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Modern Slavery, Environmental Destruction and Climate Change: *Fisheries, Fields, Forests and Factories*

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OF LONDON



- 1) Introduction to the nexus and the 'Anti-slavery Ecosystem' project.
- 2) The sectoral emergences of the nexus in current research: Fisheries, Fields, Forests and Factories.
- 3) Statistical correlations between slavery data and environmental data.
- 4) Remote sensing work, as part of the 'Slavery from Space' project.



- Modern slavery and climate change have emerged as concurrent crises.
- Estimated 40.3 million slaves globally (Global Slavery Index).
- ‘Modern slavery’: the persistent exploitative labour and trafficking practices occur globally in the contemporary world in marginalised and ‘hidden’ spaces.
- Modern slavery: “constituting control over a person in such a way as to significantly deprive that person of his or her individual liberty, with the intent of exploitation through the use, management, purchase, sale, profit, transfer or disposal of that person” (Bellagio-Harvard Guidelines).
- Simultaneously: a climate crisis.

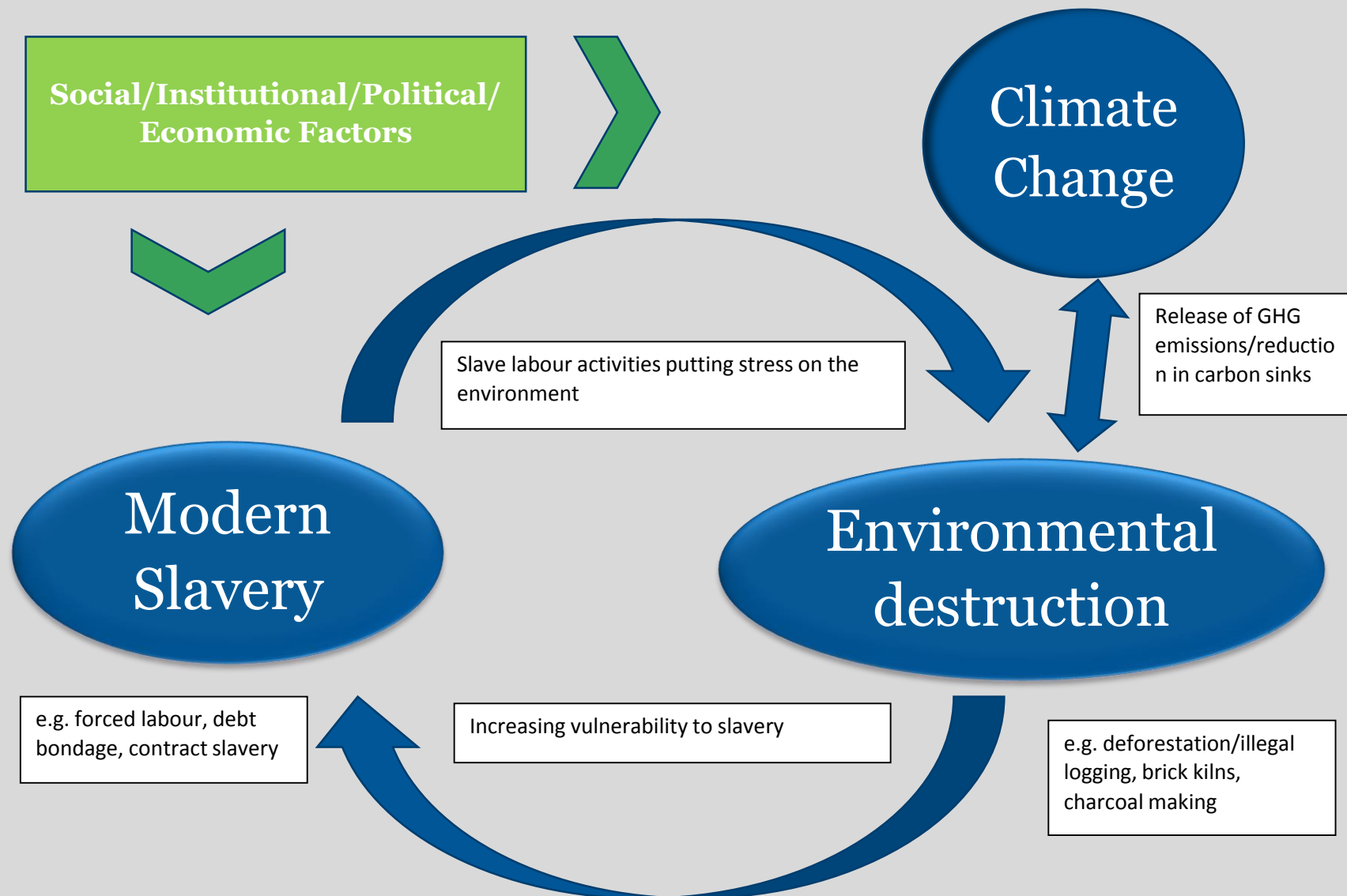
- The *Anti-slavery ecosystem project* proposes a nexus between modern slavery, contemporary environmental destruction and climate change.
- If slavery were a country, it would have a population of some 46 million people and the gross domestic product of Angola, yet would be the third largest emitter of CO₂ (2.54 billion tons per year) in the world after China (7.39 billion tons) and the United States (5.58 billion tons).
- Two-way relationship.



Credit: Nasir Khan



The Nexus





Links to the UN Sustainable Development Goals (SDGs)

8 DECENT WORK AND ECONOMIC GROWTH



Target 8.7

‘Take immediate and effective measures to eradicate forced labour, **end modern slavery** and human trafficking and secure the prohibition and **elimination of the worst forms of child labour**, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms.’ (UN 2017).

12 RESPONSIBLE
CONSUMPTION
AND PRODUCTION



13 CLIMATE
ACTION



14 LIFE
BELOW WATER



15 LIFE
ON LAND





Antislavery Ecosystem

- ❑ To compile, synthesise and integrate spatial data on the landscape changes that result from slavery activities.
- ❑ To calculate the environmental costs of these activities, and the potential gains that stem from curtailing slavery.
- ❑ To explore the values associated with environmental gains, their capacity to be captured in environmental markets, and their ability to help fund slavery prevention and abolition efforts.
- ❑ To explore links between ecological resilience at the landscape scale and its significance as a precondition for human trafficking and slavery.



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The problem:

Global
Dynamic
Under-studied.

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- ❑ *Modern Slavery, Environmental Destruction and Climate Change: Fisheries, Field, Forests and Factories.*
- ❑ A research report produced by the University of Nottingham's Rights Lab, in collaboration with the Office of the Independent Anti-Slavery Commissioner and Royal Holloway University of London
- ❑ Authors: *Dr. Doreen Boyd, Professor Katherine Brickell, David Brown, Dr. Chris Ives, Nithya Natarajan, Dr. Laurie Parsons*
- ❑ Aims to assess the state of current research on the nexus and offer insight into existing trends, gaps and potential future research directions.



Overall Trends

- 1) The prominence of debt-bondage.
- 2) The connection with illegal/informal industries in the Global South.
- 3) The connection with international commodity supply chains and consumption in the Global North.
- 4) The sectoral and geographically-specific emergence of research on the nexus: (i) *Fisheries* (ii) *Fields* (iii) *Forests* and (iv) *Factories*

(i) *Fisheries*

- Complex, two-way interconnections between over-fishing, illegal fishing and debt-bonded labour in the context of Thailand.
- Increasing economic pressures associated with over-fishing- fuelling labour exploitation in the fishing sector.
- Debt-bondage and exploitative conditions in Thai fisheries.
- Evidence of two-way relationship.
- Also- fish-farming in the Sundarbans.



Credit: Nasir Khan

(ii) *Fields*

- The exacerbated climate-induced vulnerabilities felt by rural communities in the Global South.
- Renders rural inhabitants more susceptible to trafficking/exploitative labour practices.
- A human trafficking-natural disaster nexus in the literature (e.g. Indonesia).
- Forms of labour exploitation also present and require further exploration.
- E.g. Cambodian vulnerability



(iii) *Forests*

- Mutually destructive relationship between deforestation and slave labour in Brazil.
- Debt-bonded labour force used in key industries, enabling large-scale clearing of the Amazon.
- Similar findings in Indonesia (palm oil industry) and in Ghana (small-scale mining).
- Commonalities across these cases
- How about the other nexus direction?



(iv) Factories

- Contribution of traditional brick-kilns (e.g. bull's trench kilns) to local and global environmental destruction.
- Prevalence of debt-bonded labour in the brick-kilns of South-Asia (India, Bangladesh, Cambodia).
- Fuelling localised air pollution and GHG emissions.
- Significant and on-going linkages between environmental destruction and labour exploitation in South-Asian brick-kilns.



Credit: Nasir Khan



Key Messages

- ❑ Research on the nexus has tended to emerge in sectorally or geographically-specific forms.
- ❑ Nevertheless- broad commonalities across these.
- ❑ The nexus at the sectoral levels is structurally and geographically bound together.
- ❑ Clear links with climate-induced migration.
- ❑ A need to move 'beyond' the sectoral and conceptualise a holistic and integrated framework.



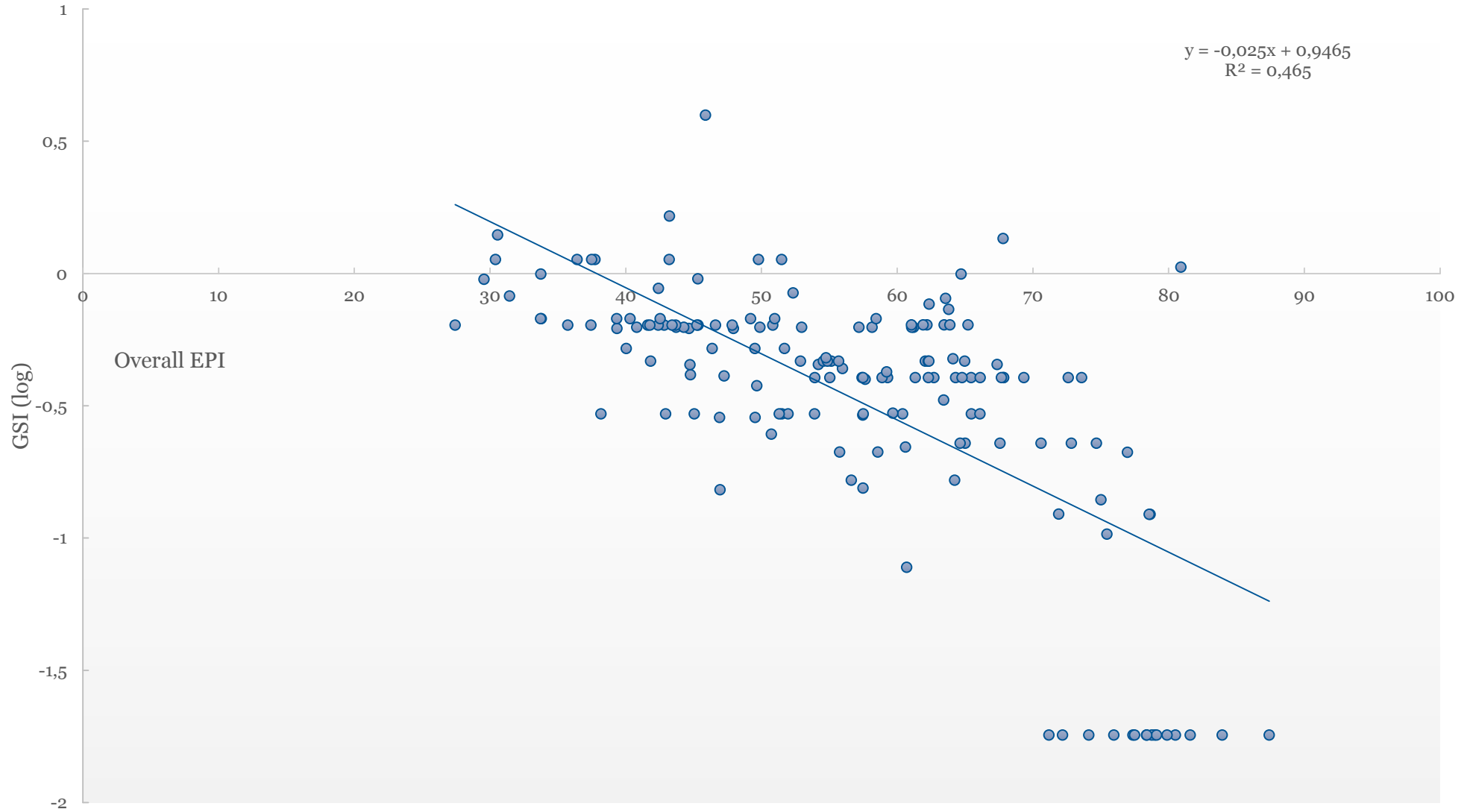
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Global Slavery Index (GSI) vs Environmental Performance Index (EPI)



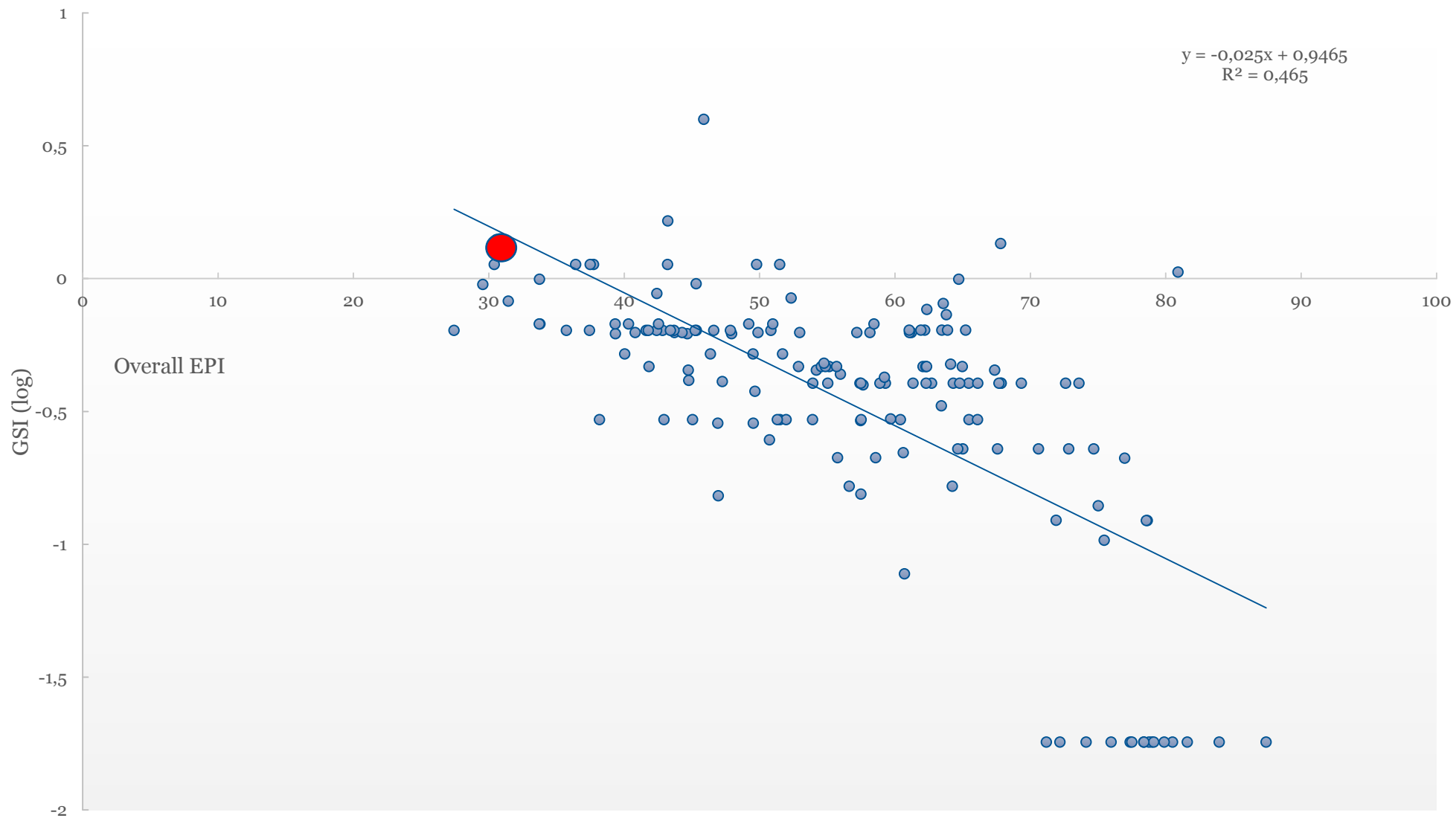


Global Slavery Index (GSI) vs Environmental Performance Index (EPI)



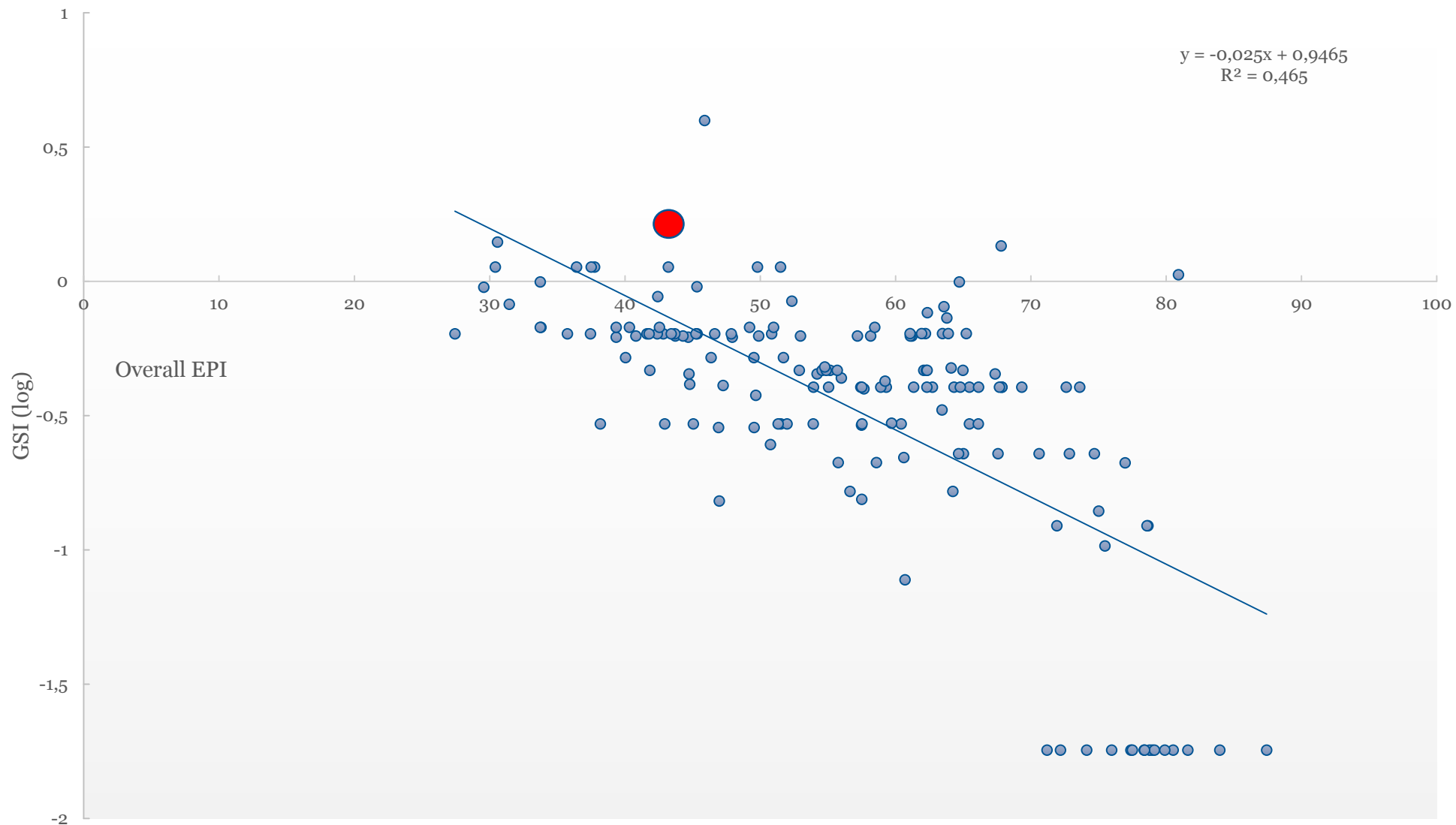


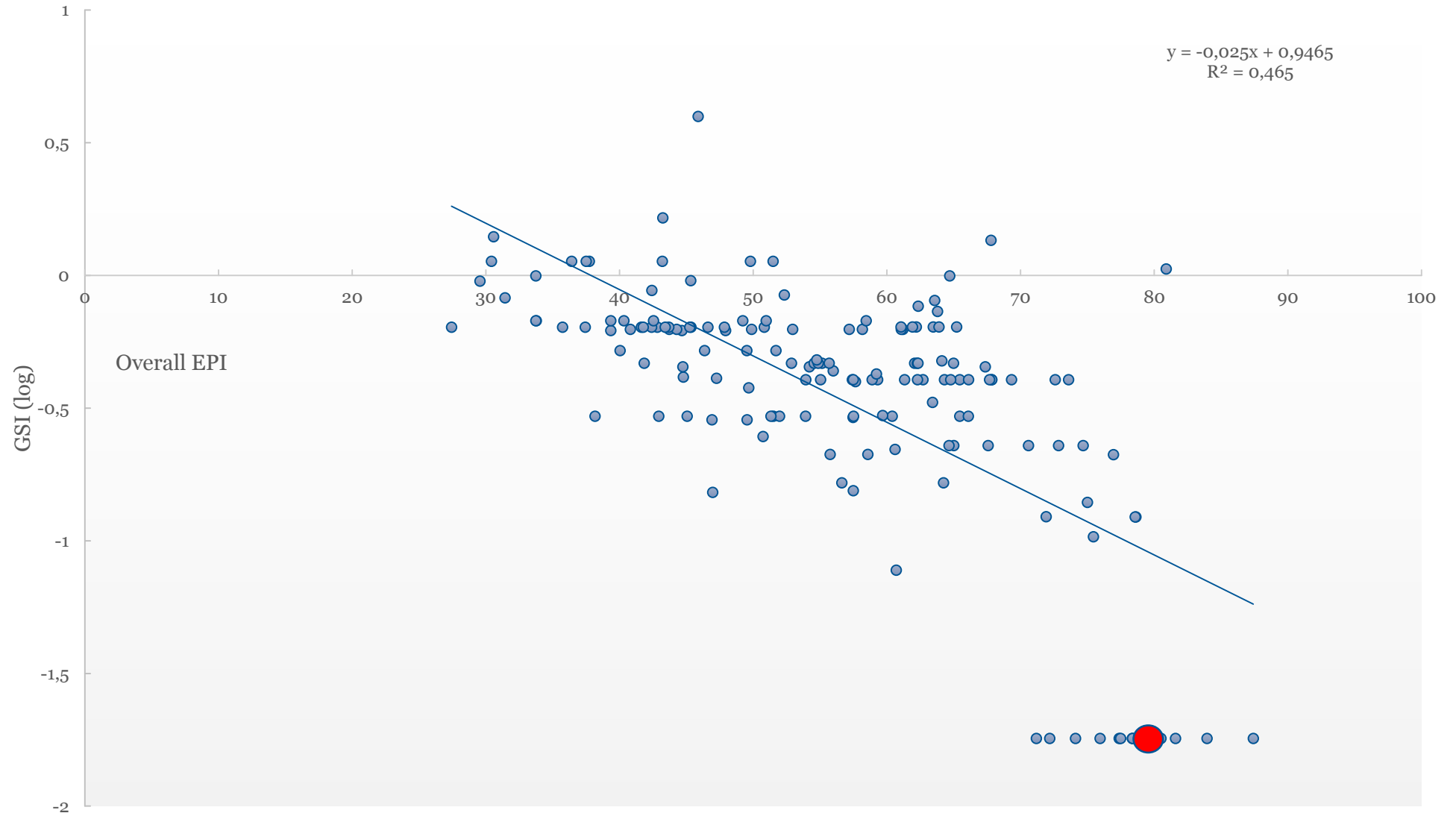
INDIA





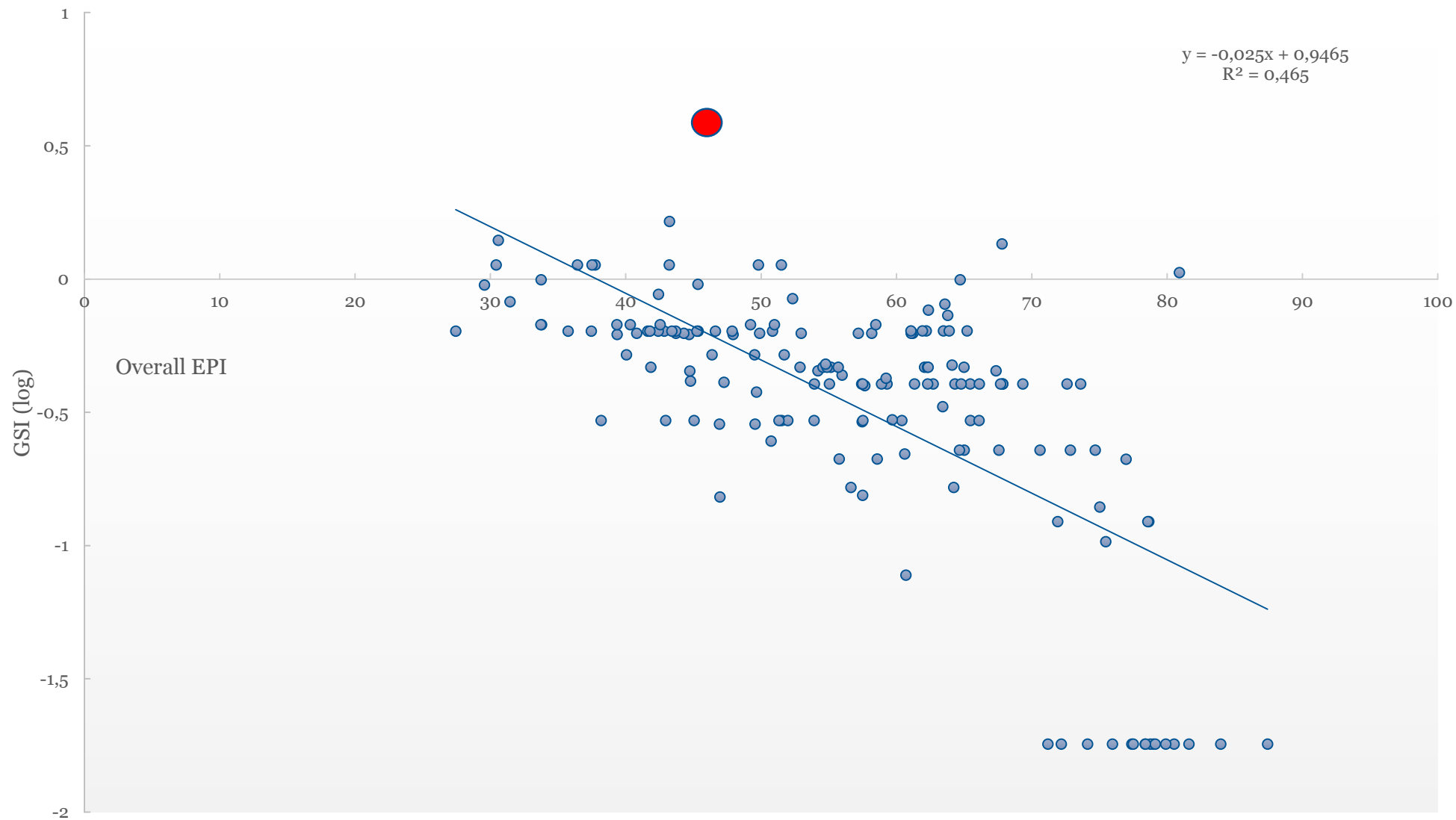
CAMBODIA







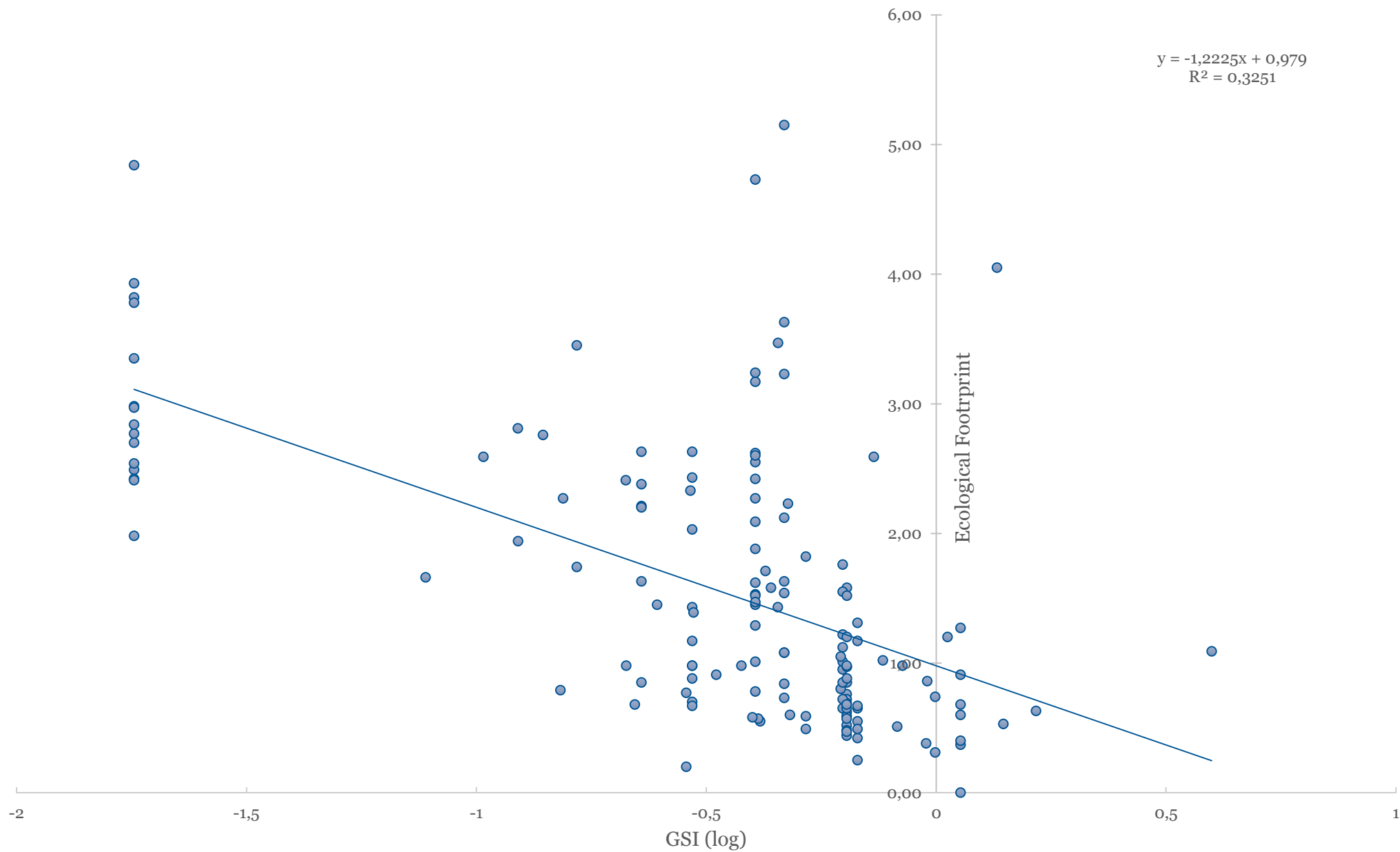
UZBEKISTAN





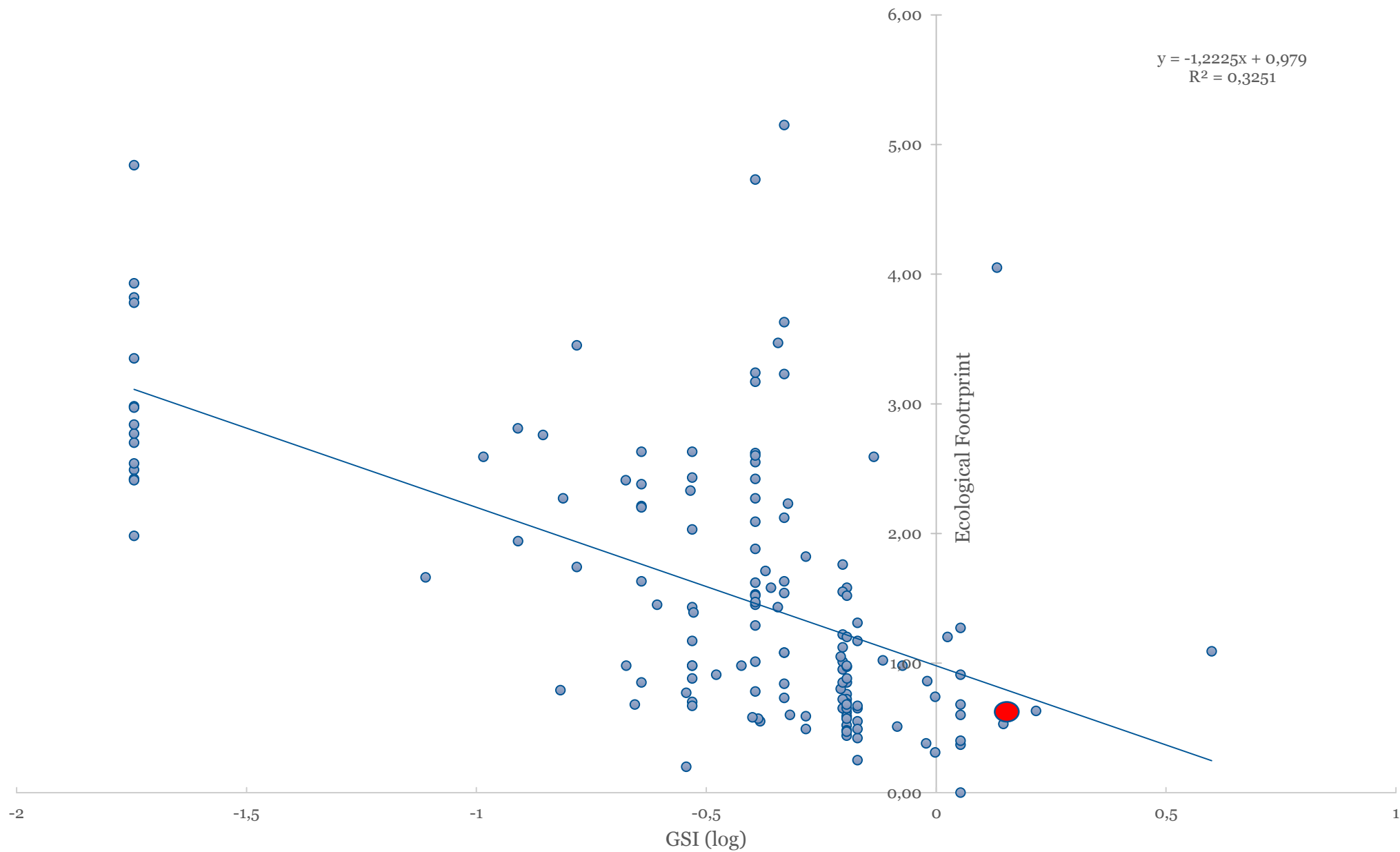
ECOLOGICAL FOOTPRINTS:

Goodlife project – a consumption-based index that measures how much land and sea is required to support a population



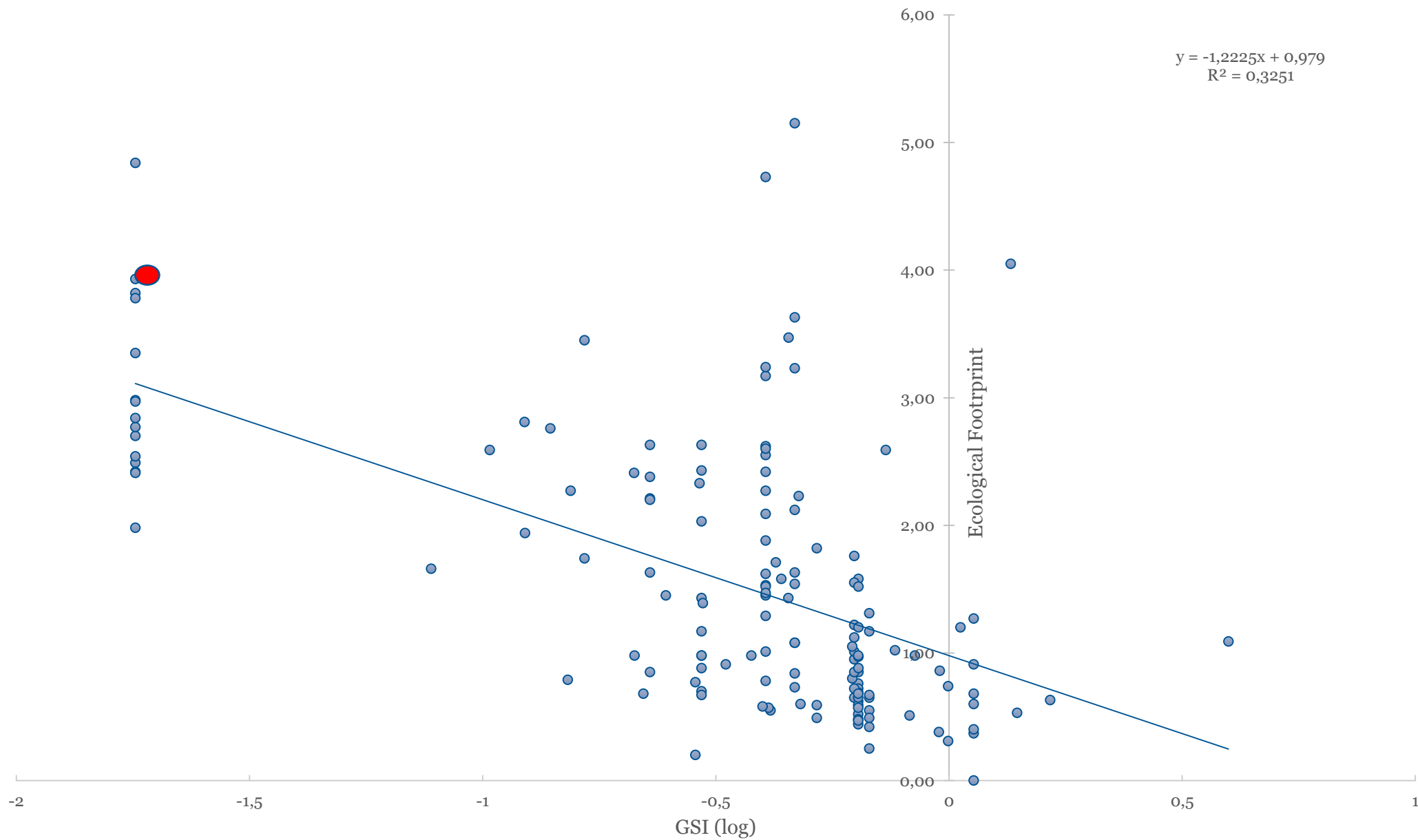


INDIA



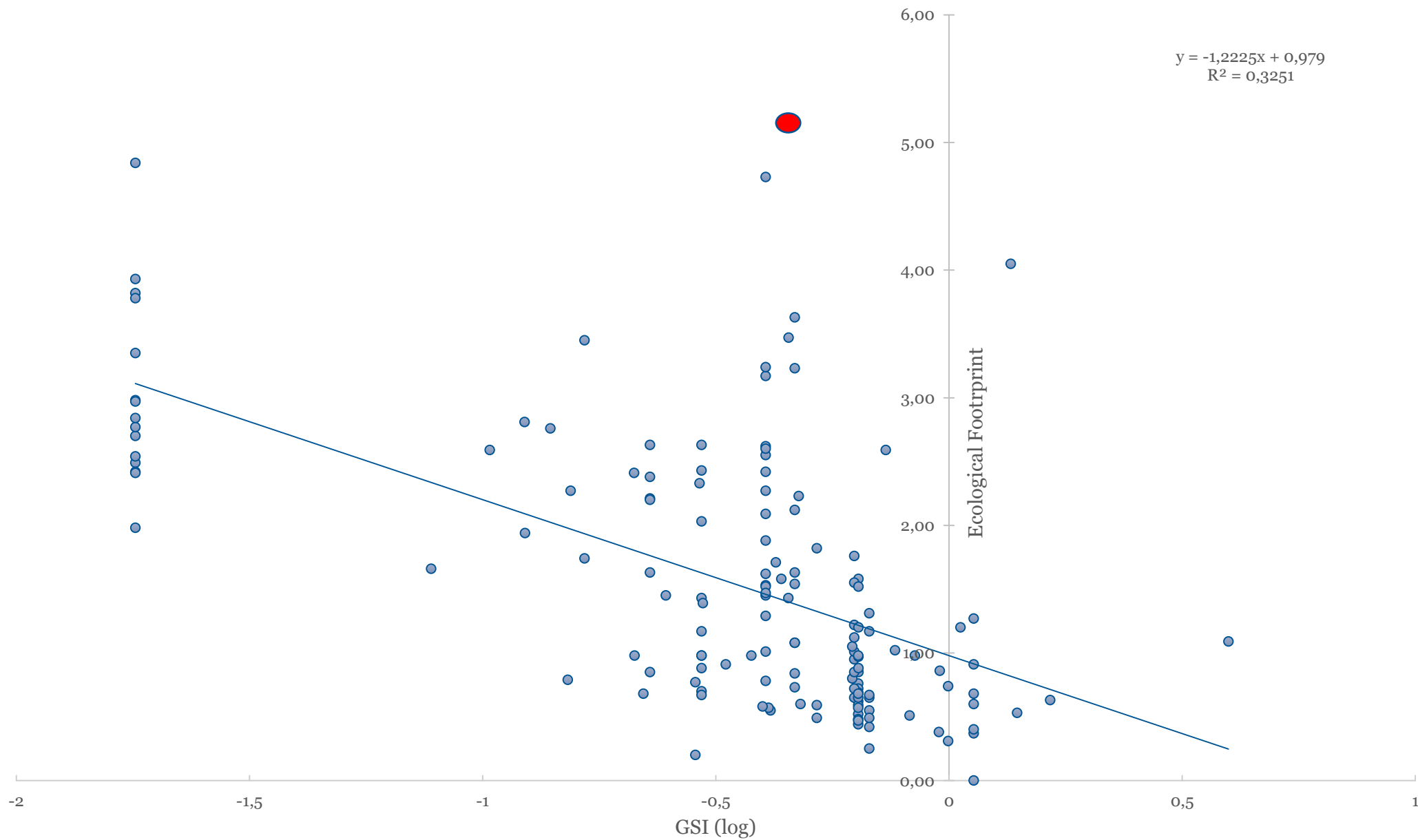


UNITED STATES





KUWAIT



We are home to the world's leading contemporary slavery experts and have built the world's first large-scale research platform for ending slavery.



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SLAVERY
FROM SPACE





- ❑ Based on the ILO's Global Estimates data of 2017, which breaks down the figure of 40 million slaves by industry, we estimate that nearly a third of slavery may be detectable from space.
- ❑ In stone quarries, brick kilns, fisheries, mines, forests and construction sites (rather than in domestic service, food and hospitality services, or sexual exploitation).



- ❑ “Slavery From Space is a necessary addition to the Global Slavery Index , which focuses on the presence of slavery at the macro level. Slavery From Space, on the other hand, works at micro level, on the ground, and allows NGOs to tackle specific and localized cases of modern slavery. Most companies that operate illegally remain under the radar, but are exposed by Slavery From Space.” Terry Fitzpatrick, *Mondiaal Nieuws*, April 4, 2018.



Slavery Observatory

- ❑ We compile, synthesise and integrate spatial data to detect and prevent slavery.
- ❑ We develop (automated) methods with as much data as possible at as low as possible cost, with known levels of uncertainty.
- ❑ We act as a conduit for all observations of slavery activity.



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An aerial photograph showing a large body of water, likely a river or delta, with a dense forest on the right side and a cluster of buildings and structures on the left side. The forest is a deep green, while the water is a dark blue-green. The buildings are small and clustered together, with some roofs visible. The overall scene is a mix of natural and human-made elements.

Bangladesh: Sundarbans Reserved Forest (SRF)



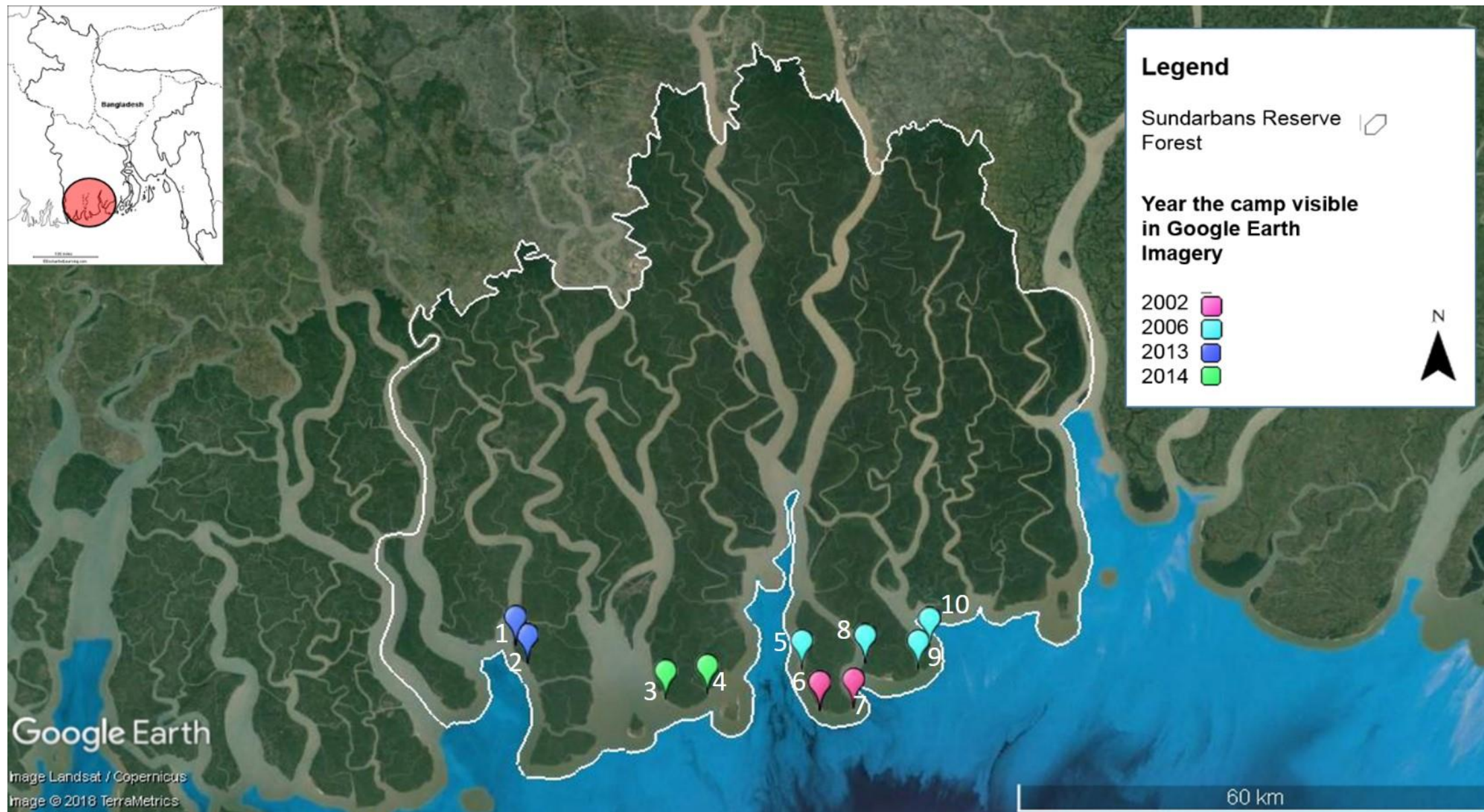
The Issue: Fish-processing Camps



Image Credit: Nasir Khan



Satellite Imagery Analysis





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- A photograph of a salt flat in a coastal area. In the foreground and middle ground, there are numerous long, low wooden racks or frames. These racks are covered with long, thin, white strips of salt that have been harvested and are now drying. Two people are visible in the scene: a man in the foreground, wearing a dark shirt and light-colored shorts, is standing near one of the racks; and a woman in the background, wearing a red headscarf and a blue dress, is also working with the salt racks. The ground is dark and wet, reflecting the light. The background shows a flat, open landscape under a clear sky.
- ☐ The SRF is a UNESCO World Heritage Site (1997)
 - ☐ The mangroves provide v important ecosystem services



- Collated from literature that specifically looks at the ecosystem services of the Sundarbans Reserve Forest (SRF).
- Based on the categories from the Millennium Ecosystem Assessment (2005).

Ecosystem Services	Indicators	Data Sources
<i>Provisioning Services</i>		
Food Production	Fish – freshly caught and dried fish for the domestic and international food markets. Shrimp. Crab. Fisheries – 678 diverse species of fish (291 species total), and other marine life; traditional artisanal fishing practices. Leaves, fruits and vegetables – crops being grown to the edges of the SRF.	Islam et al. (2018); Abdullah-Al-Mamun et al. (2017); Uddin et al. (2013).
Forest Products	Illegal logging of protected mangroves and deforestation practices (some being used to produce fish-drying racks and buildings associated to the illegal processing of fish products by children). Timber logging. Fuel wood. Thatching materials. Honey and Wax.	Uddin et al. (2013); Islam et al. (2018); Hossain et al. (2016); Ahmed et al. (2017).
<i>Cultural Services</i>		
Human Well-Being	Medicine. Clothing – from furs and skins.	Abdullah-Al-Mamun et al. (2017).
Cultural Services	Artisanal fishing methods (linked to tourism). Religious festivals and temples of important cultural significance. Educational research.	Mozumder et al. (2018); Islam et al. (2018).
Recreational Services	Tourism– promote the unique natural services available; Dublar Char commonly promoted as a tourism hotspot.	



Ecosystem Services (continued)

Regulatory Services

Climate Regulation

Carbon sequestration – the largest carbon sink within South Asia, and the largest continuous mangrove system in the region. Mangroves are highest blue carbon pool (6.5 billion tons) globally.

Added protection from rising sea levels associated with climate change in a low lying country.

Coastal Impacts

Erosion

Erosion of the coastline due to climate change and adverse practices causing destabilisation of the sediments within the delta due to mangrove removal; tree falling.

Ghosh et al. (2016).

Loss of sediments from the Ganges delta to the Indian Ocean.

Accretion

Mangrove roots trap sediments from the ocean during tidal changes; allow for the creation of new mudflats, fertilisation of species and increasing area under the mangroves.

Natural Hazard Protection

Extensive flooding inland from storm surges and cyclones – can also add to flood regulation.

Crop and aquaculture damage.

Added protection from rising sea levels associated with climate change in a low lying country (climate regulation).

Supporting Services

Biodiversity and Conservation Practices

UNESCO World Heritage Site – protected as it houses 300 species of flora including eight mangrove species and 425 species of fauna; habitat for the endangered Bengal tiger (refugia); largest continuous mangrove system within South Asia.

UNESCO (2018); Uddin et al. (2013); Spalding et al. (2010).

Mangrove species include: *H. fomes*, *E. agallocha*, *C. decandra*, *X. mekongensis*, *S. apetata*, *X. moluccensis*, *B. gymnorhiza* and *A. officinalis*.

Genetically diverse environment for unique biological materials.

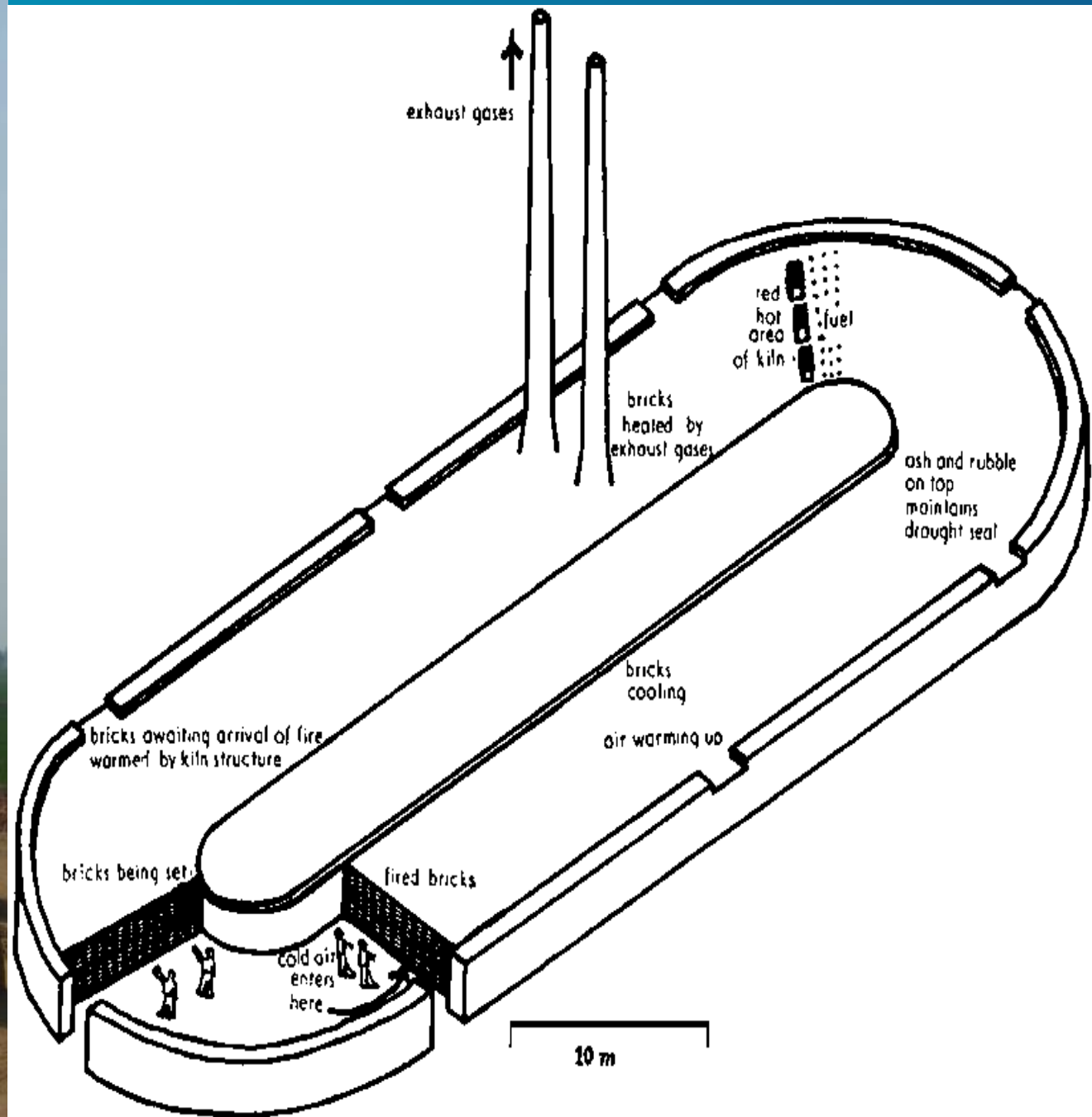
Nutrient Cycling

Up-swell from tides and freshwater flows into the delta alternate the nutrients which are available leading to nutrient cycling and a nutrient rich environment.



Brick Belt

- The brick kiln industry is one of the world's highest users of slavery: 70% of those in Indian brick kilns are estimated to be enslaved.
- Prominent practice in 14 nations (including Pakistan, India, Nepal and Bangladesh).
- Slavery in the digging of clay, shaping of bricks, firing of bricks, transport of completed product.






Legend

Tile28CompositeBands.tif

RGB

-  Red: Band_1
-  Green: Band_2
-  Blue: Band_3

0 0.125 0.25 0.5 Kilometers



Image © 2017 DigitalGlobe

Google Earth



2003

Imagery Date: 11/15/2014 26°55'09.08" N 75°57'03.13" E elev 369 m eye alt 1.20 km



Image © 2017 DigitalGlobe

Google Earth



2009

Imagery Date: 12/5/2015 27°09'47.27" N 77°15'06.71" E elev 199 m eye alt 1.20 km



First estimate with confidence of number of kilns across the Brick Belt

- Step 1: Statistical Inference via random sampling of high resolution data and visual interpretation
- Step 2: Testing the reliability of visual interpretation via Citizen Science (crowd-sourcing).



Fig. 7. An example of a Fixed Chimney Bull's Trench brick kiln @31.5385546, 75.9813821 – note the emissions from the chimney stack. From Digital Globe's WorldView-2 satellite system; pan-sharpened natural colour at 50 cm resolution; captured in November 2015. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

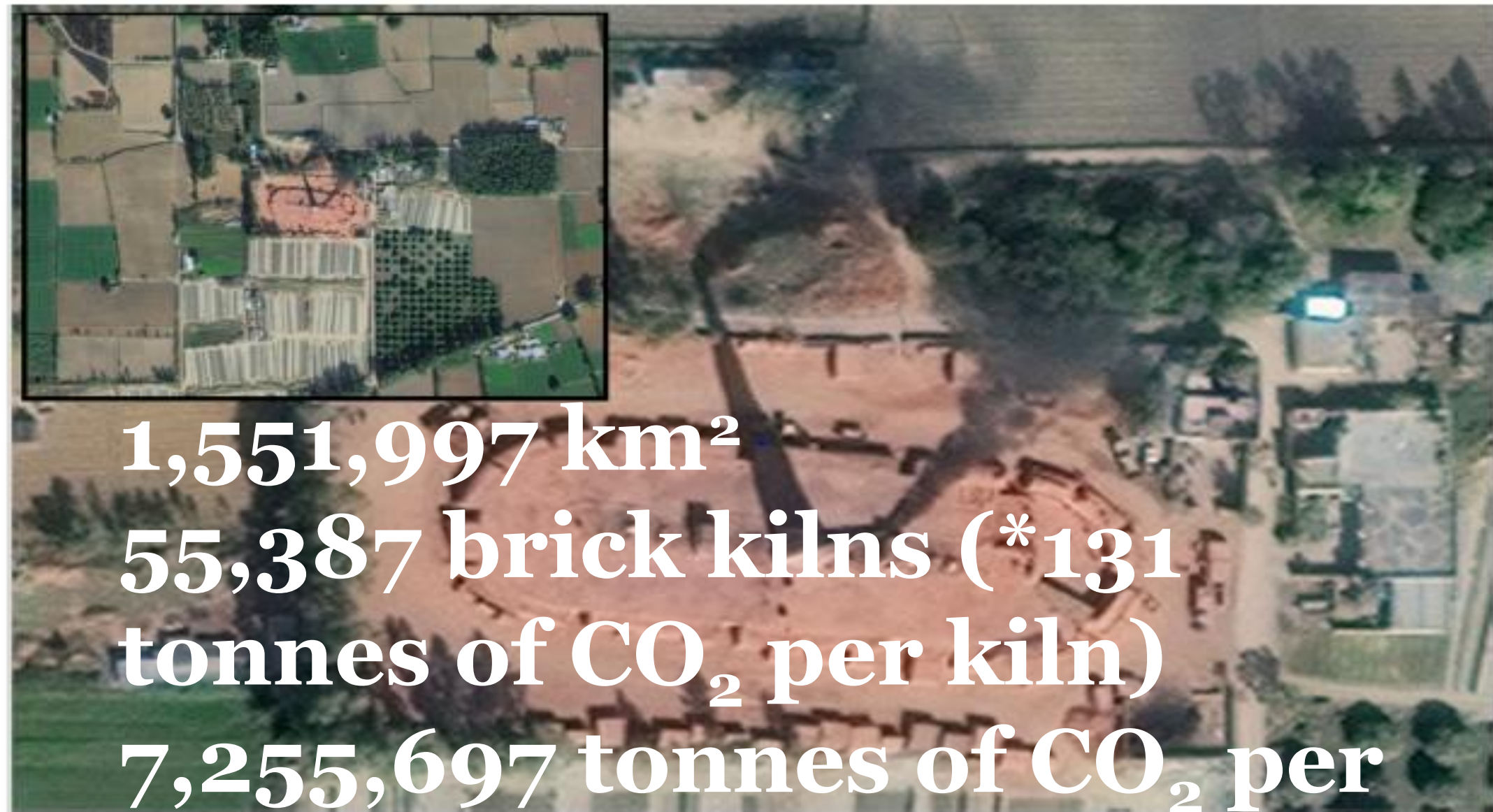


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'Blood Bricks' project (Royal Holloway, University of London)

- *'Blood Bricks: Examining the Climate Change-Modern Slavery Nexus in the Cambodian Construction Industry'*
- Explores the lives of debt-bonded workers on kilns, and the trajectory that led them there from rural villages across Cambodia.
- Identify emerging linkages between irrigated farms and indebtedness.
- Farmers forced to 'sell' their debt to brick-kiln owners.
- Fuels further environmental destruction.

Web: <http://www.projectbloodbricks.org>
Twitter: @blood_bricks



(Thomas Cristofolletti, 2017)



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Next: Brazil
(charcoal making/deforestation)



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Next: Democratic Republic of the Congo (mining)



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A photograph of several men working in a muddy, open-pit mine. They are using long-handled tools like pickaxes and shovels to dig through the earth. The ground is covered in thick, brown mud. In the background, there are large mounds of excavated soil and more workers. The scene is dimly lit, with a brownish tint.

Next: Ghana (mining)



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A young girl with dark hair, wearing a grey knit beanie and a pink sweater with a fringe at the bottom, stands in a vast cotton field. She is holding a large, fluffy ball of white cotton in her hands. The field is filled with cotton plants, some with white cotton bolls ready for harvest. The background shows a line of trees under a clear blue sky.

Next: Uzbekistan (cotton)



Key Messages

- ❑ Tightly interconnected and two-way relationship between modern slavery, environmental destruction and climate change.
- ❑ Vital that these are tackled holistically as interconnected challenges.
- ❑ Need to bring the SDGs in conversation with each other.
- ❑ Considerable scope for further examinations of the nexus.
- ❑ From statistical analysis to remote-sensing to on-the-ground qualitative analysis.



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