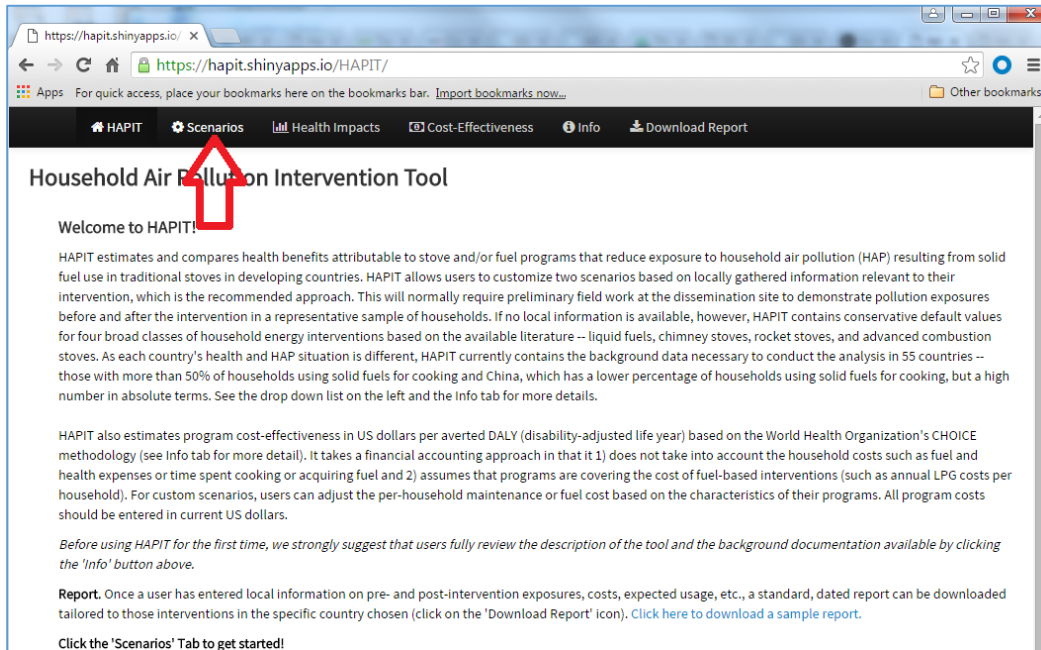


Step 1: To estimate and compare the health benefits that are attributable to your stove and/or fuel program that reduces exposure to HAP, go to <https://hapit.shinyapps.io/HAPIT/> and click the “Scenarios” tab.



Household Air Pollution Intervention Tool

Welcome to HAPIT!

HAPIT estimates and compares health benefits attributable to stove and/or fuel programs that reduce exposure to household air pollution (HAP) resulting from solid fuel use in traditional stoves in developing countries. HAPIT allows users to customize two scenarios based on locally gathered information relevant to their intervention, which is the recommended approach. This will normally require preliminary field work at the dissemination site to demonstrate pollution exposures before and after the intervention in a representative sample of households. If no local information is available, however, HAPIT contains conservative default values for four broad classes of household energy interventions based on the available literature – liquid fuels, chimney stoves, rocket stoves, and advanced combustion stoves. As each country's health and HAP situation is different, HAPIT currently contains the background data necessary to conduct the analysis in 55 countries -- those with more than 50% of households using solid fuels for cooking and China, which has a lower percentage of households using solid fuels for cooking, but a high number in absolute terms. See the drop down list on the left and the Info tab for more details.

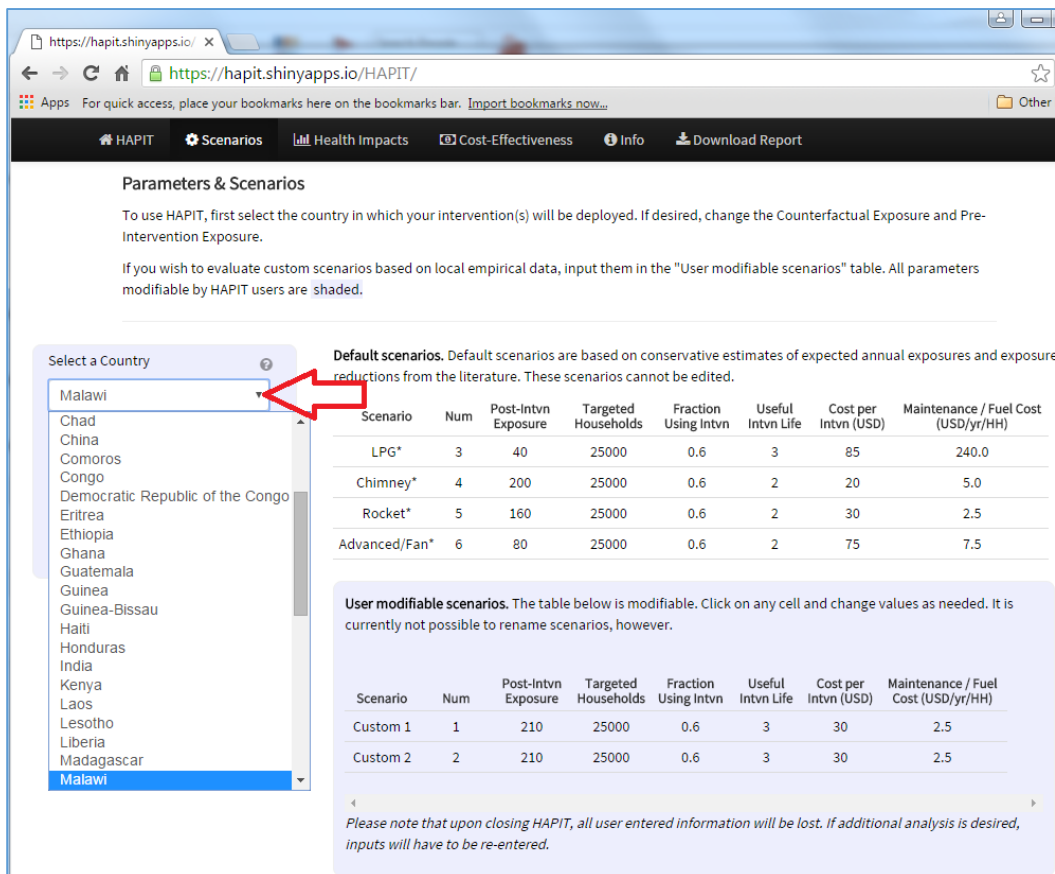
HAPIT also estimates program cost-effectiveness in US dollars per averted DALY (disability-adjusted life year) based on the World Health Organization's CHOICE methodology (see Info tab for more detail). It takes a financial accounting approach in that it 1) does not take into account the household costs such as fuel and health expenses or time spent cooking or acquiring fuel and 2) assumes that programs are covering the cost of fuel-based interventions (such as annual LPG costs per household). For custom scenarios, users can adjust the per-household maintenance or fuel cost based on the characteristics of their programs. All program costs should be entered in current US dollars.

Before using HAPIT for the first time, we strongly suggest that users fully review the description of the tool and the background documentation available by clicking the 'Info' button above.

Report. Once a user has entered local information on pre- and post-intervention exposures, costs, expected usage, etc., a standard, dated report can be downloaded tailored to those interventions in the specific country chosen (click on the 'Download Report' icon). [Click here to download a sample report.](#)

Click the 'Scenarios' Tab to get started!

Step 2: Select the country where you are implementing the intervention. Note that national averages may not accurately represent specific regions like mountains or populations like villages in extreme poverty. See the Info tab for data sources.



Parameters & Scenarios

To use HAPIT, first select the country in which your intervention(s) will be deployed. If desired, change the Counterfactual Exposure and Pre-Intervention Exposure.

If you wish to evaluate custom scenarios based on local empirical data, input them in the "User modifiable scenarios" table. All parameters modifiable by HAPIT users are shaded.

Select a Country

Malawi

Chad
China
Comoros
Congo
Democratic Republic of the Congo
Eritrea
Ethiopia
Ghana
Guatemala
Guinea
Guinea-Bissau
Haiti
Honduras
India
Kenya
Laos
Lesotho
Liberia
Madagascar
Malawi

Default scenarios. Default scenarios are based on conservative estimates of expected annual exposures and exposure reductions from the literature. These scenarios cannot be edited.

Scenario	Num	Post-Intvn Exposure	Targeted Households	Fraction Using Intvn	Useful Intvn Life	Cost per Intvn (USD)	Maintenance / Fuel Cost (USD/yr/HH)
LPG*	3	40	25000	0.6	3	85	240.0
Chimney*	4	200	25000	0.6	2	20	5.0
Rocket*	5	160	25000	0.6	2	30	2.5
Advanced/Fan*	6	80	25000	0.6	2	75	7.5

User modifiable scenarios. The table below is modifiable. Click on any cell and change values as needed. It is currently not possible to rename scenarios, however.

Scenario	Num	Post-Intvn Exposure	Targeted Households	Fraction Using Intvn	Useful Intvn Life	Cost per Intvn (USD)	Maintenance / Fuel Cost (USD/yr/HH)
Custom 1	1	210	25000	0.6	3	30	2.5
Custom 2	2	210	25000	0.6	3	30	2.5

Please note that upon closing HAPIT, all user entered information will be lost. If additional analysis is desired, inputs will have to be re-entered.

Step 3: If desired, change the counterfactual exposure from the default setting of 10 to 7 or 35. To estimate benefits, HAPIT requires an “ideal” counterfactual to be defined, below which there is no risk to health. The default setting in HAPIT is 10 $\mu\text{g}/\text{m}^3$ because this is the official Indoor Air Quality Guideline (AQG) from WHO. 7 $\mu\text{g}/\text{m}^3$ is the value used by the 2010 Burden of Disease, 35 $\mu\text{g}/\text{m}^3$ is the interim Target-1 in the WHO AQGs. See the Info tab for data sources.

Parameters & Scenarios

To use HAPIT, first select the country in which your intervention(s) will be deployed. If desired, change the Counterfactual Exposure and Pre-Intervention Exposure.

If you wish to evaluate custom scenarios based on local empirical data, input them in the "User modifiable scenarios" table. All parameters modifiable by HAPIT users are shaded.

Select a Country: Malawi

Select a Counterfactual Exposure: 10

Select the Pre-Intervention Exposure: 285

Default scenarios. Default scenarios are based on conservative estimates of expected annual exposures and exposure reductions from the literature. These scenarios cannot be edited.

Scenario	Num	Post-Intvn Exposure	Targeted Households	Fraction Using Intvn	Useful Intvn Life	Cost per Intvn (USD)	Maintenance / Fuel Cost (USD/yr/HH)
LPG*	3	40	25000	0.6	3	85	240.0
Chimney*	4	200	25000	0.6	2	20	5.0
Rocket*	5	160	25000	0.6	2	30	2.5
Advanced/Fan*	6	80	25000	0.6	2	75	7.5

User modifiable scenarios. The table below is modifiable. Click on any cell and change values as needed. It is currently not possible to rename scenarios, however.

Scenario	Num	Post-Intvn Exposure	Targeted Households	Fraction Using Intvn	Useful Intvn Life	Cost per Intvn (USD)	Maintenance / Fuel Cost (USD/yr/HH)
Custom 1	1	210	25000	0.6	3	30	2.5
Custom 2	2	210	25000	0.6	3	30	2.5

Please note that upon closing HAPIT, all user entered information will be lost. If additional analysis is desired, inputs will have to be re-entered.

Step 4: If you have the data available, enter an exposure value in annual mean $\mu\text{g}/\text{m}^3$.n.b from before your intervention was implemented. The default pre-intervention exposure is 285 $\mu\text{g}/\text{m}^3$.n.b, a personal exposure value, which is related but not necessarily equal to outdoor and indoor concentrations of pollution. You will notice the unshaded default scenarios to the right of the screen change automatically when the pre-intervention exposure level is changed.

Parameters & Scenarios

To use HAPIT, first select the country in which your intervention(s) will be deployed. If desired, change the Counterfactual Exposure and Pre-Intervention Exposure.

If you wish to evaluate custom scenarios based on local empirical data, input them in the "User modifiable scenarios" table. All parameters modifiable by HAPIT users are shaded.

Select a Country: Malawi

Select a Counterfactual Exposure: 10

Select the Pre-Intervention Exposure: 285

Default scenarios. Default scenarios are based on conservative estimates of expected annual exposures and exposure reductions from the literature. These scenarios cannot be edited.

Scenario	Num	Post-Intvn Exposure	Targeted Households	Fraction Using Intvn	Useful Intvn Life	Cost per Intvn (USD)	Maintenance / Fuel Cost (USD/yr/HH)
LPG*	3	40	25000	0.6	3	85	240.0
Chimney*	4	200	25000	0.6	2	20	5.0
Rocket*	5	160	25000	0.6	2	30	2.5
Advanced/Fan*	6	80	25000	0.6	2	75	7.5

User modifiable scenarios. The table below is modifiable. Click on any cell and change values as needed. It is currently not possible to rename scenarios, however.

Scenario	Num	Post-Intvn Exposure	Targeted Households	Fraction Using Intvn	Useful Intvn Life	Cost per Intvn (USD)	Maintenance / Fuel Cost (USD/yr/HH)
Custom 1	1	210	25000	0.6	3	30	2.5
Custom 2	2	210	25000	0.6	3	30	2.5

Please note that upon closing HAPIT, all user entered information will be lost. If additional analysis is desired, inputs will have to be re-entered.

Step 5: Review the unshaded default scenarios.

← → ↻ 🏠 <https://hapit.shinyapps.io/HAPIT/> ☆ ⓘ

Apps For quick access, place your bookmarks here on the bookmarks bar. [Import bookmarks now...](#) Other bookmarks

HAPIT Scenarios Health Impacts Cost-Effectiveness Info Download Report

Parameters & Scenarios

To use HAPIT, first select the country in which your intervention(s) will be deployed. If desired, change the Counterfactual Exposure and Pre-Intervention Exposure.

If you wish to evaluate custom scenarios based on local empirical data, input them in the "User modifiable scenarios" table. All parameters modifiable by HAPIT users are shaded.

Select a Country

Malawi

Select a Counterfactual Exposure

10

Select the Pre-Intervention Exposure

285

Default scenarios. Default scenarios are based on conservative estimates of expected annual exposures and exposure reductions from the literature. These scenarios cannot be edited.

Scenario	Num	Post-Intvn Exposure	Targeted Households	Fraction Using Intvn	Useful Intvn Life	Cost per Intvn (USD)	Maintenance / Fuel Cost (USD/yr/HH)
LPG*	3	40	25000	0.6	3	85	240.0
Chimney*	4	200	25000	0.6	2	20	5.0
Rocket*	5	160	25000	0.6	2	30	2.5
Advanced/Fan*	6	80	25000	0.6	2	75	7.5

User modifiable scenarios. The table below is modifiable. Click on any cell and change values as needed. It is currently not possible to rename scenarios, however.

Custom 1	1	210	25000	0.6	3	30	2.5
Custom 2	2	210	25000	0.6	3	30	2.5

Please note that upon closing HAPIT, all user entered information will be lost. If additional analysis is desired, inputs will have to be re-entered.

The scenario column shows each technology type used in each default intervention. The data entered for each scenario are based on conservative estimates of expected annual exposures and exposure reductions from the literature. The "Num" column simply exists to organize the structure of the report that will be downloaded later. The "Post-intvn Exposure" column estimates the personal exposure level in $\mu\text{g}/\text{m}^3$. n.b after the intervention has been deployed. The targeted households is the number of households that were provided with the technology during the intervention. The "Fraction Using Intvn" column is set to 60% in the default scenarios and represents the intensity at which the 25,000 households that acquired the technology, used it. The last two columns include data that is used to calculate cost effectiveness.

Step 6: Modify your custom scenarios. All fields in the modifiable scenarios section are customizable except for the “Num” column. If the inputs in the “Num” column are changed, the system will produce an error message when you try to download your report. The capability to rename your custom scenarios in the table below exists, but the names you enter will not carry over into the report you will download later. In the example below, the custom scenarios were modified to calculate the health outcomes in India for a hypothetical program without local data available from a prior field study. To use HAPIT to calculate the health outcomes of an LPG intervention with a use rate of 80% and of an advance biomass/fan stove intervention with a use rate of 80%, both across 25,000 households in India, all you need to do is replicate the default data for each technology in the default scenarios and change the data in the “Fraction Using Intvn” column from 0.6 to 0.8.

Default scenarios. Default scenarios are based on conservative estimates of expected annual exposures and exposure reductions from the literature. These scenarios cannot be edited.

Scenario	Num	Post-Intvn Exposure	Targeted Households	Fraction Using Intvn	Useful Intvn Life	Cost per Intvn (USD)	Maintenance / Fuel Cost (USD/yr/HH)
LPG*	3	40	25000	0.6	3	85	240.0
Chimney*	4	200	25000	0.6	2	20	5.0
Rocket*	5	160	25000	0.6	2	30	2.5
Advanced/Fan*	6	80	25000	0.6	2	75	7.5

User modifiable scenarios. The table below is modifiable. Click on any cell and change values as needed. It is currently not possible to rename scenarios, however.

Custom 1	1	40	25000	0.8	3	85	240.0
Custom 2	2	80	25000	0.8	2	75	7.5

Please note that upon closing HAPIT, all user entered information will be lost. If additional analysis is desired, inputs will have to be re-entered.

If you have local data from a field study you can enter that data in the modifiable scenarios fields. When you download the report, it will show the health outcomes for your specific program.

Step 7: Download the report.

←→↻🏠🔒https://hapit.shinyapps.io/HAPIT/☆🌐

AppsFor quick access, place your bookmarks here on the bookmarks bar. Import bookmarks now...Other bo...

HAPIT

Scenarios

Health Impacts

Cost-Effectiveness

Info

Download Report

Parameters & Scenarios

To use HAPIT, first select the country in which your intervention(s) will be deployed. If desired, change the Counterfactual Exposure and Pre-Intervention Exposure.

If you wish to evaluate custom scenarios based on local empirical data, input them in the "User modifiable scenarios" table. All parameters modifiable by HAPIT users are shaded.

Select a Country

Malawi

Select a Counterfactual Exposure

10

Select the Pre-Intervention Exposure

285

Default scenarios.

Default scenarios are based on conservative estimates of expected annual exposures and exposure reductions from the literature. These scenarios cannot be edited.

Scenario	Num	Post-Intvn Exposure	Targeted Households	Fraction Using Intvn	Useful Intvn Life	Cost per Intvn (USD)	Maintenance / Fuel Cost (USD/yr/HH)
LPG*	3	40	25000	0.6	3	85	240.0
Chimney*	4	200	25000	0.6	2	20	5.0
Rocket*	5	160	25000	0.6	2	30	2.5
Advanced/Fan*	6	80	25000	0.6	2	75	7.5

User modifiable scenarios.

The table below is modifiable. Click on any cell and change values as needed. It is currently not possible to rename scenarios, however.

Custom 1	1	210	25000	0.6	3	30	2.5
Custom 2	2	210	25000	0.6	3	30	2.5

Please note that upon closing HAPIT, all user entered information will be lost. If additional analysis is desired, inputs will have to be re-entered.

Step 8: Review the health outcomes of your program or hypothetical interventions in the downloaded report.

The beginning of the report describes the national demographic data the analysis was based on to generate the health outcomes you will see in the report.

Total Averted Deaths and DALYs

Scenario	Pre-Intervention	Post-Intervention	Total DALYs	Total Deaths
Custom 1	285	40	13060	282.00
Custom 2	285	80	3239	68.20
LPG*	285	40	9840	211.70
Chimney*	285	200	495	12.13
Rocket*	285	160	864	20.53
Advanced/Fan*	285	80	2359	50.40

Children's Health: Averted Deaths and DALYs due to ALRI

Scenario	Pre-Intervention	Post-Intervention	ALRI DALYs <5	ALRI Deaths <5
Custom 1	285	40	8400	97.0
Custom 2	285	80	2100	24.0
LPG*	285	40	6300	73.0
Chimney*	285	200	250	2.9
Rocket*	285	160	470	5.5
Advanced/Fan*	285	80	1500	18.0

Averted Deaths and DALYs due to Chronic Diseases in Adults

Scenario	Pre-Intervention	Post-Intervention	COPD DALYs	COPD Deaths	IHD DALYs	IHD Deaths
Custom 1	285	40	2400	84.0	1400	61.0
Custom 2	285	80	660	23.0	320	14.0
LPG*	285	40	1800	63.0	1100	45.0
Chimney*	285	200	160	5.5	59	2.6
Rocket*	285	160	250	8.8	99	4.3
Advanced/Fan*	285	80	500	17.0	240	10.0

Scenario	Pre-Intervention	Post-Intervention	Lung Cancer DALYs	Lung Cancer Deaths	Stroke DALYs	Stroke Deaths
Custom 1	285	40	260	10.00	600	30.00
Custom 2	285	80	71	2.80	88	4.40
LPG*	285	40	190	7.70	450	23.00
Chimney*	285	200	16	0.63	10	0.50
Rocket*	285	160	26	1.00	19	0.93
Advanced/Fan*	285	80	53	2.10	66	3.30