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WaterWorld: impacts du changement d'affectation du sol sous le *statu quo* (BAU) pour CAZ

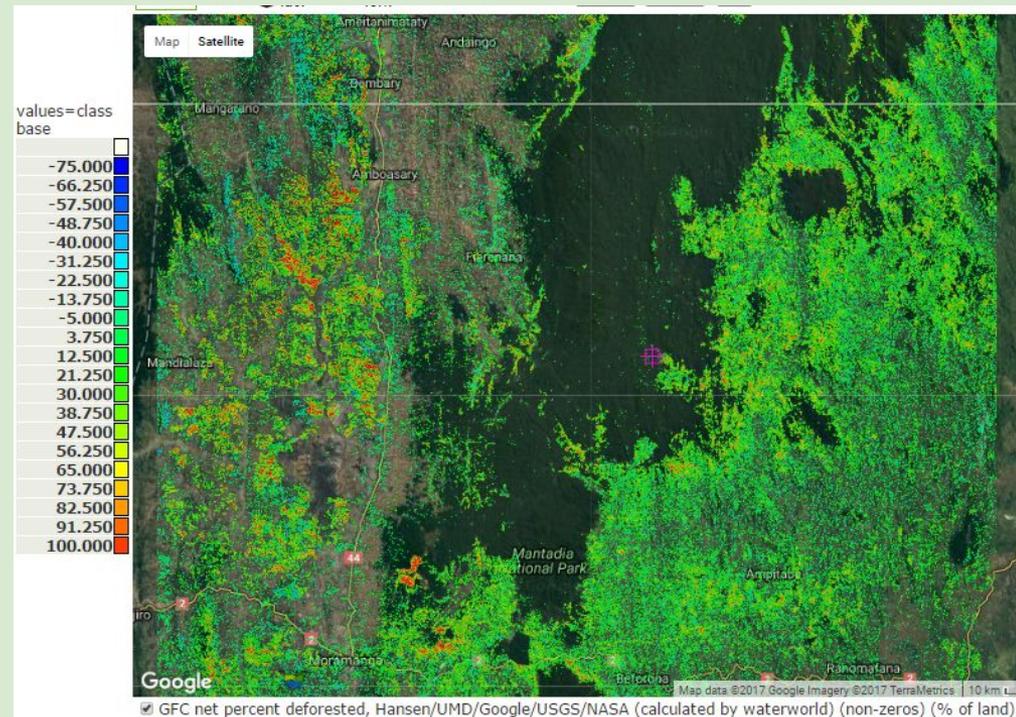
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UNIVERSITY OF TWENTE.

Monter un scénario de déforestation qui maintient le *statu quo* (BAU) avec WaterWorld

- Projeter les taux de déforestation récents pour les 30 prochaines années (basé sur le GFC net loss data) et un modèle de changement d'affectation des sols (CAS)
- Ce scénario est différent de celui établi par Jenny Hewson pour P4GES. Jenny a utilisé [Clark Labs land Change Modeller](#). Nous allons utiliser [QUICKLUC](#) dans WaterWorld, qui est similaire
- Convertir les forêts pour l'agriculture dans les pixels appropriés



The image shows a screenshot of a web application interface. On the left is a sidebar with the 'KING'S College LONDON' logo, a 'WaterWorld' globe, and various navigation links like 'Report problem', 'Logout', 'Control panel', 'Want v.1? | Want v.3?', 'explore:', 'set-up:', 'simulation:', 'results:', and 'Help:'. The main content area is a browser window titled 'Policy options - Google Chrome' showing a URL from 'www1.policysupport.org'. A yellow banner at the top of the browser window says 'Click the scenario, intervention or uncertainty tool you would like to use (the tools available will depend on your licensed access level)'. Below this is a list of options with radio buttons: 'Climate Change', 'Land Use and Cover Change', 'Land and water management', 'Change input maps', 'Extractives', and 'Population'. The 'Land Use and Cover Change' option is selected and labeled with a red 'B'. Below the list is a 'Submit choice' button with a green checkmark, labeled with a red 'C', and a 'Close window' button. Below the browser window, the main application interface shows a yellow banner for 'LAND USE AND COVER CHANGE: choose the scenario that you wish to apply.' followed by a link 'View recent land use and cover change'. Below this is a text block describing 'FOREST TO HERBACEOUS and HERBACEOUS TO FOREST' changes. To the right of this text is a red 'D'. Below the text are several expandable sections: 'Use a pre-defined rule: ±', '...or define your own rule: ±', 'CREATE LAND COVER TYPE: For each row that you want to apply, set the corresponding percentage of tree, herb and bare soil functional types (FTs) per pixel to achieve the land cover that you wish, for example pasture might be 10% tree FT, 85% herb FT and 5% bare FT, a crop might be 10% tree FT 50% herb FT and 40% bare FT', 'Use a pre-defined rule: ±', '...or define your own rule: ±', '...or copy your own maps: ±', '...or upload your own maps: ±', '...or run QUICKLUC (v2.1) land use change model: ±', and '...or define from a land use or cover classification: ±'. At the bottom is a link 'List baseline workspace data'.

Etape 4: Policy exercises

Lancer un scénario de changement d'affectation de terres

1. Cliquer sur **Step 4: Policy exercises from the main menu (A)**
2. Sélectionner 'Land use and cover change'(B) puis cliquer sur **Submit choice ©**. La fenêtre (D) apparaît

www1.policysupport.org/cgi-bin/simterra/v1/simterra/pss/policy.cgi

Use: ecoengine for: waterworld v.2 [.92] [non-commercial use] | Help | Disclaimer | » amout.vansoesbergen (hyperuser) » CAZ1 (70 hrs.) » baseline » baseline » defaWorking...

...or run QUICKLUC (v2.1) land use change model: A

Name for my scenario: BAU B

Set/change tree, herb, bare covers: -100 %0 %0 % C

using recent rate of loss by compare: GFC net loss for: 30 D years. Multiply recent rate by: 1, and add (% forest loss/yr): 0

Include recent (fractional) forest cover losses greater than: 0

Allocate by agricultural suitability: yes E

Include planned infrastructure (if available): no

Include likely new transport routes: yes F

Management effectiveness index (0-1): 1

where: Study area mask is >= this value: 0

other rules: ±

Define converted areas as: Most suitable agriculture G Fraction of water exposed to contamination: 1, or: scale the default for land use.

Mean conversion cost (USD per ha): 100

Check and Submit H

Configurer le modèle de changement d'affectation du sol (CAS):

1. Sélectionner le modèle CAS QUICKLUC land use change model en cliquant sur + (A)
2. Nommer votre scénario, par exemple BAU (B)
3. Fixer les % de changement pour les trois de types de couvert: -100 pour 'tree', et 0 pour 'herb' et 'bare' (C)
4. Utiliser les données 'GFC net loss' pour les gains et pertes récents en couvert arboré et pour une projection de 30 ans (D)
5. En choisissant 'yes' pour 'Allocate by agricultural suitability' (E), vous allouez les pixels déforestés par aptitude agricole
6. Inclure la possibilité de nouvelles routes en choisissant 'yes' pour 'Include likely new transport routes' (F)
7. Choisir 'most suitable agriculture for the pixel' (G) pour 'Define converted areas as:'
8. Cliquer sur 'Check and Submit' (H) pour construire le scénario
9. Vous pouvez développer un large éventail de scénarios avec cet outil



supported by:



Further credits

Welcome! (hyperuser)
arnout.vansoesbergen

[Report problem](#)
[Logout](#)

Control panel

[Want v.17](#) | [Want v.32](#)

explore:

set-up:
[Step 2: Prepare data](#)

simulation:
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results:
[Step 5: Results: maps](#)
[Step 6: Results: stats](#)
[Step 7: Results: narrative](#)

Help:
[System documentation](#)
[FAQ](#)
[Change log](#)
[Model documentation](#)

Runmodel do - Google Chrome

www1.policysupport.org/cgi-bin/simterra/v1/simterra/pss/scenarios.cgi?

Opening any other waterworld window while the scenario is building will return you to your baseline. You must then change back before running the scenario or you will inadvertently run the baseline instead.

Completed....

[Show baseline and scenario](#) **A**

[Stack further changes \(compound scenario\)](#)

[Run scenario](#)

[Progressive scenarios](#)

[List alternative workspace data](#)

Compare maps - Google Chrome

www1.policysupport.org/cgi-bin/simterra/v1/simterra/images/images.cgi?model=ecoengine&&username=xyz07oalp%A360o%5Enaxnm79

Use: | ecoengine for: waterworld v.2 [.92] [non-commercial use] | [Help](#) | [Disclaimer](#) | [» amout.vansoesbergen \(hyperuser\)](#) » [CAZ1 \(70 hrs.\)](#) » [bau](#) » baseline » default

Croplands (2005) \pm

Croplands (2005)[intensity] \pm

Pastures (2005) \pm

Pastures (2005)[intensity] \pm

Cover of bare ground (Landsat 2000) \pm

Cover of herb-covered ground (Landsat 2000) \pm

Cover of tree-covered ground (Landsat 2000) **B**

Protected areas (UNEP-WCMC WCPA) 2014 \pm

Wetlands including lakes, rivers and reservoirs \pm

[Close window](#) [Back](#)

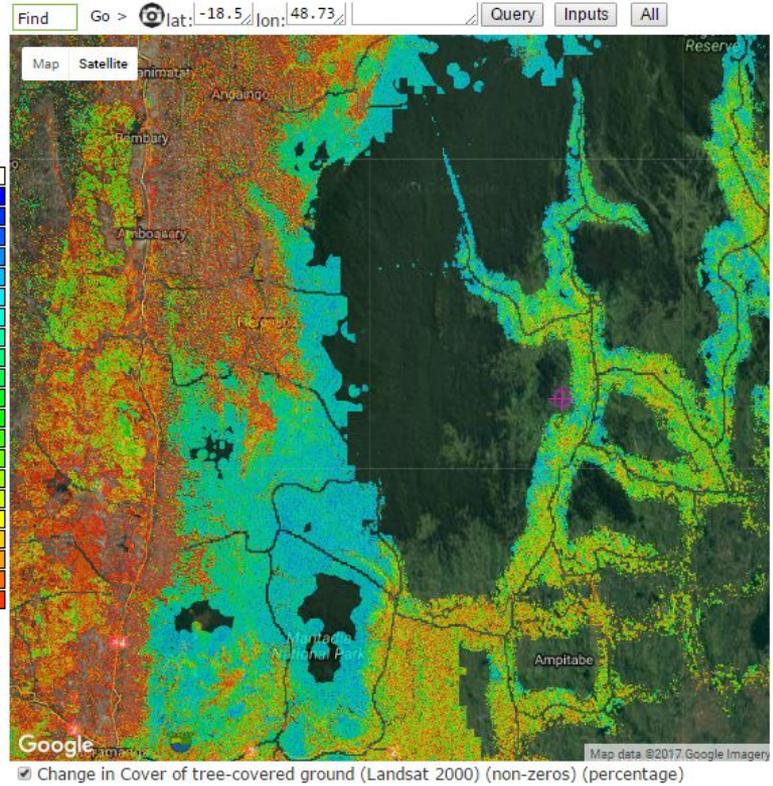
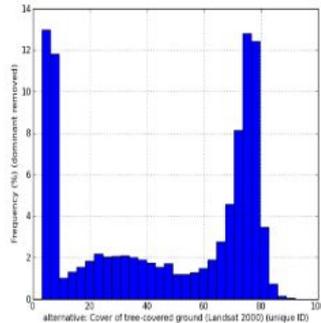
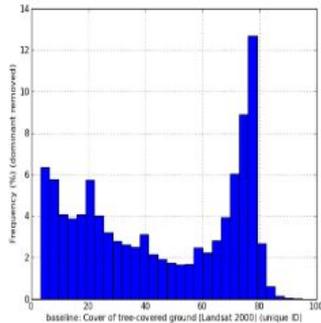
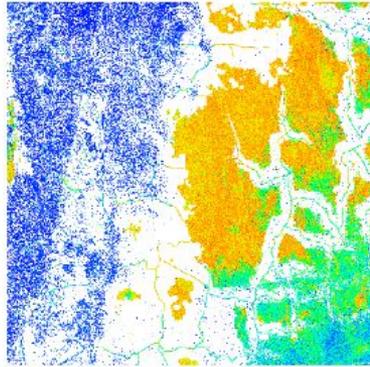
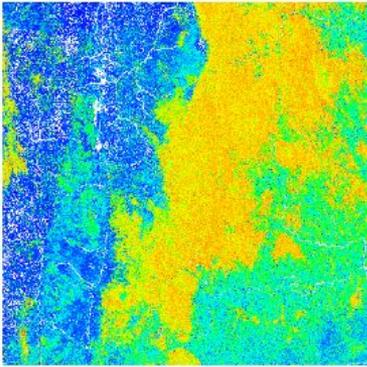
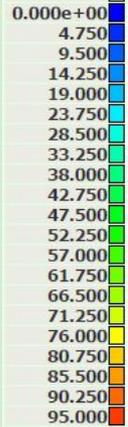
Une fois le scénario établi, cliquer sur **Show baseline and scénario (A)** pour voir ce qui a changé sous votre scénario (ceci prendra quelques minutes). Vous pouvez ainsi voir ce qui a changé en termes d'affectation des terres. Voyez **cover of tree-covered ground (B)**

baseline: Cover of tree-covered ground (Landsat 2000) alternative: Cover of tree-covered ground (Landsat 2000)

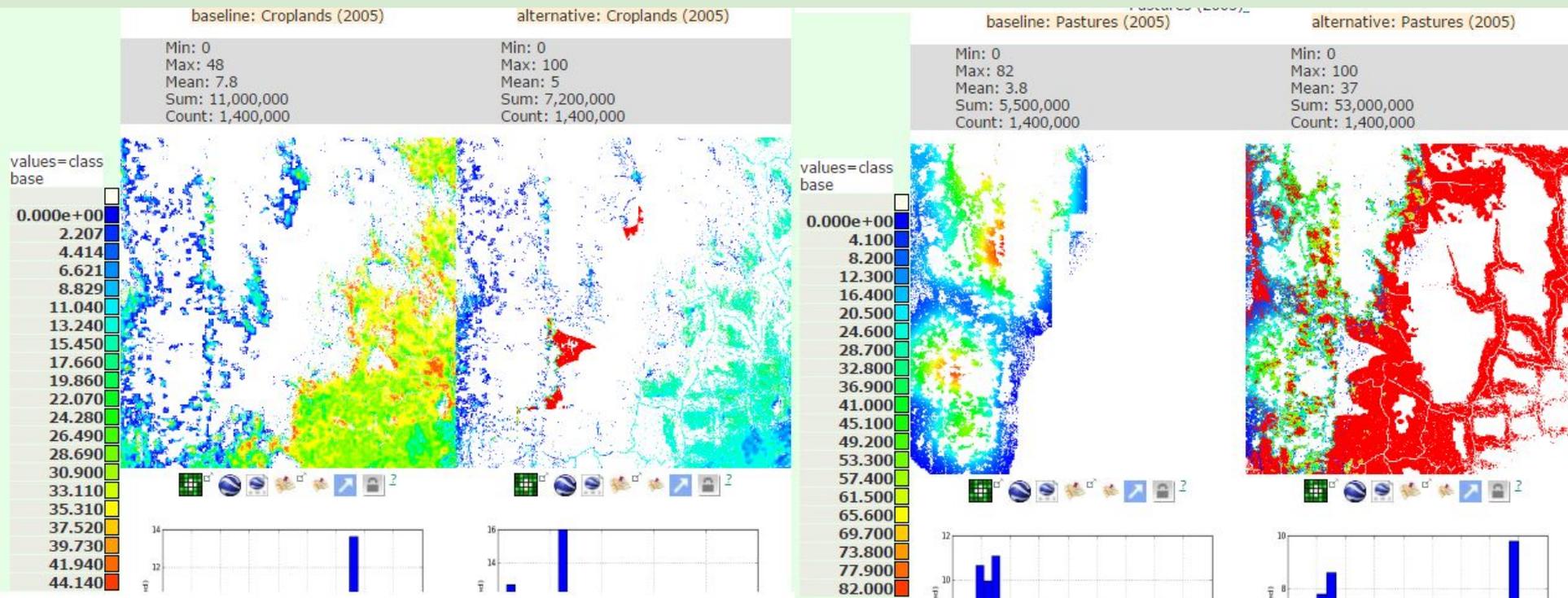
Min: 0
Max: 96
Mean: 41
Sum: 58,000,000
Count: 1,400,000

Min: 0
Max: 96
Mean: 21
Sum: 30,000,000
Count: 1,400,000

values=class base



- Scénario de changement d'affectation des terres: changement du couvert arboré
- Baseline et scénario couvert arboré restant
- Le % moyen de couvert arboré diminue de 41% à 21%
- Différence (montrant uniquement les non-zeros) entre baseline et scénario (à droite)
- Les parties colorées ont un couvert arboré de 0-100% sur la base du scénario
- Pas de changement dans les parties goudronnées, sans arbres pour commencer ou loin des routes actuelles ou futures (ces parties sont transparentes)



- Scénario de CAS: changement en terrains de culture (gauche) et en pâturage (droite)
- La majorité de la zone convient mieux au pâturage qu'aux terrains de culture (selon les données globales utilisées)
- Donc la déforestation est surtout pour obtenir des terres pour le pâturage, qui va d'~ 4% à ~37%
- Une allocation selon agriculture existante (plutôt que selon la compatibilité) produirait des résultats différents



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Further credits

Welcome: (hyperuser)
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Report problem

Logout

Control panel

Want v.17 | Want v.37

explore:

set-up:

Step 2: Prepare data

simulation:

Step 3: Start simulation

Step 4: Policy exercises

Manage simulations

results:

Step 5: Results: maps

Step 6: Results: stats

Step 7: Results: narrative

Help:

System documentation

FAQ

Change log

Model documentation

Find

Go > lat: -18.466 lon: 48.5714 Run name _Tiled 1km

Step 1: Define a

Runmodel do - Google Chrome

www1.policysupport.org/cgi-bin/simterra/v1/simterra/pss/scenarios.cgi?

Opening any other waterworld window while the scenario is building will return you to your baseline. You must then change back before running the scenario or you will inadvertently run the baseline instead.

Completed....

A

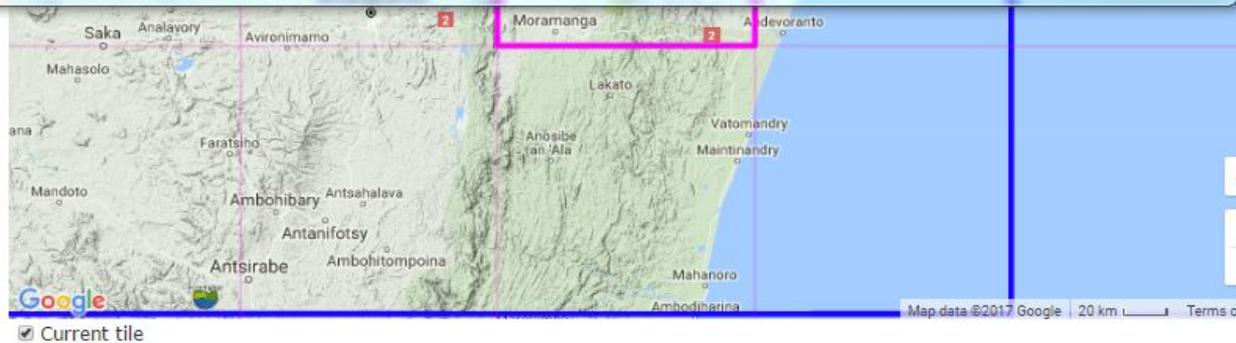
[Show baseline and scenario](#)

[Stack further changes \(compound scenario\)](#)

Run scenario **B**

[Progressive scenarios](#)

[List alternative workspace data](#)



Fermer la fenêtre qui compare les cartes et revenir à la fenêtre du scénario principal (A). Cliquer sur **Run scenario** pour commencer la simulation (B). Comme auparavant, le scénario prendra environ 15 minutes pour s'exécuter.

DISCUSSIONS/PAUSE en attendant que la simulation soit terminée

KING'S College LONDON

WaterWorld

supported by:

RESEARCH PROGRAM ON Water, Land and Ecosystems **espa** European Science Academy

CGIAR **CONSERVATION INTERNATIONAL**

[Further credits](#)

Welcome: (hyperuser)
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[Report problem](#)
[Logout](#)

Control panel

[Want v.1?](#) | [Want v.3?](#)

explore:

set-up:
[Step 2: Prepare data](#)

simulation:
[Step 3: Start simulation](#)
[Step 4: Policy exercises](#)
[Manage simulations](#)

results:
[Step 5: Results: maps](#) **A**
[Step 6: Results: stats](#)
[Step 7: Results: narrative](#)

Help:
[System documentation](#)
[FAQ](#)
[Change log](#)
[Model documentation](#)

waterworld was developed with the

Results maps - Google Chrome

www1.policysupport.org/cgi-bin/simterra/v1/simterra/pss/controls.cgi?model=ecoengine&username=xyz07oalp%A360o%5E...

Use: | ecoengine for: waterworld v.2 [.92] [non-commercial use] | [Help](#) | [Disclaimer](#) | [» arnout.vansoesbergen \(hyperuser\)](#) » [CAZ1 \(69 hrs.\)](#) » [bau](#)

The output datasets that appear on this list depend upon your licensed user level and whether or not you are using the commercial-use version of this system.

[Analyses, metrics and reporting](#)

- Costs mapping±
- Benefits mapping±
- Water quality mapping±
- Key output maps-

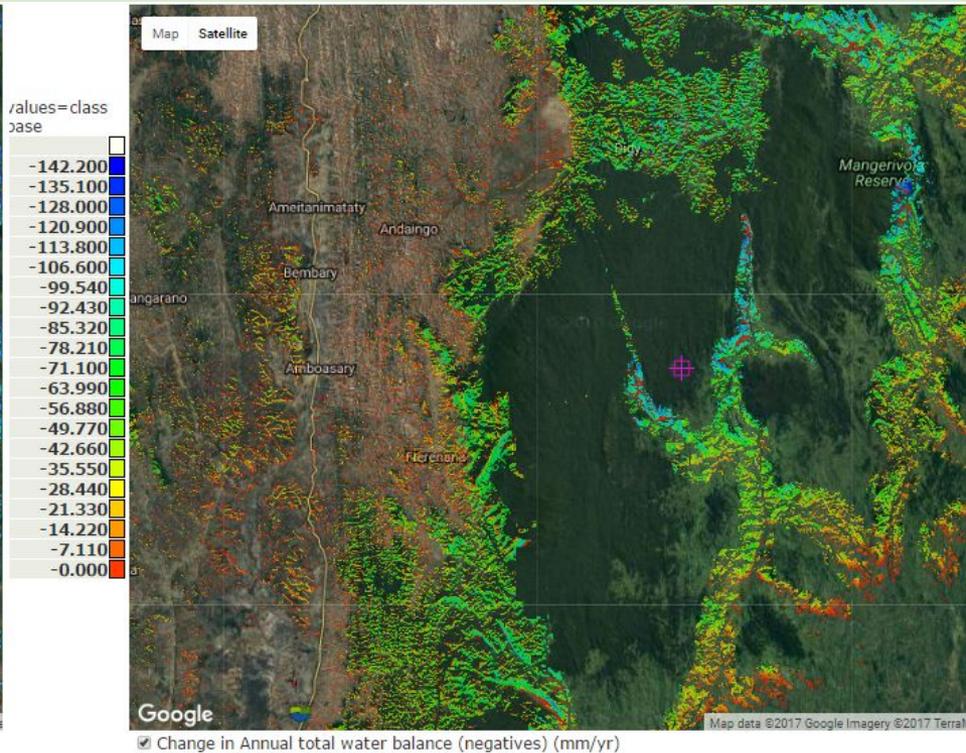
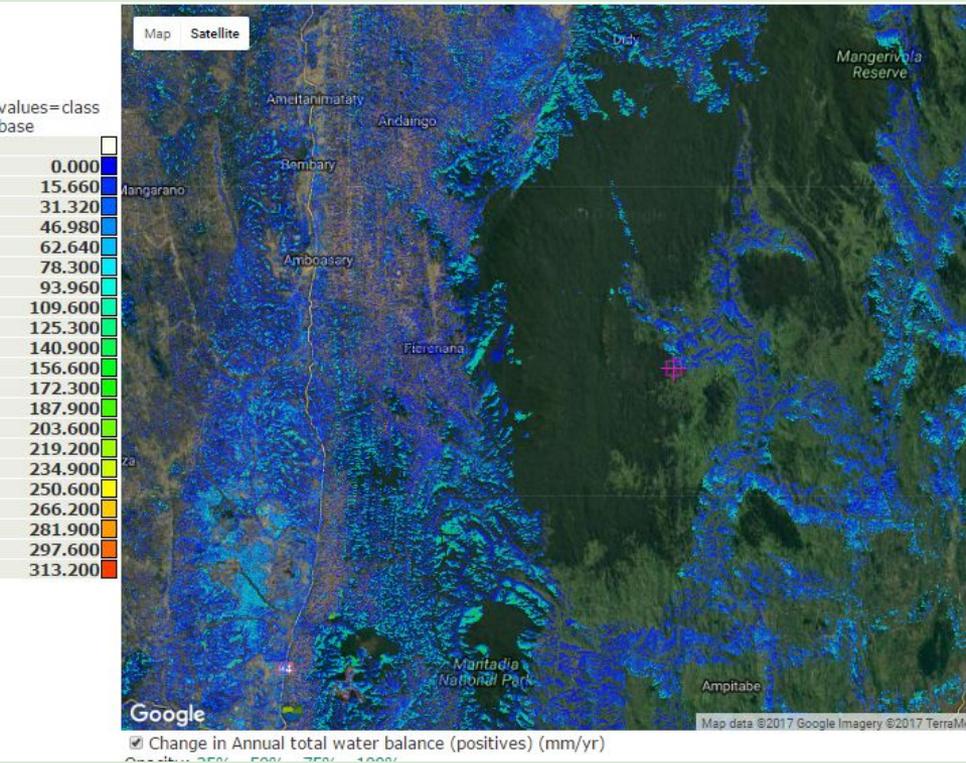
Name	Explanation	Change from baseline
Change in rainfall	Change in total annual (wind-driven) rainfall (mm/yr)	
Change in water balance	Change in local water balance (mm/yr) (rainfall minus actual evapotranspiration (AET). Where water balance is negative local AET is supported by upstream sources of water and/or groundwater)	B
Change in runoff	Change in total annual runoff (m ³ /yr). Calculated as water balance cumulated downstream. Negative water balance (AET > precipitation) in a cell consumes runoff from upstream.	
Change in hillslope net erosion	Change in hillslope net erosion (mm/yr). Net erosion (erosion minus deposition) on hillslopes	
Change in total net erosion	Change in total net erosion (mm/yr). Net erosion (erosion minus deposition) from hillslopes and channels (streams/rivers)	
Change in human footprint on water quality (pollution)	Change in mean percentage of water that may be polluted (human footprint index, %)	

Changement d'affectation des sols: Step 5: Results maps

Une fois le run terminé, retourner dans le menu principal et cliquer sur **Step 5: results maps (A)**. Le tableau résultant donne accès au changement par rapport au baseline pour une variable donnée. Par exemple, cliquer sur **(B)** pour voir le changement du bilan hydrologique.

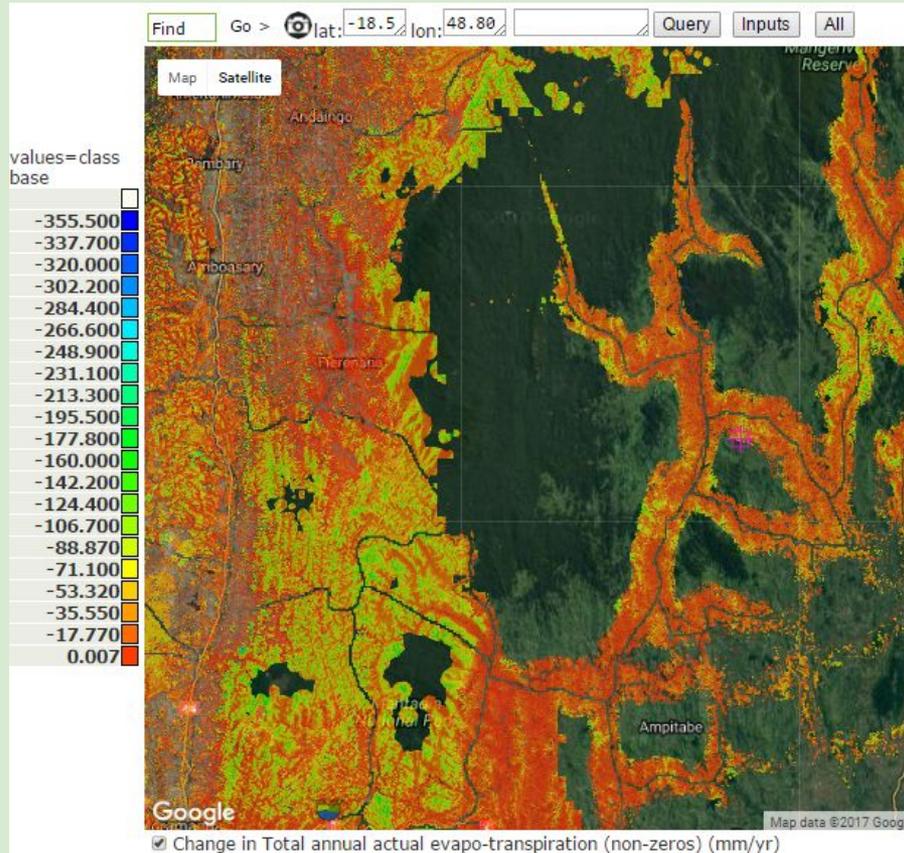
Changement du bilan hydrologique (+ seulement)

Changement du bilan hydrologique (- seulement)

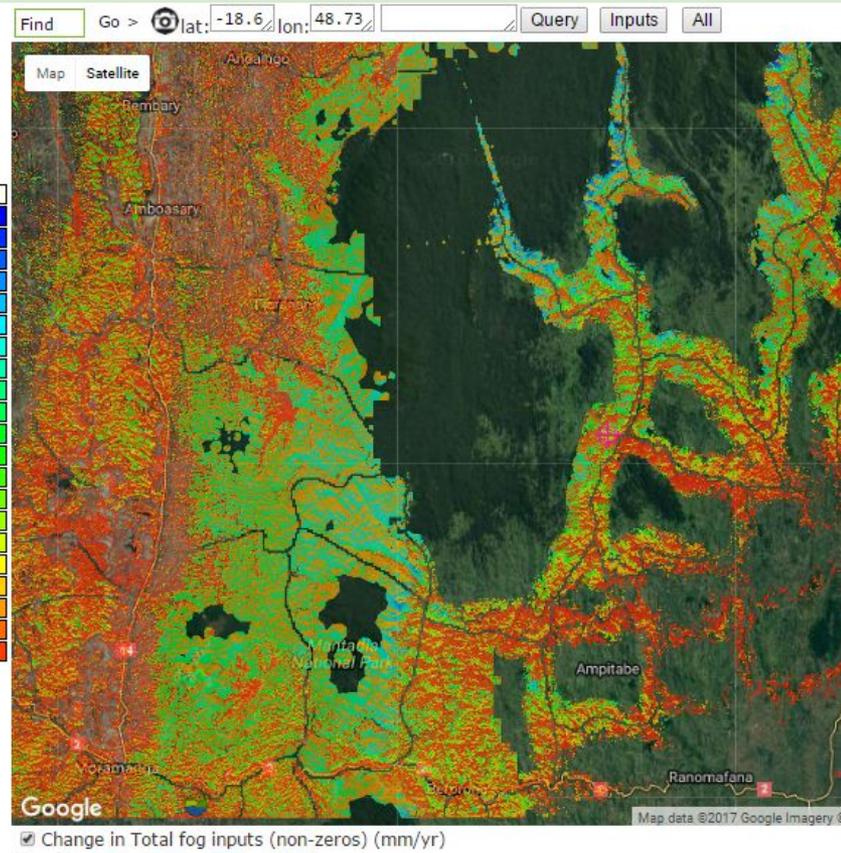


Les changements du bilan hydrologiques sont variables dans l'espace:

- La diminution de l'utilisation d'eau (AET) par les arbres entraîne une augmentation du bilan hydrologique dans certaines parties (gauche)
- Mais la réduction de la capture de brouillard par les arbres fait que la disponibilité en eau autre part (droite) diminue, généralement sur les pentes raides exposées au brouillard.



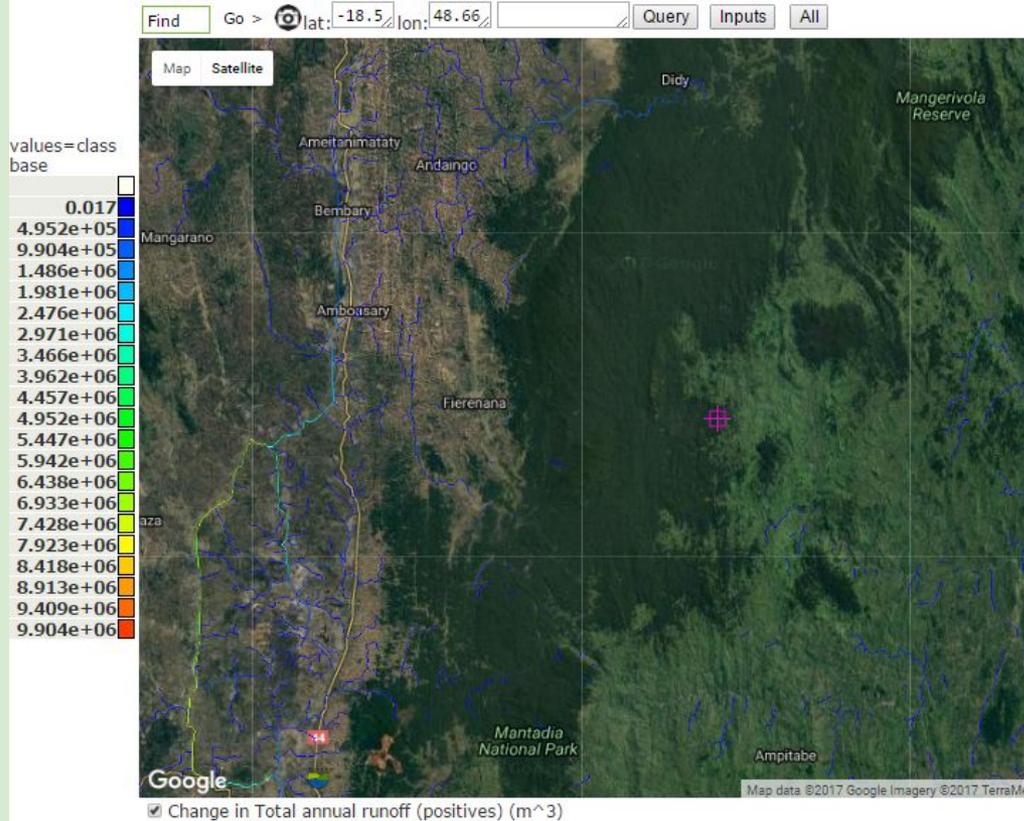
AET ↓ signifie WB ↑



Fog inputs ↓ signifie WB ↓

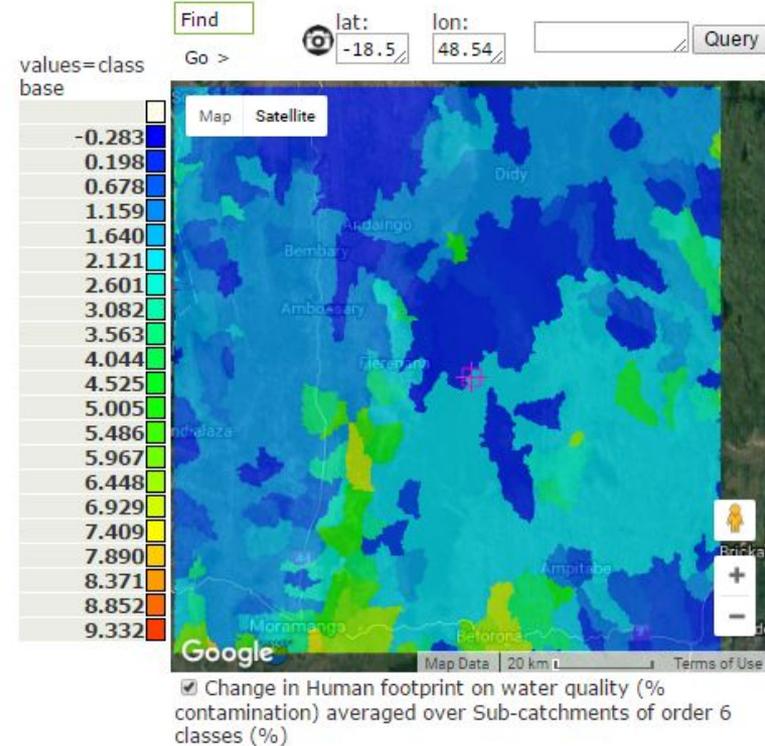
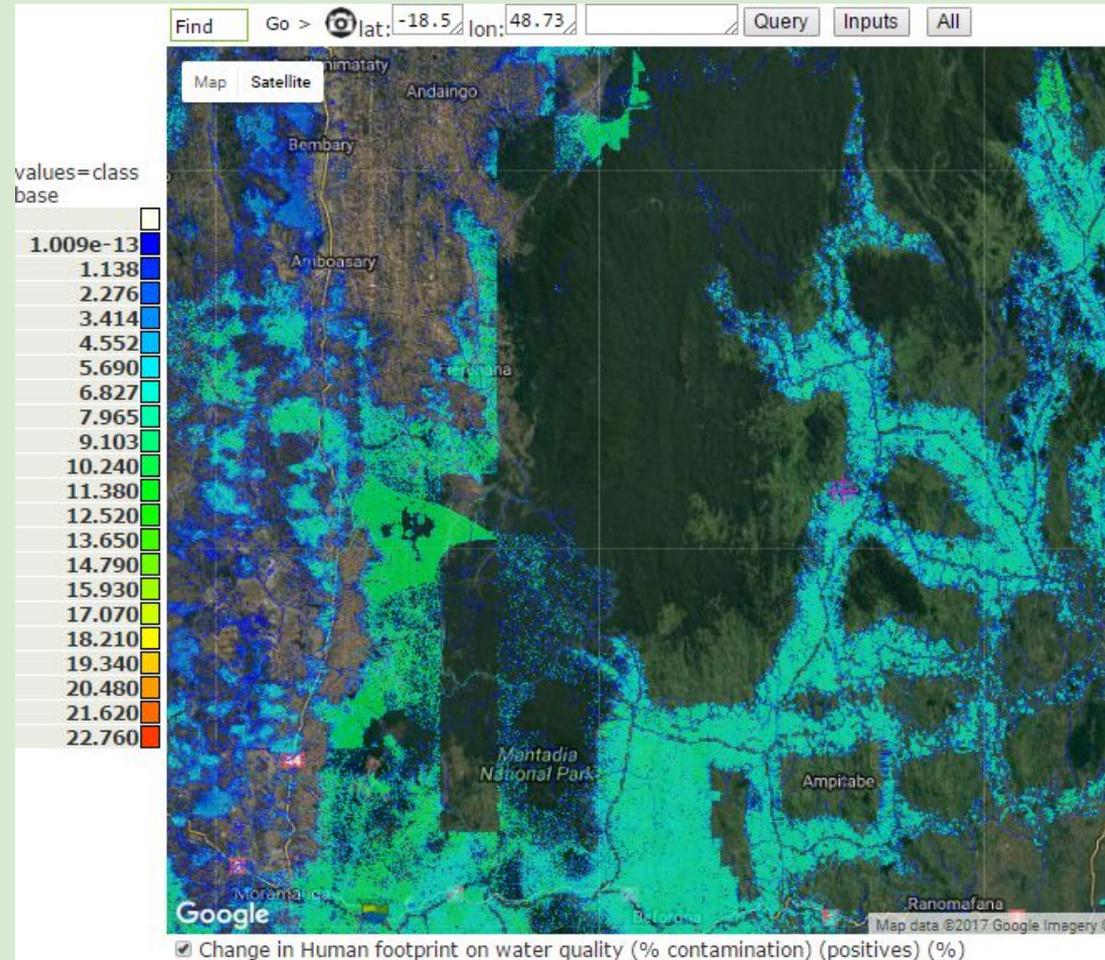
Evapotranspiration réelle (AET en anglais, gauche) et brouillard total (droite)

- AET et brouillard total diminuent suite à la déforestation. Les changements du bilan hydrologique (WB) dépendent de l'équilibre entre la réduction de l'AET et celle de la contribution du brouillard.



Changements en écoulement/débit (runoff)

- L'écoulement s'accumule en aval et augmente en certains endroits (gauche) et diminue dans d'autres (droite) à cause du changement du bilan hydrologique
- En général, les rivières qui s'écoulent vers l'Ouest voient leur écoulement s'accroître car ces parties sont peu affectées par les brouillards (i.e. **AET diminue > diminution en capture de brouillard**)
- On observe principalement une diminution de l'écoulement pour les rivières qui s'écoulent vers l'Est car les changements en capture de brouillard sont supérieurs aux changements en AET (i.e. **réduction ETR < réduction de la capture de brouillard**)
- Les impacts hydrologiques de la déforestation **ne sont pas simples!**



Changement de l'empreinte humaine sur l'indice de la qualité de l'eau (à gauche **pixel based increase**, à droite moyenne pour les sous bassins)

- En majorité, la pollution potentielle de l'eau augmente due à la déforestation et la conversion en agriculture
- Certaines parties ont une légère réduction de la pollution potentielle de l'eau en raison d'une augmentation de l'eau disponible (**dilution**)



Versions personnalisées de WW/CN pour le rapport WAVES

Des personnalisations de WW existent pour:

- Rapport WAVES
- Rapport ODD
- Rapport pour l'EPA sur la qualité de l'eau

Ces versions fournissent des indicateurs personnalisés et fonctionnalités additionnelles en plus de WW.

ODD: Objectifs du Développement Durable
EPA: Environmental Protection Agency

Basin water accounting for voltawaves (baseline)		
Asset (stock) accounts (produced assets)		
Treated and sanitised water_		
Name	Explanation	Show
Water treatment costs	Total costs of domestic water treatment (USD)	
Volume of treated water	Total volume of treated water (m3)	
Sanitation costs	Total costs of sewage treatment (sanitation) (USD)	
Volume of sanitized water	Total volume of sanitized water (m3)	

Asset (stock) accounts (water resources)		
Water natural capital_		
Name	Explanation	Show
January glacier water equivalent	January glacier water equivalent (mm)	
January snowpack water equivalent	January snowpack water equivalent (mm)Distribution of dams	
Dams		

Water storage capacity± Water storage±		
Asset (stock) accounts (water quality accounts)		
Flow accounts (contribution of water to the economy)		
Flow accounts (agricultural water use)		
Agricultural water use±		
Flow accounts (domestic water use)		
Flow accounts (returned treated water)		

Close window

Quelques indicateurs initiaux pour les ODD dans WW/C\$N: état de référence

[Analyses, metrics and reporting](#)
SDG indicators:

SDG	Indicator	Baseline map	# people	# urban people	# rural people	# poor people		
Goal #1. End poverty in all its forms everywhere	Goal #1:							
1.2 Water poverty	Population without access to sufficient quantity of quality water		show	show	show	show		
1.2 Lack of productive resources	Per-capita agricultural production		show	show	show	show		
1.2 Health poverty	Population exposed to diarrhoeal disease		show	show	show	show		
1.5 Natural hazard vulnerability	Persons in areas of unmitigated natural hazard risk		show	show	show	show		
Goal #2. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	Goal #2:							
2.3 Water-for-food	Population with limited water-for-food (Ea<		show	show	show	show		
2.3 Productivity	Per-capita agricultural productivity		show	show			7.2 Renewable energy	Sedimentation of hydropower reservoirs.
2.4 Sustainability	Fraction of agricultural land with Et>rainfall (irrigation)		show	show			Goal #11. Make cities and human settlements inclusive, safe, resilient and sustainable	Goal #11:
Goal #3. Ensure healthy lives and promote well-being for all at all ages	Goal #3:						11.5 Ecosystem based natural hazard mitigation	Proportion of hazard mitigation services protected
3.3 Water-borne disease	Population with (seasonal) exposure to diarrhoeal disease		show	show			11.5 Flood protection by green infrastructure	Flood storage in excess of flow volume upstream of cities
3.9 Lack of domestic water	Population with less than (seasonal) 20L/day (WHO) of quality water		show	show			11.7 Urban green infrastructure and ecosystem services	Urban vegetation and protected area fraction
Goal #6. Ensure availability and sustainable management of water and sanitation for all	Goal #6:						Goal #13. Take urgent action to combat climate change and its impacts	Goal #13:
6.1 Access	Population with less than (seasonal) 20L/day (WHO) of quality water		show	show			13.1 Hazard resilience	Proportion of HM services protected
6.2 Sanitation, hygiene	Persons benefitting from natural footprint on water quality		show	show			13.2 Climate change planning	pressured carbon, threatened carbon
6.3 Pollution load	Total human footprint on water quality		show	show			Goal #15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Goal #15:
6.4 Water scarcity	Mean per-cent of time in which demand is not met by supply		show	show			15.1 Ecosystem service protection	Fraction of bundle of realized ecosystem services protected
6.6 Protected hydrological services	Proportion of realised clean water provision from protected areas		show	show			15.2 Forests and forest loss	Net forest change
Goal #7. Ensure access to affordable, reliable, sustainable, and modern energy for all	Goal #7:						15.3 Desertification	Soil erosion on agricultural land
							15.5 Species richness	Richness loss
							15.5 Endemism	Endemism loss

