Leverhulme Centre for Nature Recovery

Beyond the Sensor

Participatory socio-ecological mapping and restoration in the mosaic landscapes of Ghana

The work of the Leverhulme Centre for Nature Recovery is made possible thanks to the generous support of the Leverhulme Trust

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Focus groups 2019; 2022

Household survey 2024

Carting plantain from 'illegal' farms within a protected area: Southern Ghana, Jan 2020

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Beyond the sensor …

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Overview

- Why and how remote sensing sets the scene for restoration initiatives
- Show how participatory mapping can add new layers to decision-making
- Implications for navigating more equitable restoration or nature recovery initiatives

Global goals: halt deforestation, promote restoration

- REDD+ – voluntary, nationally driven mechanism to reduce emissions from deforestation and safeguards (seven) to protect biodiversity and the well-being of local communities (Cancun Agreement 2010)
    - Alignment, transparency, participation, local rights …

- **Article 6** – Internationally Transferable Mitigation Outcome (ITMO) – framework for carbon credit exchange between actors (Paris Agreement 2016)

Bastin et al. (2019)

Article

Global priority areas for ecosystem restoration

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Check for updates

Bernardo B. N. Strassburg[1,2,3,4]✉, Alvaro Iribarrem[1,2], Hawthorne L. Beyer[5], Carlos Leandro Cordeiro[1,2], Renato Crouzeilles[1,2,3], Catarina C. Jakovac[1,2,6], André Braga Junqueira[1,2,7], Eduardo Lacerda[1,2,8], Agnieszka E. Latawiec[1,2,9,10], Andrew Balmford[11], Thomas M. Brooks[12,13,14], Stuart H. M. Butchart[11,15], Robin L. Chazdon[2,16,17,18], Karl-Heinz Erb[19], Pedro Brancalion[20], Graeme Buchanan[21], David Cooper[22], Sandra Díaz[23], Paul F. Donald[11,15,21], Valerie Kapos[24], David Leclère[25], Lera Miles[24], Michael Obersteiner[25,26], Christoph Plutzar[19,27], Carlos Alberto de M. Scaramuzza[2], Fabio R. Scarano[3] & Piero Visconti[25]

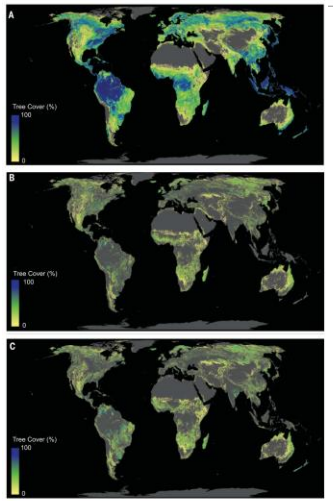

Fig. 2. The current global tree restoration potential. (**A**) The global potential tree cover representing an area of 4.4 billion ha of canopy cover distributed across the world. (**B** and **C**) The global potential tree cover available for restoration. Shown is the global potential tree cover (A), from which we subtracted existing tree cover (25) and removed agricultural and urban areas according to (B) Globcover (16) and (C) Fritz et al. (17). This global tree restoration potential ((B) and (C)) represents an area of 0.9 billion ha of canopy cover (table S2).

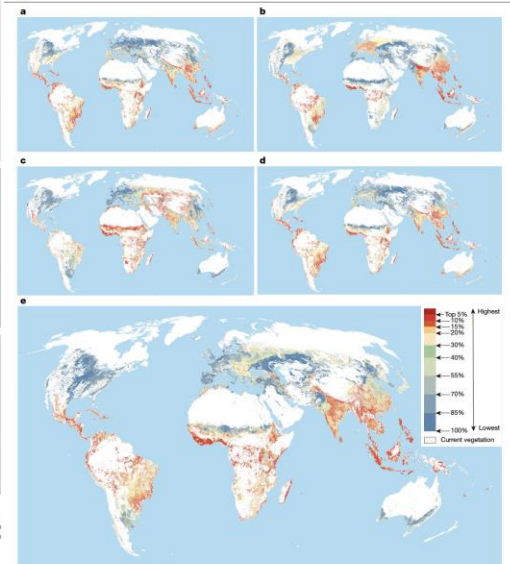

Fig. 1 | Global priorities for restoration according to various criteria. **a**–**e**, Priority areas for restoration, focused on biodiversity (**a**), the mitigation of climate change (**b**), minimizing costs (**c**), biodiversity and the mitigation of climate change (**d**) and all three criteria (**e**). All converted lands are ranked from highest priority (top 5%) (dark red) to lowest priority (85–100%) (blue). The spatial patterns for individual criteria (**a**–**c**) vary considerably, which highlights the role of joint optimizations (**d**, **e**) in capturing synergies.

to conserving

Matters arising

Restoration prioritization must be informed by marginalized people

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Check for updates

Forrest Fleischman[1]✉, Eric Coleman[2], Harry Fischer[3], Prakash Kashwan[4], Marion Pfeifer[5], Vijay Ramprasad[6,7], Claudia Rodriguez Solorzano[1] & Joseph W. Veldman[8]

ARISING FROM: B. B. N. Strassburg et al. *Nature* https://doi.org/10.1038/s41586-020-2784-9 (2020)

The maps and analysis by Strassburg et al.[1] should not be used by policy-makers in their current form, because of the risk of displacing marginalized people, compromising food security and undermining democratic processes. Their analysis was based on normative choices to value (that is, to optimize) relationships among biodiversity potential, carbon storage potential and cost effectiveness, without considering the well-being and rights of people who live in areas identified as restoration priorities, nor the implementation costs of changing land use. Although it may be informative to map the joint distribution of biodiversity, carbon and commodity prices, the absence of important land use by people[2]. For example, Strassburg et al.[1] identified most of the Indian state of Kerala, famous for biodiverse and carbon-rich agroforestry[3], as a priority area for restoration. It is unlikely, and not necessarily desirable, that Kerala's 33 million people would abandon highly productive and biodiverse agricultural systems and then wait for centuries for old-growth tropical forests to develop.

The second question we pose is what the costs of restoration are and who pays for it. The model of Strassburg et al.[1] maximized aggregate net benefits of biodiversity and carbon storage globally. Yet it did not consider how to compensate people who live locally and might be

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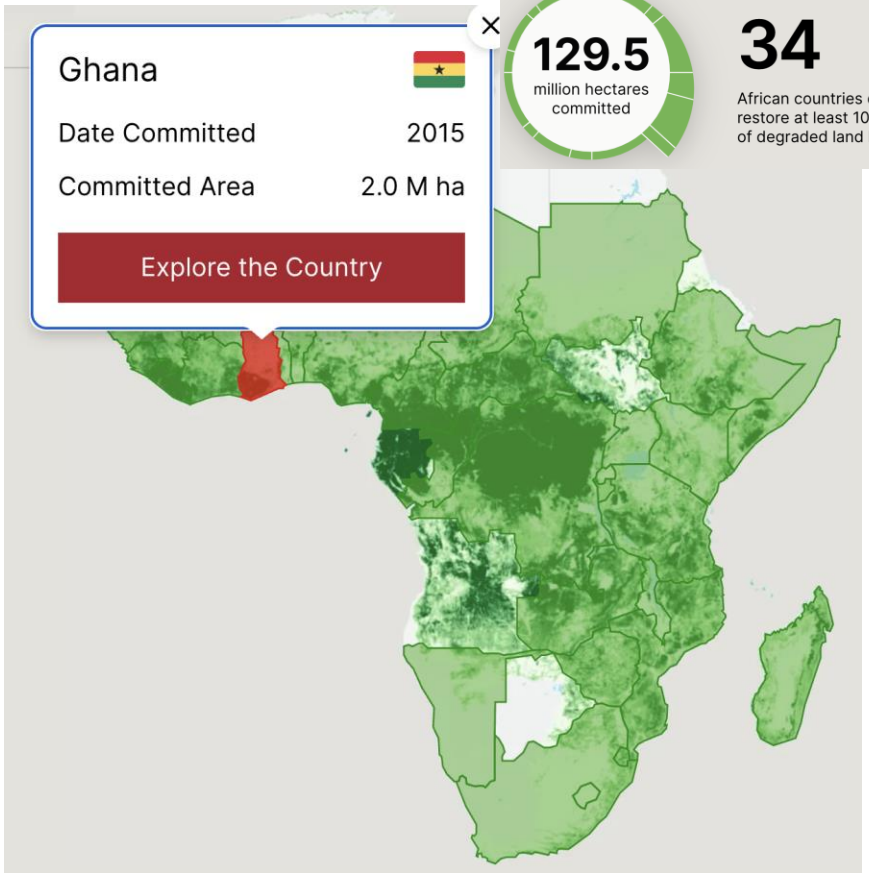

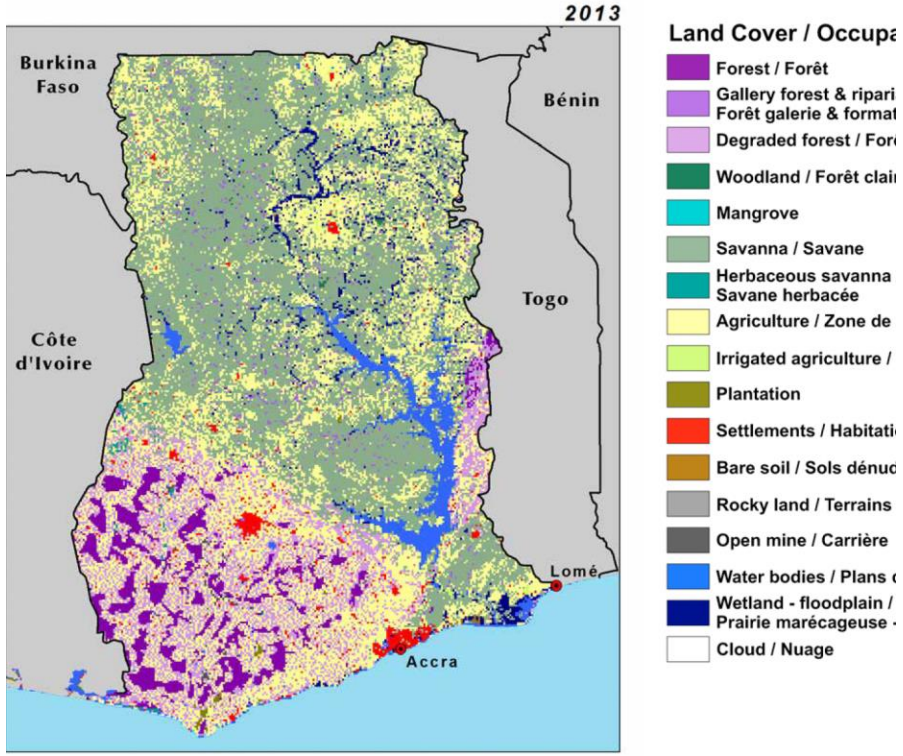

GHANA FOREST PLANTATION STRATEGY: 2016 - 2040

GHANA FOREST PLANTATION STRATEGY: 2016-2040

Ghana's framework on international carbon markets and non-market approaches

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'It is projected that **75%** of the cropland area (i.e., approximately 4 million ha) across the high forest, transition, and Savannah zones will be targeted for trees-on-farms/farm boundary planting/climate-smart agriculture by 2040.' (MLNR 2016, p. 25).

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“Forestry, NGOs, even you researchers, everyone is telling me to plant more trees on my cocoa farms” (Oct. 2024)

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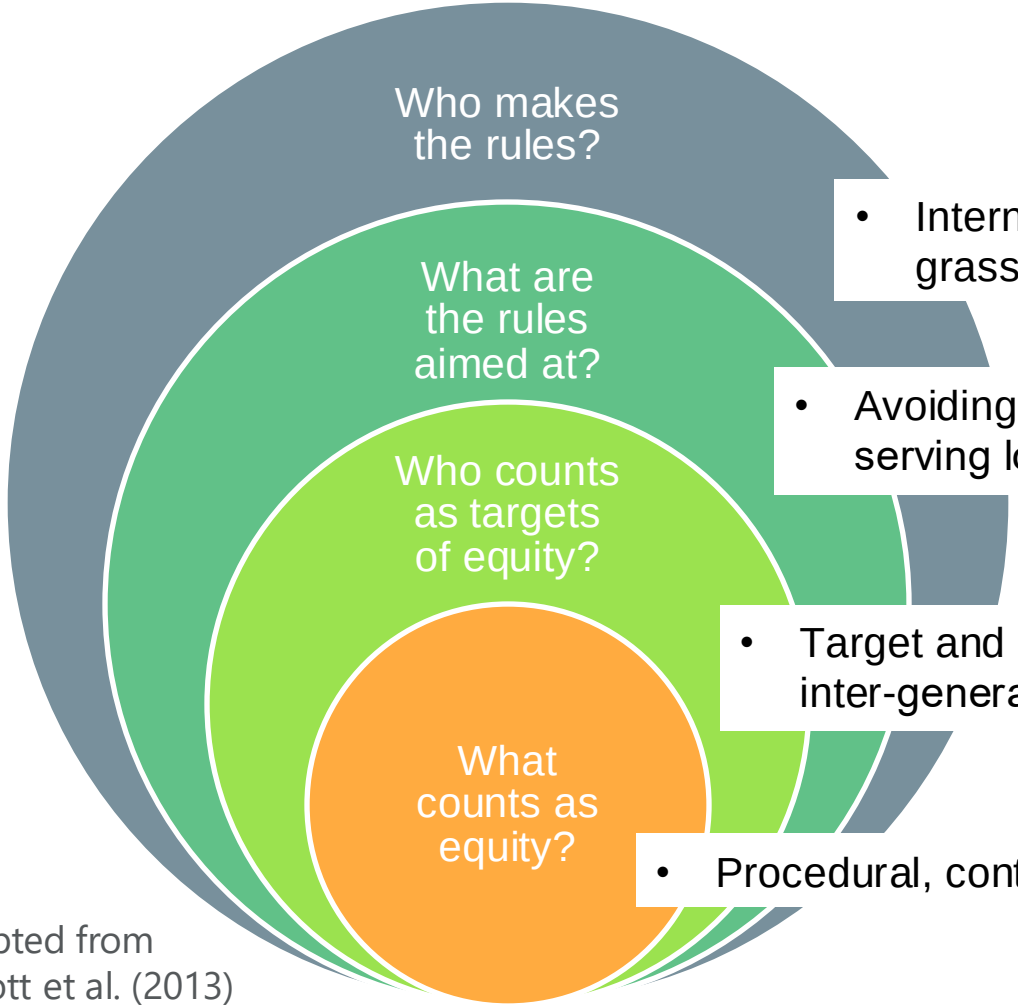

- International, national, or grassroots actors
- Avoiding deforestation, climate mitigation, serving local needs, e.g., food, livelihoods …
- Target and scale: individual-community, inter-generation, interspecies …
- Procedural, contextual and distributive

Adapted from McDermott et al. (2013)

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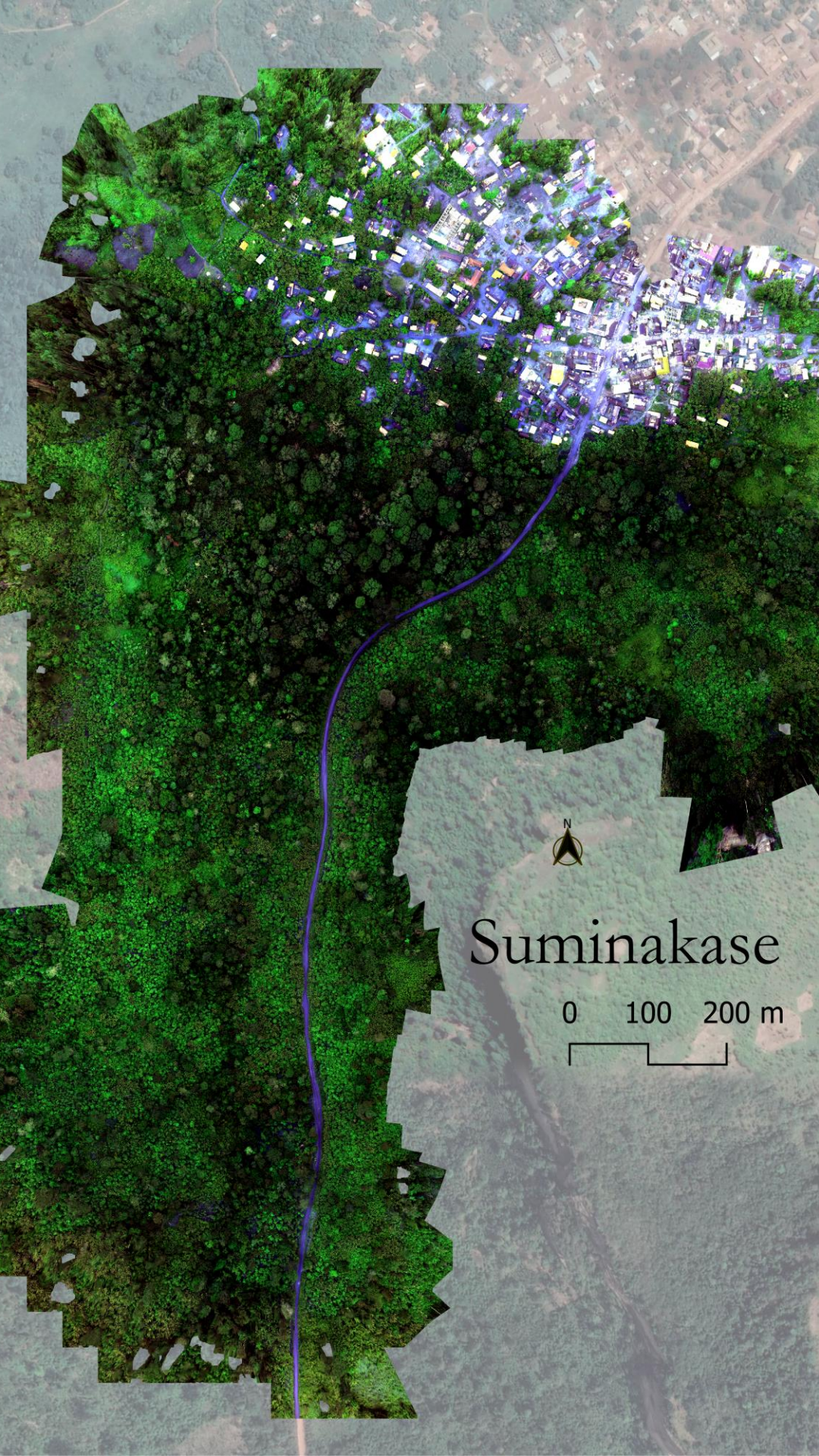
JAGUAR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100
200
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400
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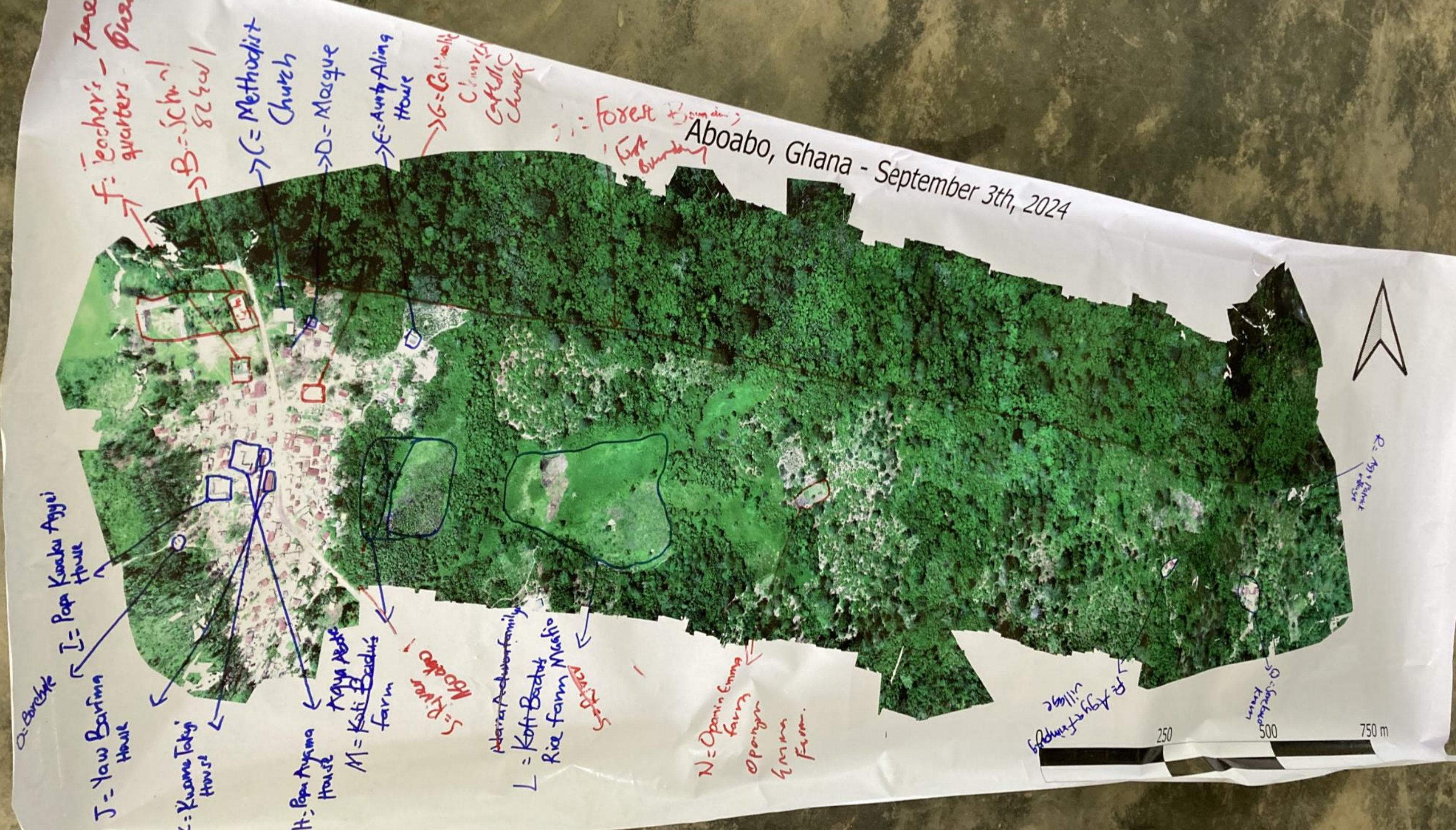
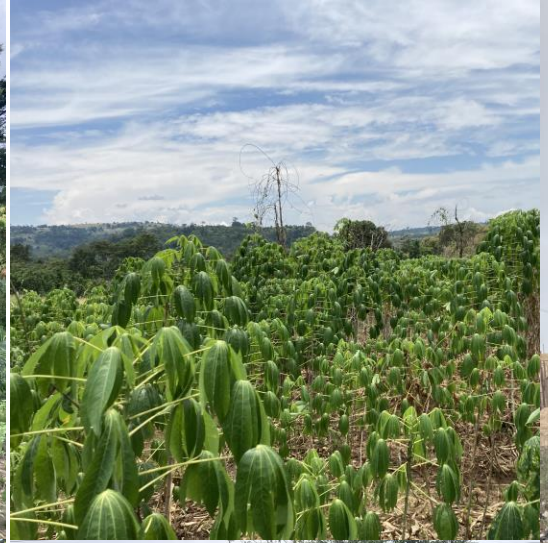
OXFORD
29


Aboabo, Ghana - September 3th, 2024
0
250
500
750 m
F: Teacher's quarters
B = School
C = Methodist Church
D = Mosque
E = Aunty Aling House
G = Catholic Church
I = Papa Kwaku Agyei House
J = Yaw Barfina House
M = Kofi Badu's farm
S = River Aboabo
L = Kofi Badu's Rice farm Maafio
N = Opanin Emma farm
P: Agya Frimpong village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Preliminary insights

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1. Starting point of the “restoration story” matters

- Many protected areas are a product of unresolved struggles over land
  - Admitted communities (post-1927)
  - Deforestation and degradation as mechanisms for contesting land
- Risk of “recursive dispossession” – “100-year restoration” contracts between state and private investors

2. Tenure varies considerably

Mean farm size **2.93 ha**

[SD 4.57] (n = 573)

- Land access tied crops' survival: 6-12 months (veggies); 3 years (plantain); perennials (lifespan of tree crops)
- Tree access depends on "**proof of planting**"; naturally regenerated trees within state control
- Additionality and **permanence of carbon storage**

"Why should I participate when, in the end, I will have no control over the trees I planted by myself, on my own land?

3. Some communities “excluded” for doing good

- **Farms/areas with good tree retention excluded** from Article 6 restoration projects, not much potential for carbon storage …
- Should farmers cut down their trees to qualify for restoration projects and associated benefits?
- How do we reward farmers for their ongoing contributions to nature?



4. Some relations transcend regulation and traceability

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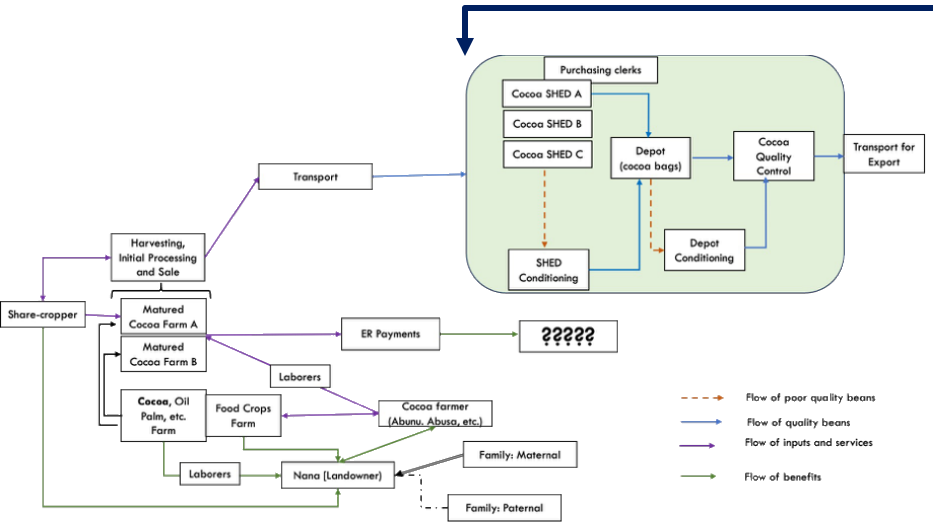

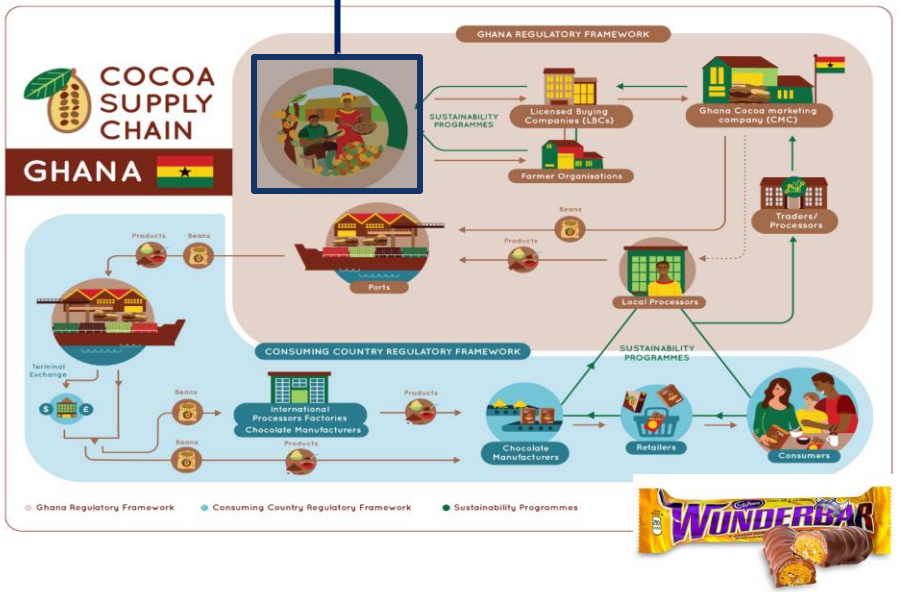

Cocoa value chain (ECA 2022)

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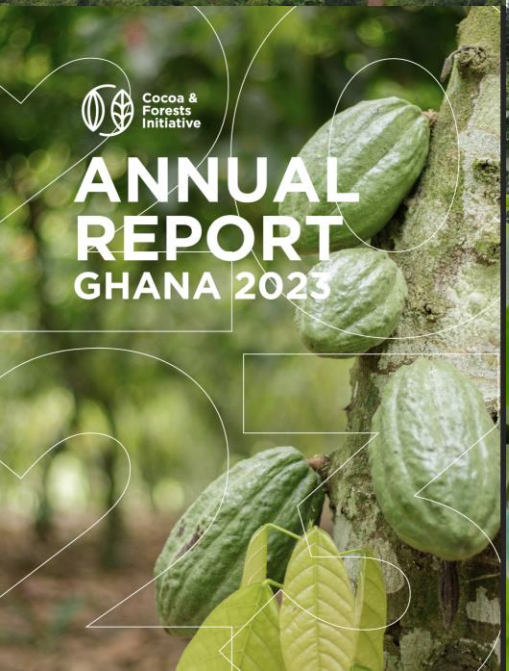
5. Centring cocoa and trees hide many critical issues

- **Food insecurity** among cocoa farmers
  - **Nearly 50% (n=573)** of households with food access insecurity (HFIAS), more severe with stricter forest protection and among migrants
  - Income from cocoa is not enough to secure food.
    - Share of profits to farmers keeps dwindling (farmgate prices around 38% of market prices)
    - Yields are declining; systemic risks are not properly managed, e.g., CCSVD, climate impacts, etc.



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Food production is now the largest driver of new deforestation in Ghana's cocoa and forest belt (MLNR, IDH, and WCF, 2024).

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Concluding thoughts

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Sensors are good, but local voices matter

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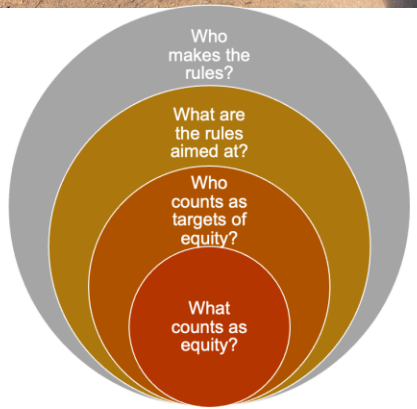

- Remote sensing is important for “big, coarse overview” – not to be confused with “the big picture”
- Participatory mapping can help identify different voices, put social issues on the map
- Create more spaces where local voices can speak “their truth” to power

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What interests, whose interest of “restoration”

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- What needs to be “restored” is often beyond vegetation, iconic species, etc.
- Broken relations between people and their lands, redressing injustices created via land enclosures
- **Place-based solutions that enable people to end hunger and poverty** vs alternatives that feed path dependencies and exploitative trade relations

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Monitoring outcomes equitably

- Type of targets determine acceptable means for monitoring outcomes

- Important to go beyond targets that can be monitored remotely – create more space for putting social issues on the map

Team

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Thanks for your attention

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More of my work

Goals

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Understand the societal, biophysical, policy and systemic factors that enable or challenge nature recovery

Work with partners in case study landscapes to develop and advance the frameworks, technologies and tools that enable and support the delivery and tracking of nature recovery that is effective, inclusive, durable, scalable, provides for society and wellbeing, and is sustainably and ethically resourced.

Develop a community of nature recovery at Oxford that draws on its intellectual capital and convening power across disciplines to examine the key debates and challenges in nature recovery

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Themes

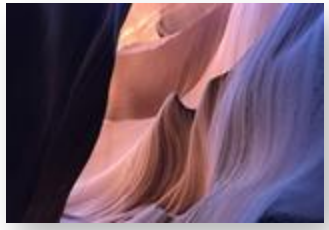
Ecology

Scale

Society

Finance

Health



Integration