

The Potential for Crowdsourcing and Using Mobile Phone Technology

Linda See

Ecosystems Services and Management Program

Geo-Wiki Team: Steffen Fritz, Ian McCallum,
Christoph Perger, Martina Duerauer, Mathias
Karner, Jon Nordling, Michael Obersteiner

Overview

- Terminology
- Intro to Geo-Wiki
 - Campaigns
 - Hackathon
 - Gaming
- Mobile devices and applications
- Data collection for GHG accounting
- Discussion

Crowdsourcing

- Outsourcing to the crowd (Howe, 2006)
 - E.g. Amazon's Mechanical Turk
- Using the crowd to collect data, solicit ideas, analyze data, do voluminous tasks that could otherwise not be done
- Represents an untapped potential source of data for scientific research
 - Already being harnessed in ecology, conservation, species identification under the umbrella of citizen science

Plethora of Terminology

- Citizen science (+ extreme version)
- PPSR
- Volunteered Geographic Information
- GeoCollaboration / PPGIS
- GeoWeb
- Neogeography
- Participatory sensing
- Web mapping



CHRISTMAS BIRD COUNT



CITIZEN SCIENCE ALLIANCE



eBird



Context: Need for Improved Land Cover

- Crucial baseline information for many applications/integrated assessment models
- Overall and spatial disagreement when different products are compared
- Need for more ground-based validation data
- Confusing for users – Which one is correct? Which is the best product to use?
- A number of studies have shown that the choice of land cover can have a significant affect on the final results

Geo-Wiki: Visualization, Crowdsourcing and Validation Tool

http://www.geo-wiki.org/ Welcome to Geo-Wiki Proje...

View Favorites Tools Help

vert Select

ENGAGING CITIZENS IN ENVIRONMENTAL MONITORING

GEO-Wiki

- » Home
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- » Related projects
- » Data source

Games


- » Instructions + Videos
- » Cropland Capture
- » FAQ

Branches

- » Geo-Wiki branches
- » AusCover Geo-Wiki
- » Livestock Geo-Wiki
- » Risk Geo-Wiki
- » SIGMA Geo-Wiki
- » LACOVAL


The Geo-Wiki Platform

Geo-Wiki is a platform which provides citizens with the means to engage in environmental monitoring of the earth by providing feedback on existing spatial information overlaid on satellite imagery or by contributing entirely new data. Data can be input via the traditional desktop platform or mobile devices, with campaigns and games used to incentivize input. Resulting data are available without restriction.



[General overview](#) [Competition](#) [Geo-Wiki pictures](#)

Inspect land cover overlays



Login

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Password

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[I've lost my password](#)

[Register here!](#)

Try Geo-Wiki

[Try as guest](#)

Administration

- » Smartphone Legends

Tweets

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IIASA 29 Sep
@IIASAVienna

IIASA's @GrowersNation app brings #citizenscience to the garden & farm. Download now! bit.ly/1Cz41C #crowdsourcing #game

Retweeted by Cropland Capture

Expand

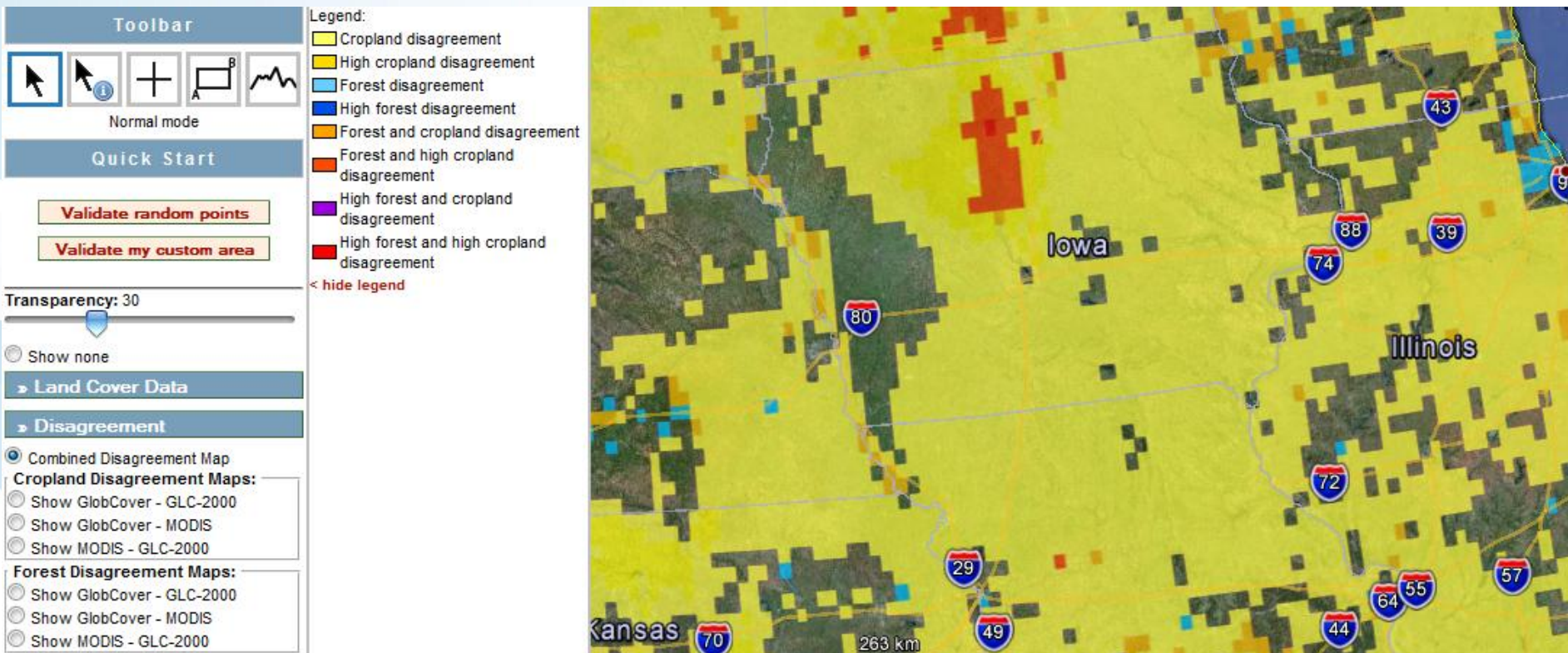
Cropland Capture 28 May

Tweet to @CropCapture

[Like](#) [Share](#) 266

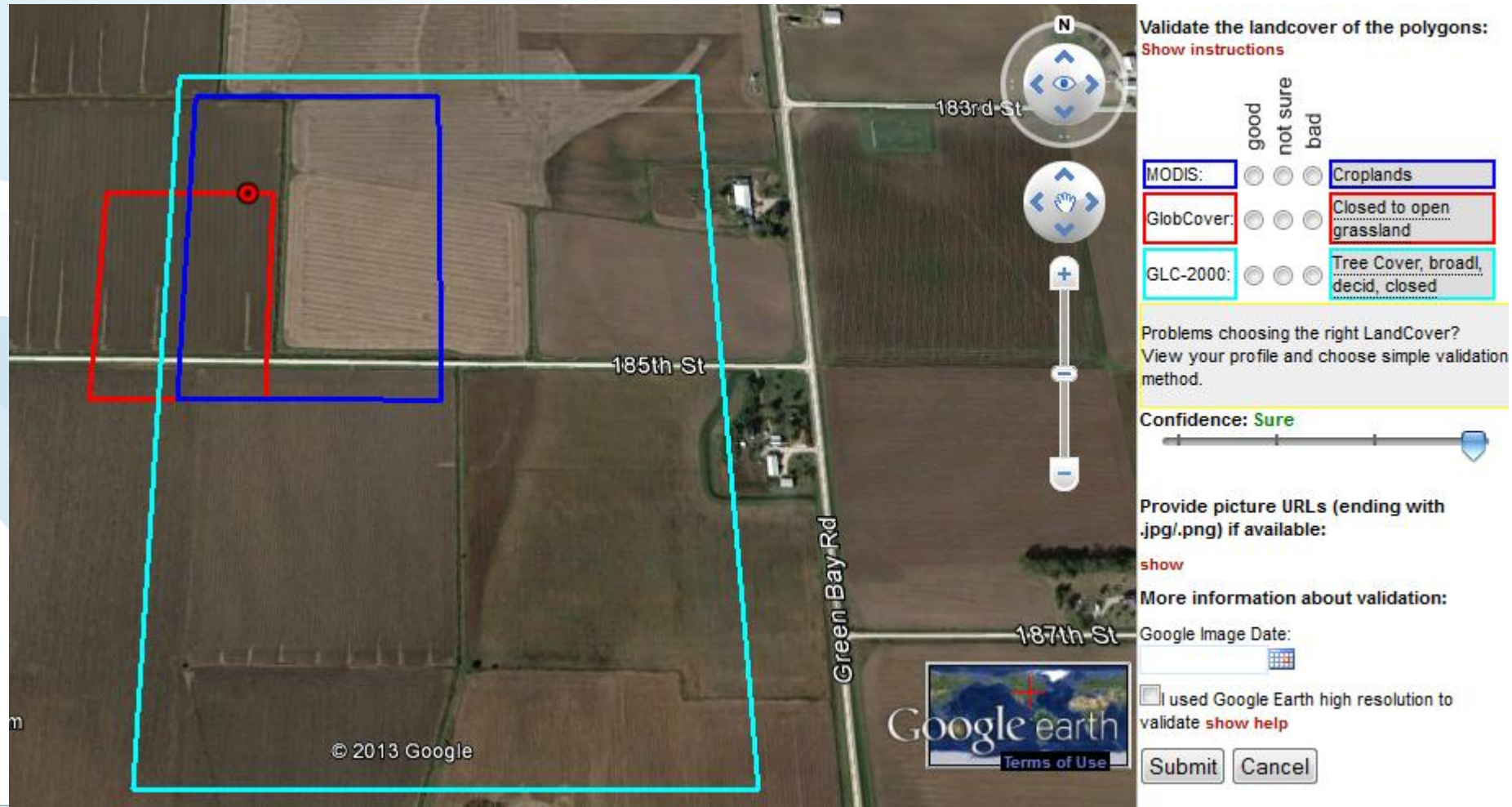
[+1](#) +24 Recommend this on Google

Large Disagreements in Cropland



Can view these on: <http://www.geo-wiki.org>

Showing Disagreement on Google Earth



Validate the landcover of the polygons:
[Show instructions](#)

	good	not sure	bad
MODIS:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GlobCover:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GLC-2000:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Croplands
Closed to open grassland
Tree Cover, broad, decid, closed

Problems choosing the right LandCover?
View your profile and choose simple validation method.

Confidence: **Sure**

Provide picture URLs (ending with .jpg/.png) if available:
[show](#)

More information about validation:
Google Image Date:
☐ I used Google Earth high resolution to validate [show help](#)

Example from a Competition (Humanimpact.geo-wiki.org)

Please classify the polygon:
Competition Instructions

Human impact: 50 %
0 % 100 %

Confidence: Sure

Land cover type:
-Choose from below-

Confidence: Sure

Land abandoned? 50 %
0 % 100 %

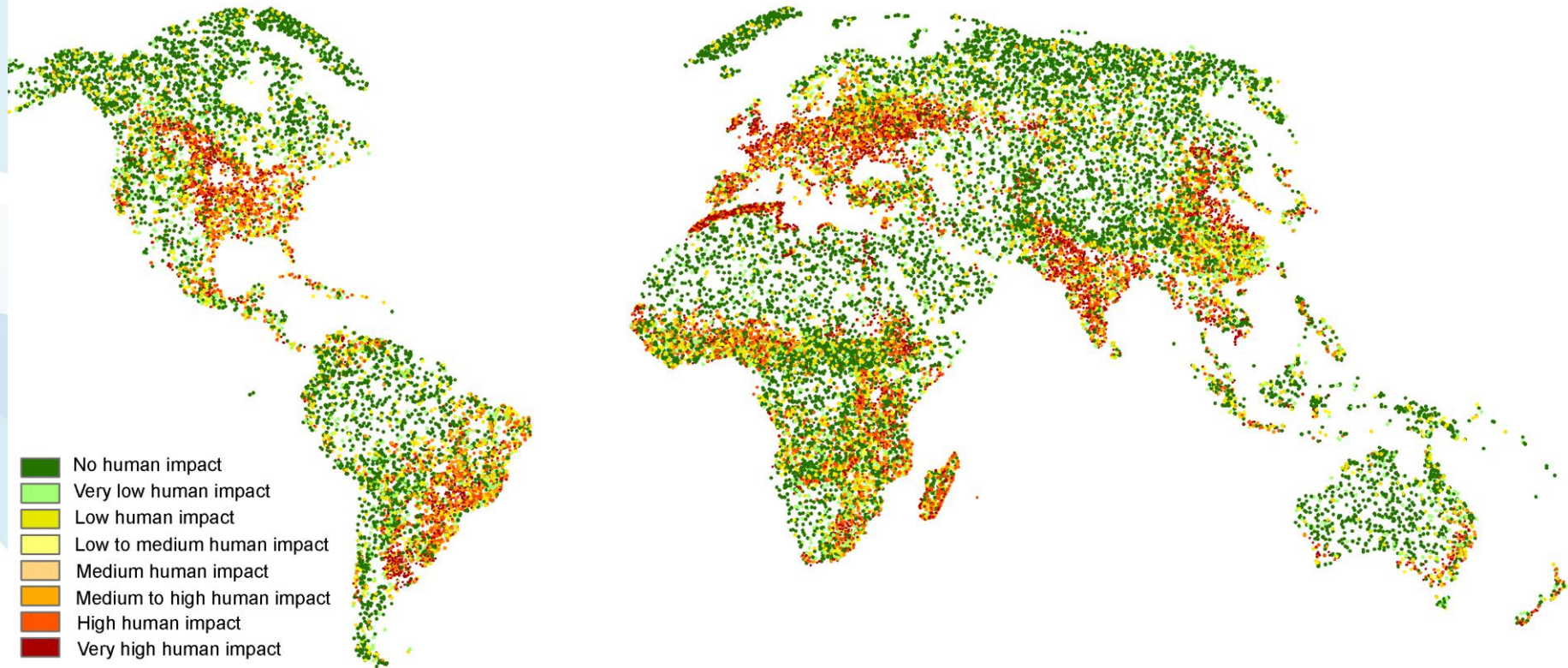
Confidence: Sure

More information about validation:
Google Image Date:
☐ I used Google Earth high resolution to validate [show help](#)

ID: 6230

Google earth

Data from Human Impact Competition



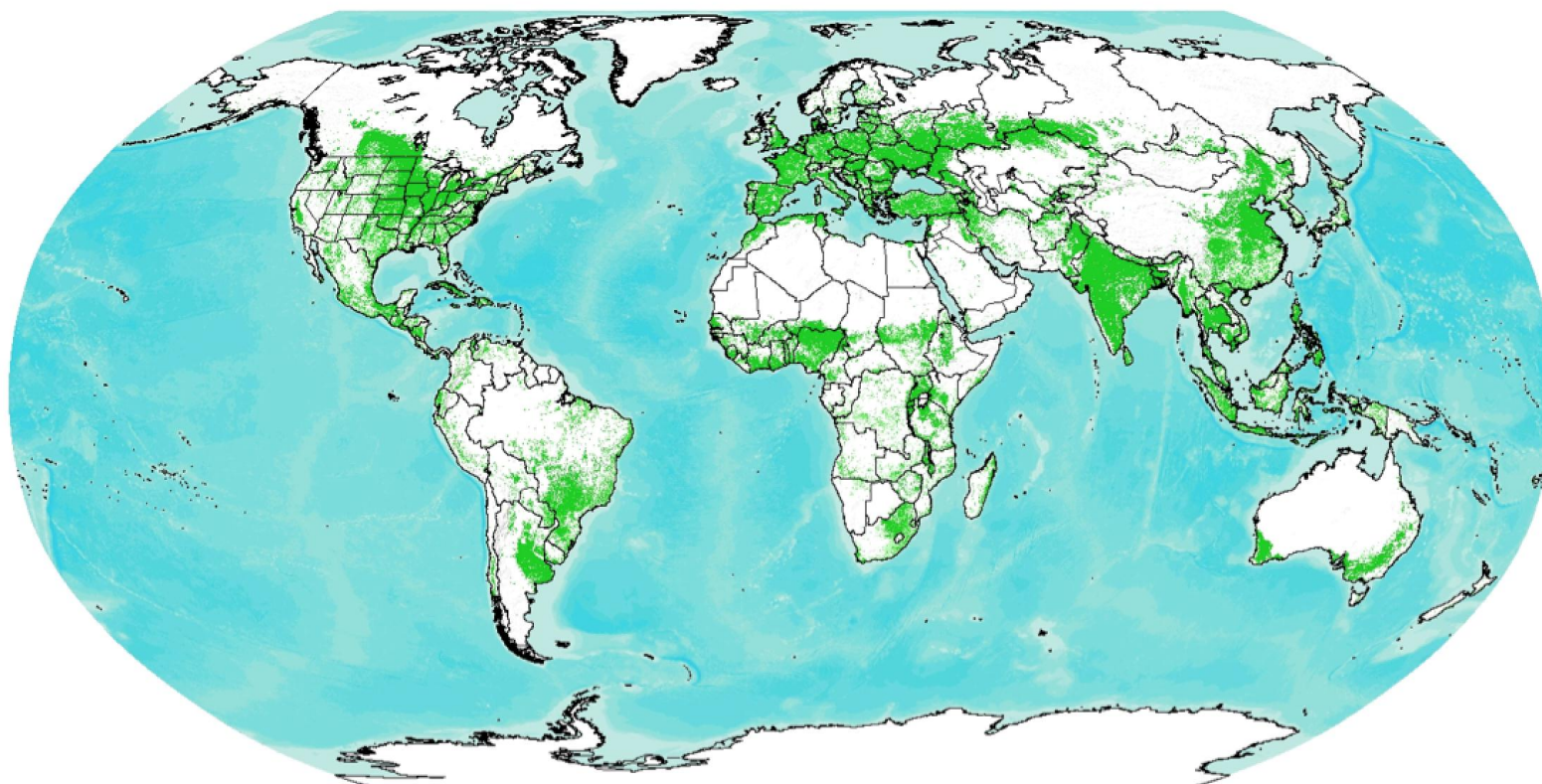
Crowdsourcing Validation Data

Number	Competition	Purpose of the Competition
1	Human Impact	To validate a map of land availability for biofuel production
2	Hotspots of Map Disagreement	To collect validation points in the areas where the GLC2000, MODIS and GlobCover disagree with one another
3	Wilderness	To collect land cover and human impact in order to determine the amount of global wilderness. The locations used were the same as that of the Chinese 30 m land cover map
4	Global Validation Dataset	To collect data at the same locations as the validation data assembled for the Chinese 30 m land cover map
5 & 6	Hackathon and IIASA Competition	To collect data on the degree of cultivation and the degree of human settlement in Ethiopia in the context of land grabbing

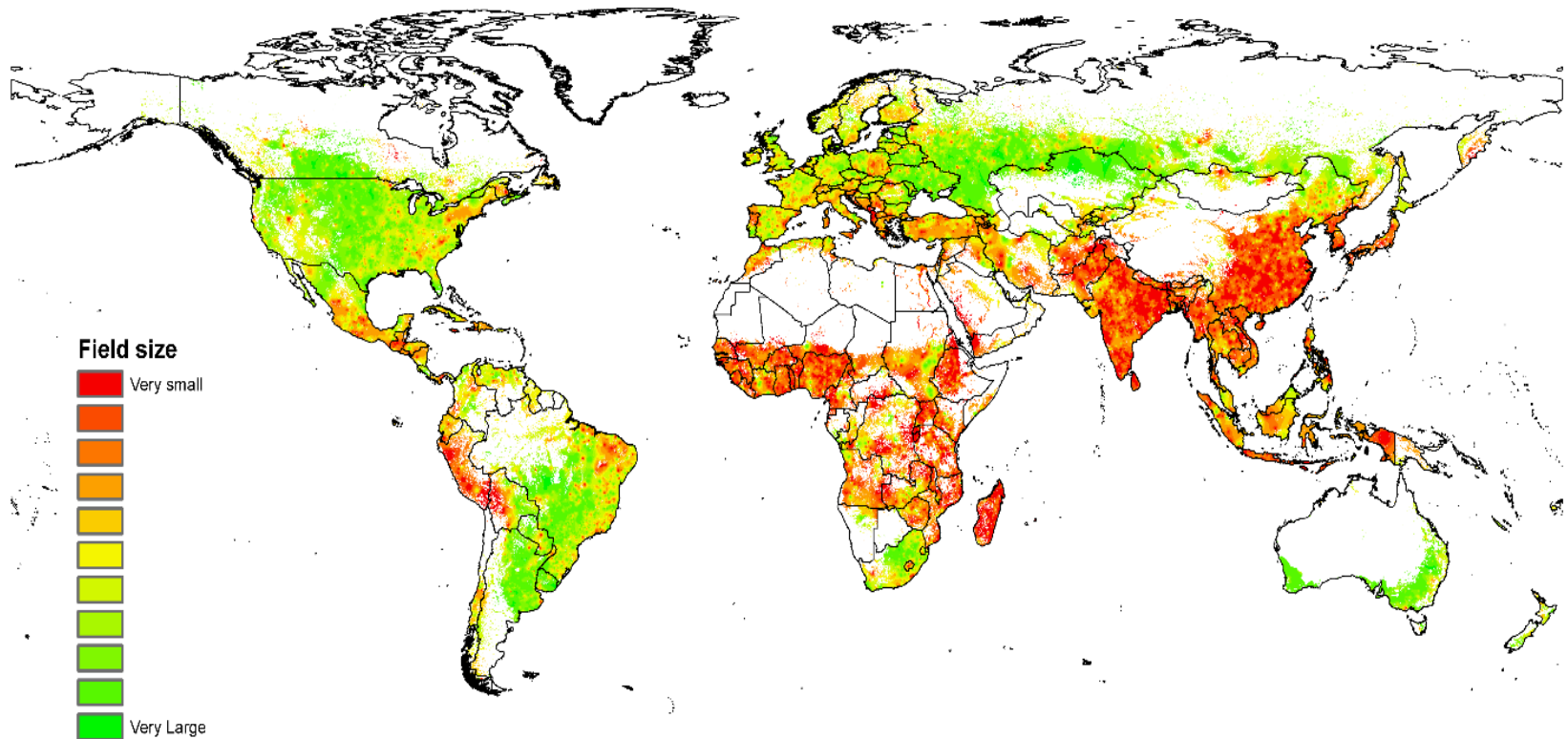
~200,000 validation samples collected

Outputs from Geo-Wiki: Cropland Map

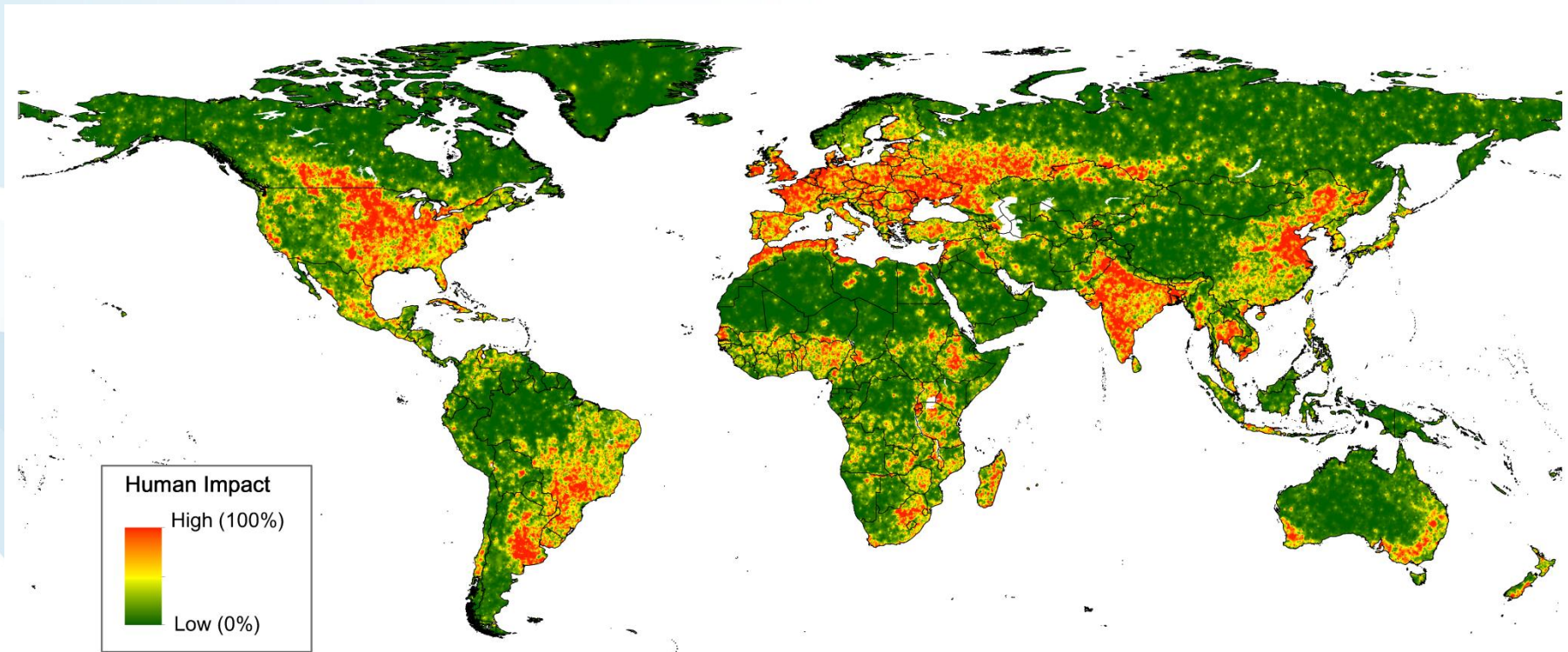
**Current Cropland Distribution:
best available from existing satellite-derived sources**



Outputs from Geo-Wiki: Map of Field Size



Geo-Wiki Output: Global Map of Human Impact / Wilderness



Outputs from Geo-Wiki: Downgrading of Land Availability for Biofuels

Scenario	Original figures (million ha)	Adjusted for land cover (million ha)	Adjusted for field size (million ha)	Adjusted for human impact (million ha)
S1	320	98	42	34
S2	702	467	201	84
S3	1411	998	N/A	409
S4	1107	786	N/A	264

Fritz, S., See, L., van der Velde, M., Nalepa, R.A., Perger, C., Schill, C., McCallum, I., Schepaschenko, D., Kraxner, F., Cai, X., Zhang, X., **Ortner, S., Hazarika, R., Cipriani, A., Di Bella, C., Rabia, A.H., Garcia, A., Vakolyuk, M., Singha, K., Beget, M.E., Erasmi, S.**, Albrecht, F., Shaw, B., Obersteiner, M. 2013. Downgrading recent estimates of land available for biofuel production. *Environmental Science & Technology*, 47(3), 1688-1694.

Hackathon.geo-wiki.org

- Organized by USAID
- Challenge:
 - Collect information about cropland and settlement for Ethiopia
 - Overlay with location of land acquisitions
 - Look for evidence of effects on local populations
- Extended to a competition for 3 weeks

HELP TO VALIDATE GLOBAL LAND COVER



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The Geo-Wiki Project

Tweet 0

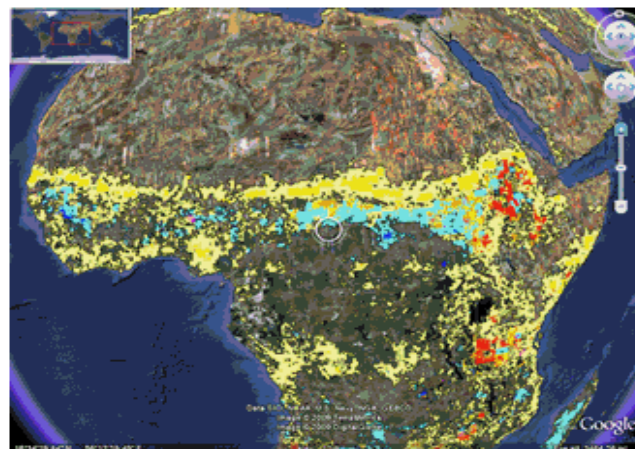
The **Geo-Wiki Project** is a global network of volunteers who wish to help improve the quality of global land cover maps. Since large differences occur between existing global land cover maps, current ecosystem and land-use science lacks crucial accurate data (e.g. to determine the potential of additional agricultural land available to grow crops in Africa). **Volunteers** are asked to review hotspot maps of global land cover disagreement and determine, based on what they actually see in Google Earth and their local knowledge, if the land cover maps are correct or incorrect. Their input is recorded in a database, along with uploaded photos, to be used in the future for the **creation of a new and improved global land cover map.**

Participate in our USAID Hackathon Challenge

[View publication](#)

[Watch the tutorial video online](#)

[Download Data](#)



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albrecht@iiasa.ac.at

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My Profile

number of validation

5088

current rank

8

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Geo-Wiki top 5 validators

1	gipsyman	1
2	Ahmed Harb Rabia	8
3	Simone Ortner	8
4	anka	7
5	JP Ardila	5

[View complete ranking](#)

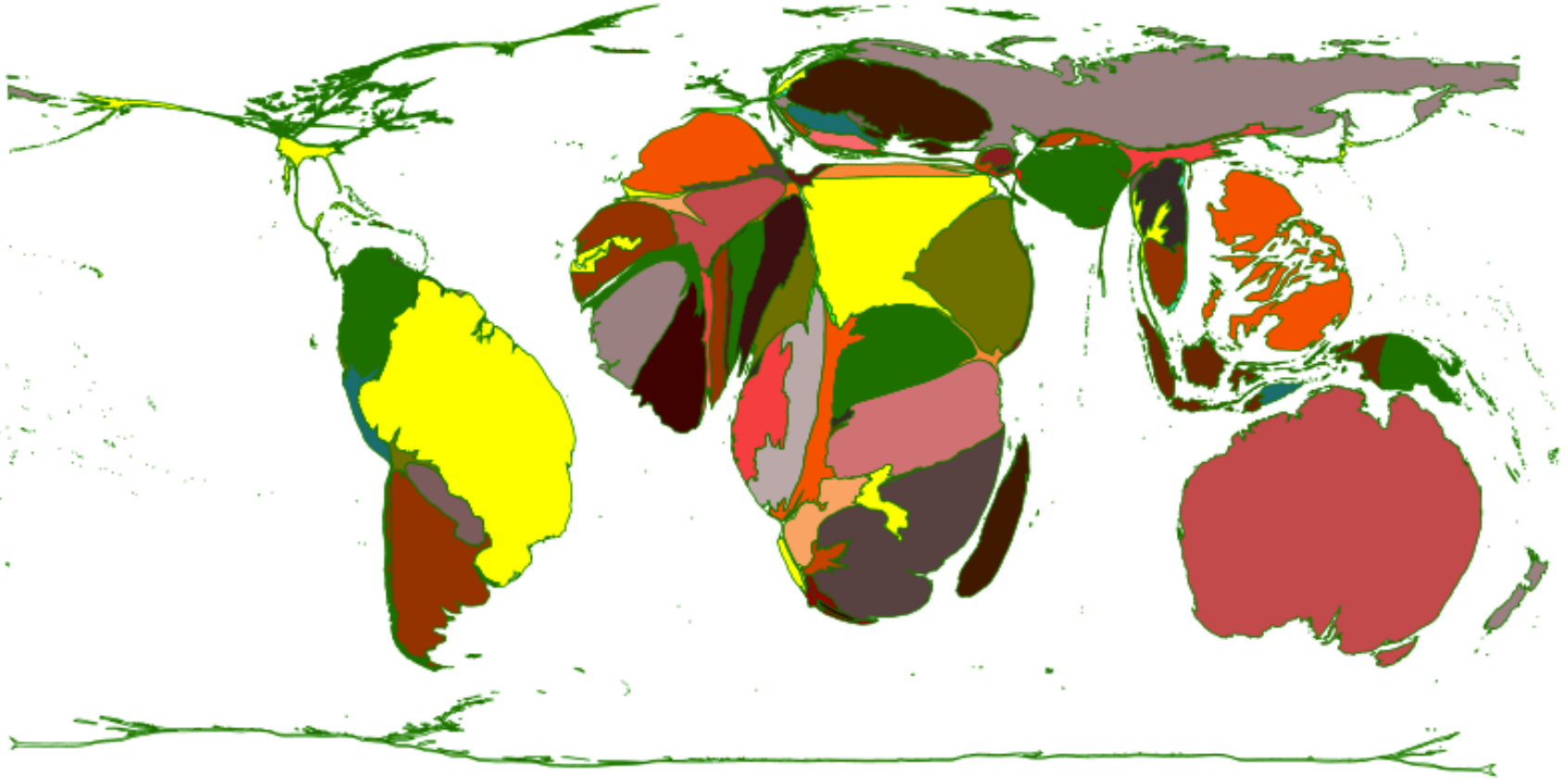
Google Translate

Select Language



Gadgets

Land Grabbing



More Outputs from a Hackathon



Identify in the blue box:

Settlements:

Cultivated:

Confidence:

Submit your results:

skipped

[▶ Short instructions](#)

[▶ More Info and Ask Experts](#)

Overall progress: Level: 6

0 50000

268 m

Image © 2012 GeoEye

Google earth

Terms of Use

Imagery Date: 2/14/2010 2002 8°44'33.85" N 34°47'52.00" E elev: 1813 m 2.98 km

NONE

LOW

SETTLEMENT

MED

HIGH

NONE



LOW

CULTIVATED



MED



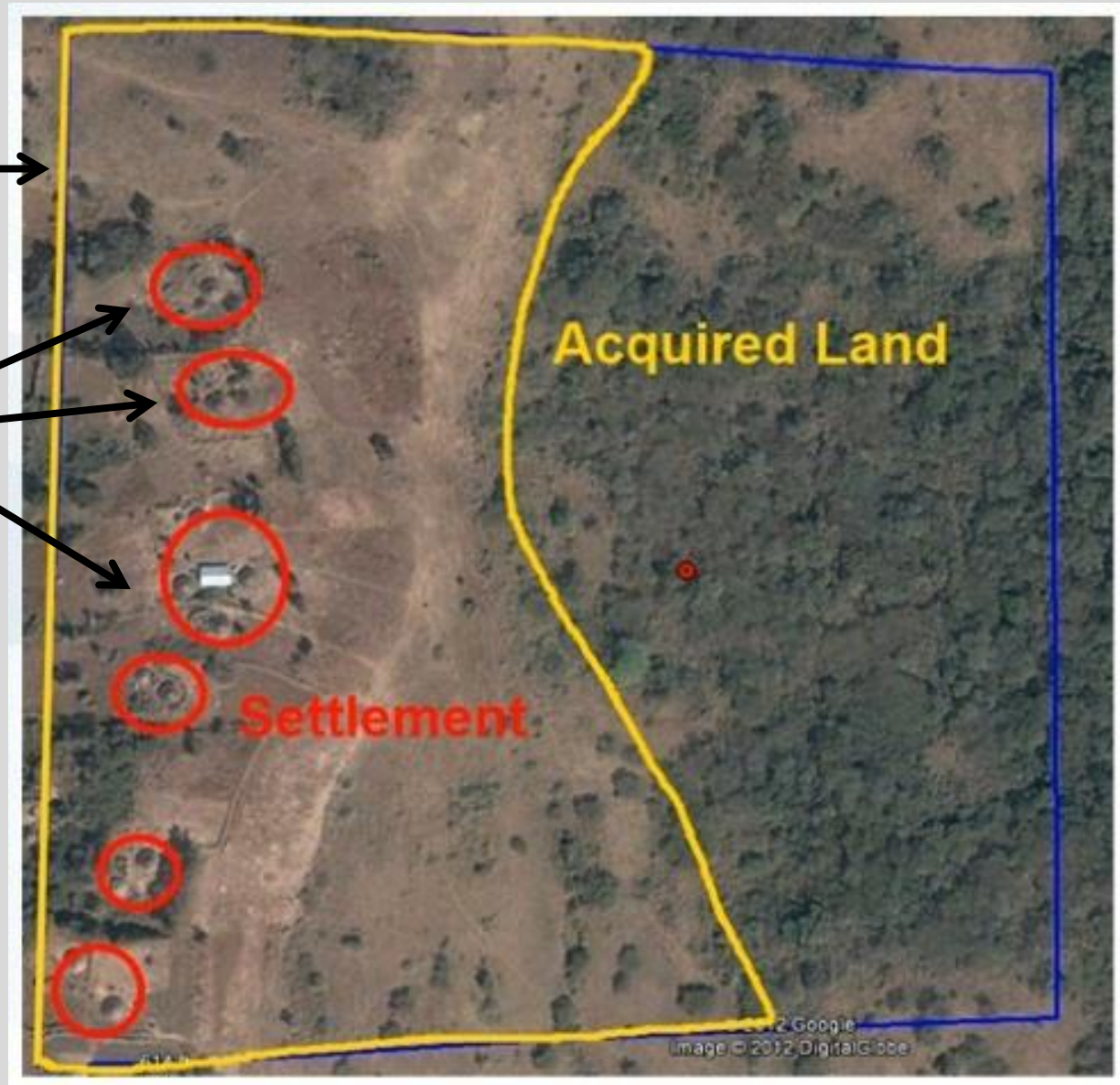
**Land Acquisition
Area
(from Land Matrix
Database)**

+

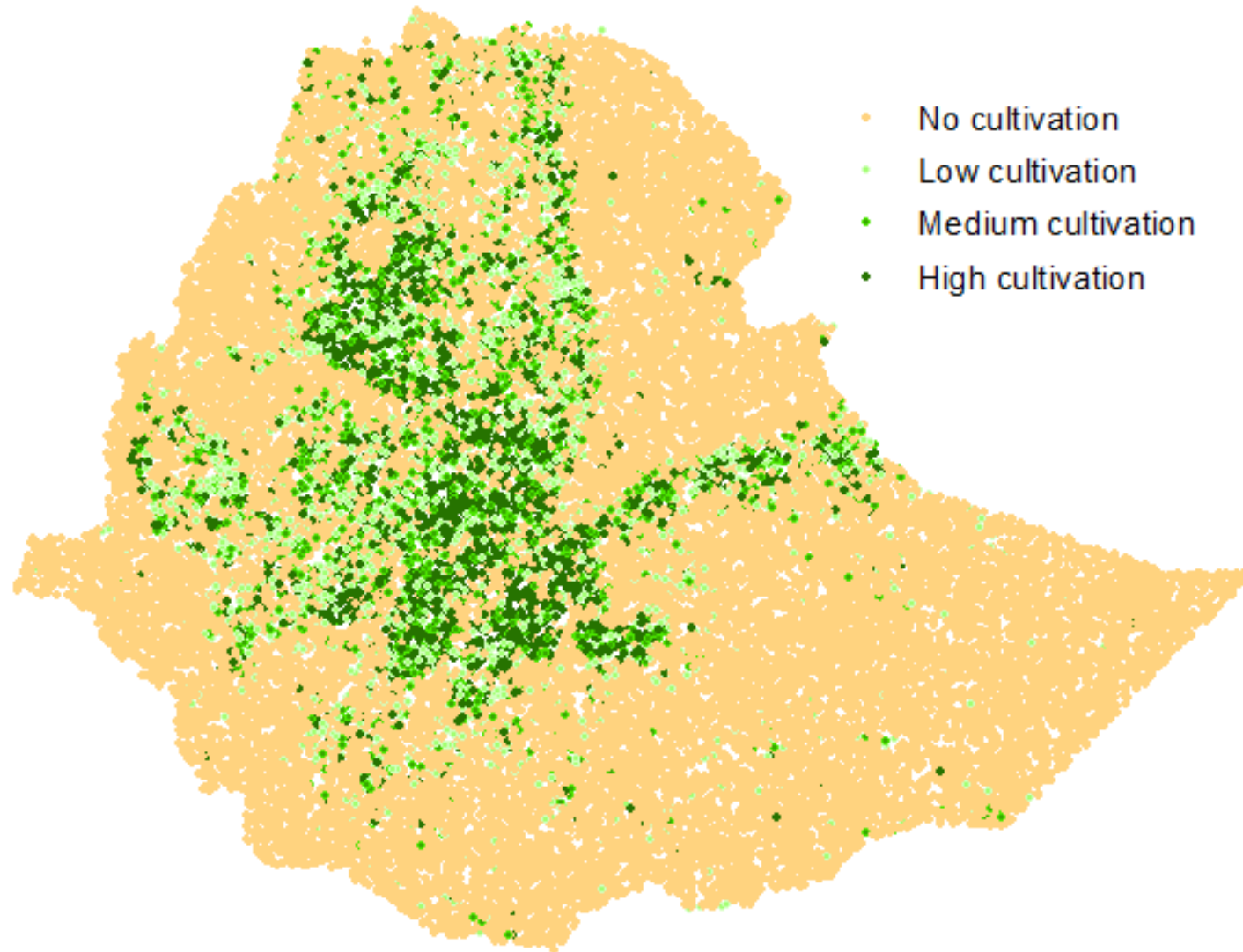
**Clear Evidence
of Settlements
(from Geo-Wiki
Hackathon)**

=

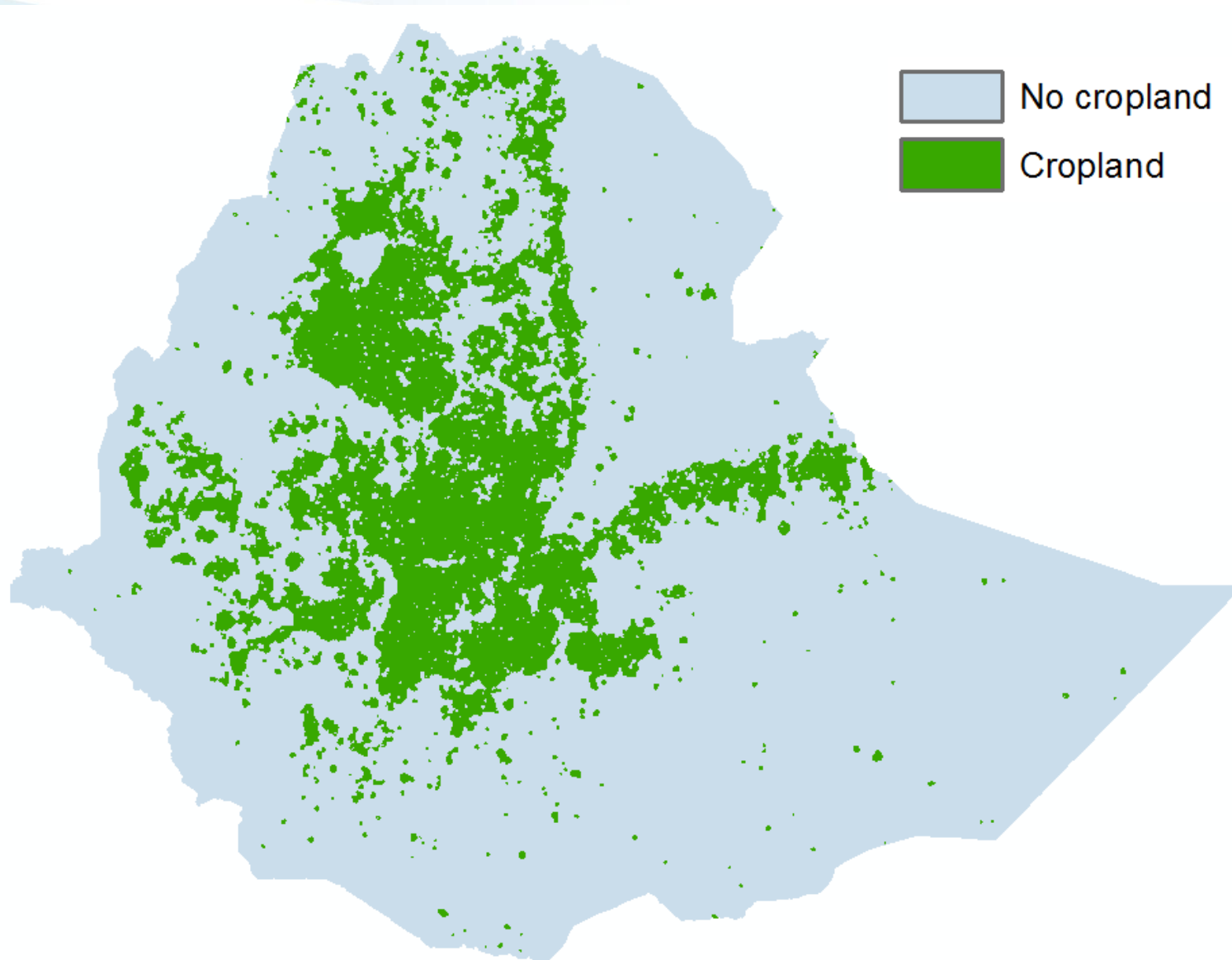
**Areas
of Conflict**



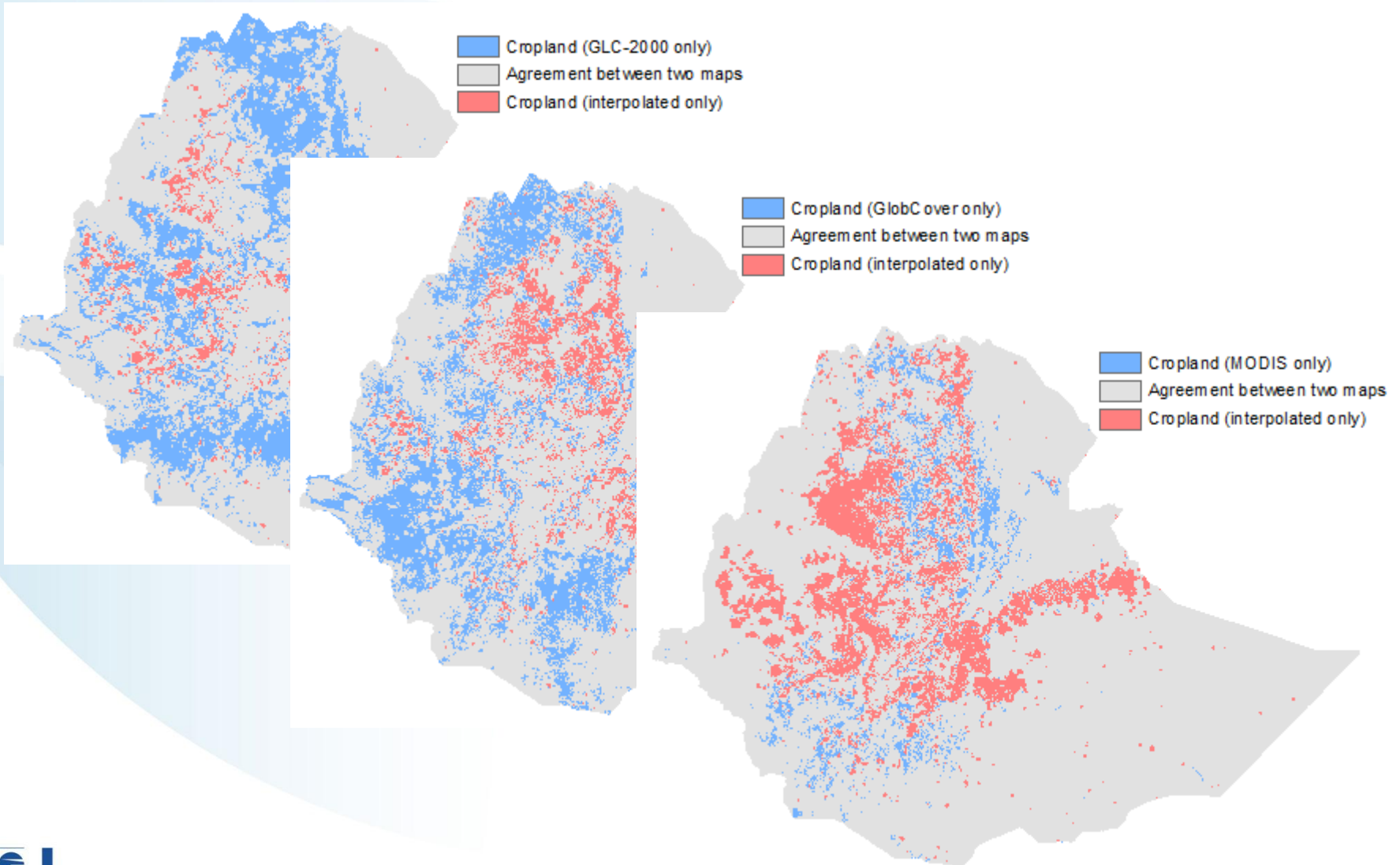
Data Collected over Three Weeks



Geo-Wiki Output: Interpolated Cropland Map



Comparison through Differencing

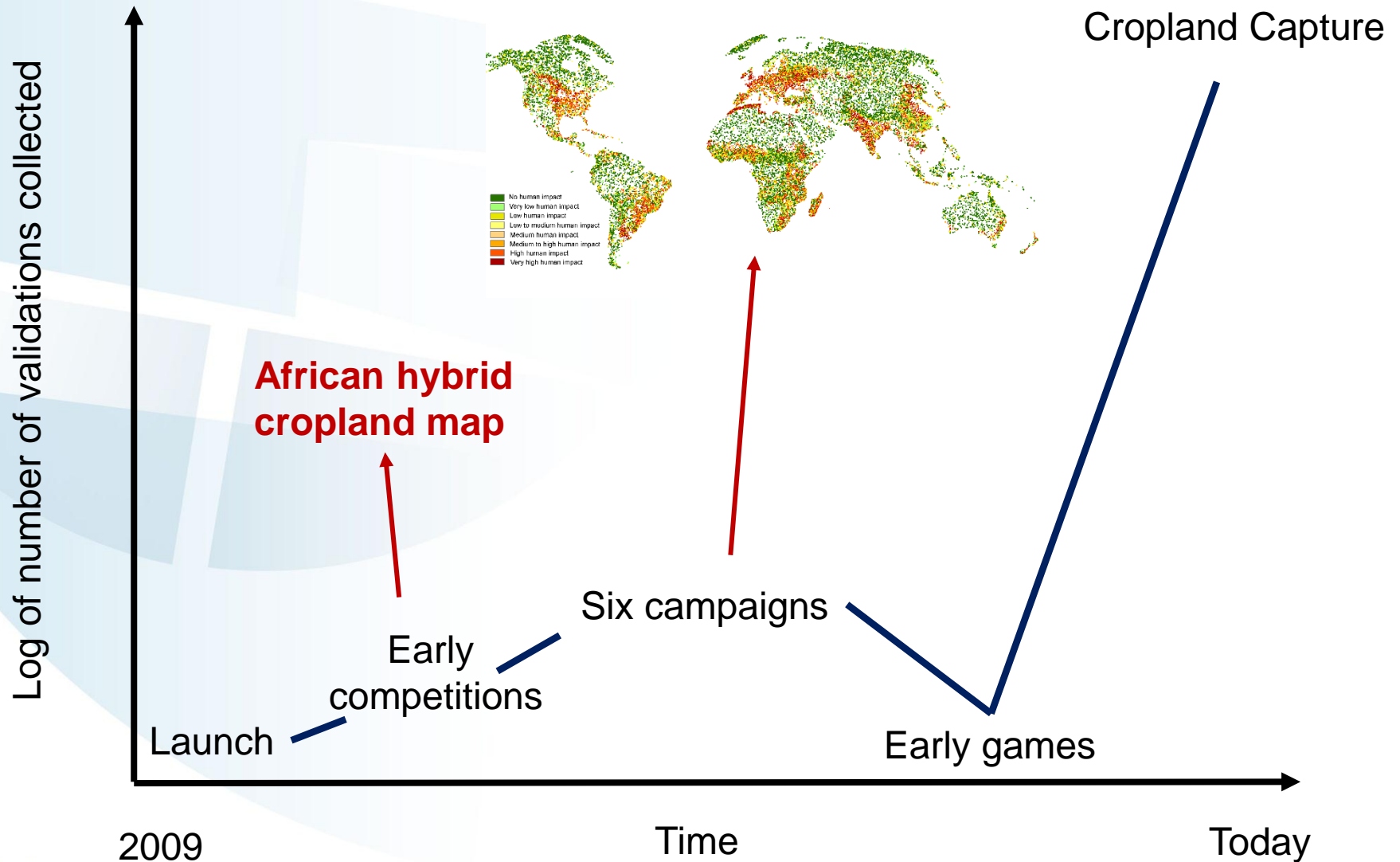


Accuracy Assessment

Maps	Accuracy measures (%)				
	Overall accuracy	User's accuracy		Producer's accuracy	
	All	No Crop	Crop	No Crop	Crop
GLC-2000	77.3	90.5	48.1	79.5	69.6
MODIS	81.8	83.2	67.5	96.1	29.3
GlobCover	74.5	89.3	43.9	76.8	66.3
Crowdsourced cropland map	89.3	91.7	78.8	94.9	68.5

See, L., McCallum, I., Fritz, S., Perger, C., Kraxner, F., Obersteiner, M., **Deka Baruah, U., Mili, N. and Ram Kalita, N.** In press. Mapping Cropland in Ethiopia using Crowdsourcing. International Journal of Geosciences.

Evolution of Crowdsourcing



Multi-Platform Game



Cropland Capture

GEO-Wiki

About Cropland Capture

By 2050 we will need to feed more than 2 billion additional people on the Earth. By playing Cropland Capture, you will help us to improve basic information about where cropland is located on the Earth's surface. Using this information, we will be better equipped at tackling problems of future food security and the effects of climate change on future food supply.

Get involved and contribute to a good cause! Help us to identify cropland area!

[Continue](#) [What is cropland?](#) [What is NOT cropland?](#)

Win Prizes !!!

←

FAQ

Is there cropland in the red box?

Japan



 NO  YES

Image © 2013 DigitalGlobe

Google earth

  MAYBE  Menu

Week 8 will end in 2 days, 10 hours, 3 min, 46 sec.

Follow us on [twitter](#) to get the latest news about Cropland Capture!

Cropland Capture

GEO-Wiki

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