground Water, Transmission Humans, Transmission Soil, and Transmission Surface Water. The 'Infection Risk' variable is selected. The map on the right is titled 'Infection Risk (Baseline)' and shows a map of Fiji with a color scale from 0.00 to 1.00. The 'Update Maps' button is visible on the right side of the map. The 'Reset Scenario' button is at the bottom left, and the 'Print Maps' button is at the bottom right.

Downloading Outputs

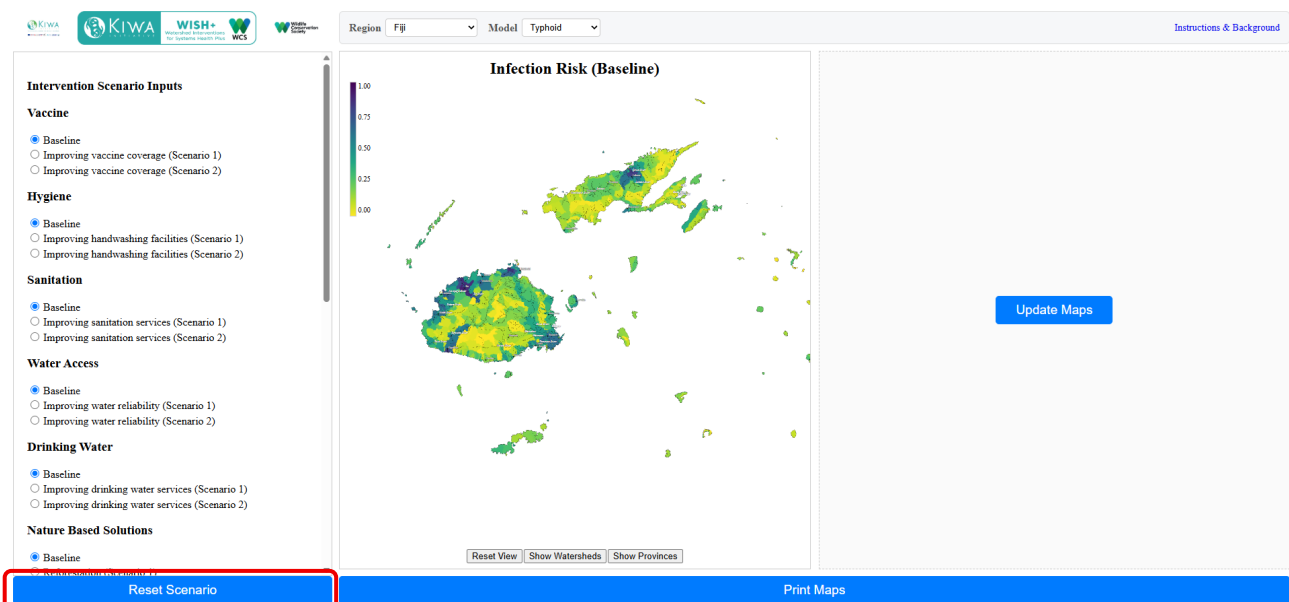
You are able to download images of the Baseline and Intervention Scenario maps directly as Portable Network Graphic (PNG) files. Download these images by selecting the “*Print Maps*” button at the bottom of the tool and then choosing where to save the file.

The screenshot shows the WISH+ tool interface with the 'Intervention Scenario Inputs' panel on the left. The panel is divided into sections: Vaccine, Hygiene, Sanitation, Water Access, Drinking Water, and Nature Based Solutions. Each section has a 'Baseline' option selected. The map on the right is titled 'Infection Risk (Baseline)' and shows a map of Fiji with a color scale from 0.00 to 1.00. The 'Update Maps' button is visible on the right side of the map. The 'Reset Scenario' button is at the bottom left, and the 'Print Maps' button is at the bottom right.

Troubleshooting

The tool allows users to combine multiple interventions and estimate changes in the resulting Infection Risk and other disease risk factors. To avoid accidentally carrying interventions over into a new scenario, we recommend pressing the *Reset Scenario* button between sessions. This restores the scenario to its default settings.

The decision-support tool runs models across a large amount of spatial data and may therefore take some time to complete, sometimes up to five minutes. If the run takes longer than five minutes, the connection may have timed out. In this case, we recommend reloading the page and rerunning the scenario.



Interpretation of Outcomes

The Decision Support Tool provides its predictions based on the best available understanding of key disease risk factors and transmission pathways for which sufficient data was also available to produce predictive maps. However, with limited spatialised data on leptospirosis and typhoid infections across the three countries to validate model outputs, results should be interpreted with caution as predictions are based only on the risk factors included in the models.

The Intervention Scenarios presented here are a collection of broad management options for disease prevention applied at a national scale. However, there is considerable local variability in the implementation success and relevance of actions necessary for different Intervention Scenarios. Consequently, even when an Intervention Scenario is predicted to be highly effective at reducing disease risks by the Tool, users should carefully consider the local implementation environment to further assess which actions are most suitable to implement the Intervention and whether they are locally applicable.

See the Methodology Report for further details on interpretation of outcomes, including some examples of actions that could work to implement each Intervention.

Contact

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