Building up local knowledge on restoration: lessons learnt from organizing a set of crowdsourcing campaigns

Olha Danylo, Hadi, M Thoha Zulkarnain, Neha Joshi, Andree Ekadinata, Tobias Sturn, Fathir Mohamad, Bunga Goib, Ping Yowargana, Ian McCallum, Inian Moorthy, Linda See, Steffen Fritz, Florian Kraxner

International Institute for Applied Systems Analysis

RESTORE+

Motivation

Improve earth observation-based land cover and land degradation maps with context-specific data streams using crowdsourcing

Why Crowdsourcing?

Low-cost solutions
Up-to-date information
Geographical scope/coverage
Environmental stewardship

What are the gaps?

Different types of degradation

Variable biophysical conditions

Complex land histories

...

How can crowdsourcing help?

Earth Observation + Crowdsourcing

1

Land cover analysis

Crowd-driven classifications of high-resolution satellite imagery through rapid binary sorting

South Sumatra & East Kalimantan:

National campaign:

2

In-situ validation

Field verification based on EO-based change detected with unknown causes of change

South Sumatra & East Kalimantan:

3

Restoration preferences
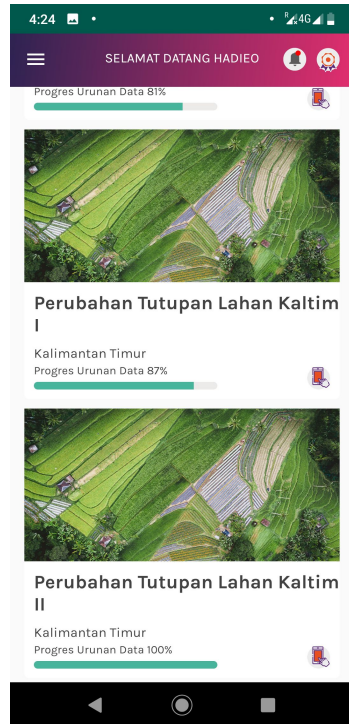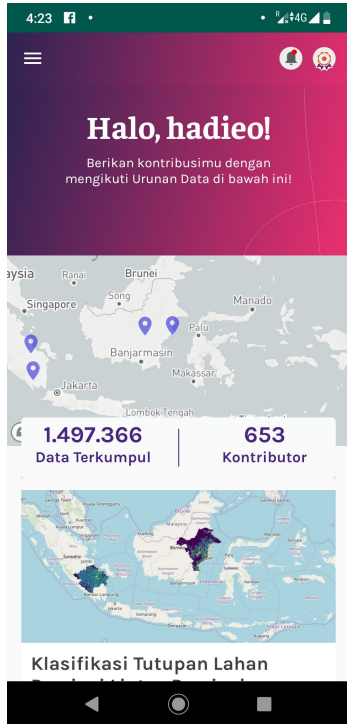
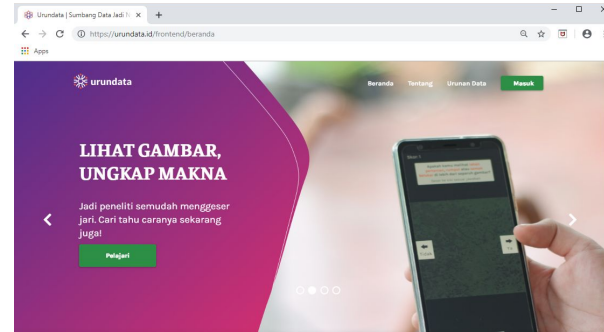Survey of local, community-based preferences of restoration measures
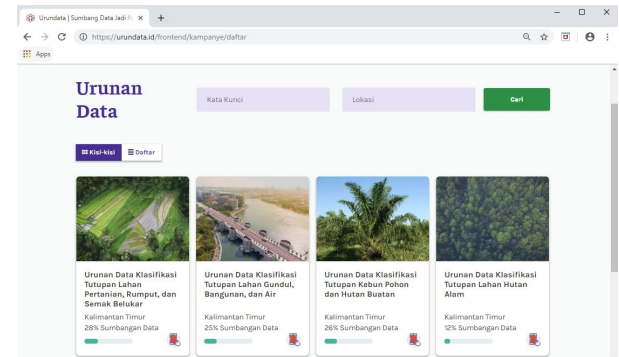
National campaign

Mobile and web-based platform

Urundata Mobile Application

Urundata Website

https://urundata.id

1 Land Cover Analysis

Focus: Onboarding & Engagement
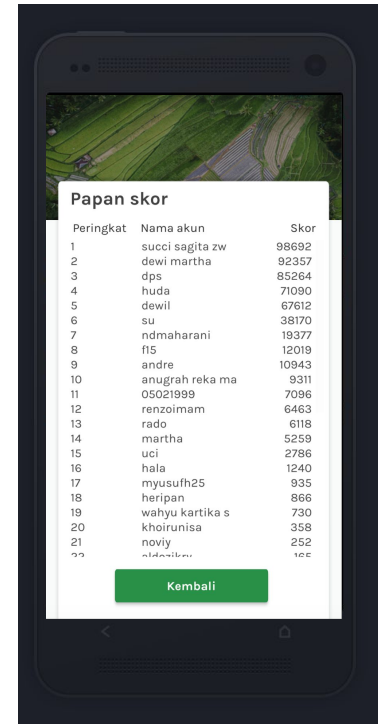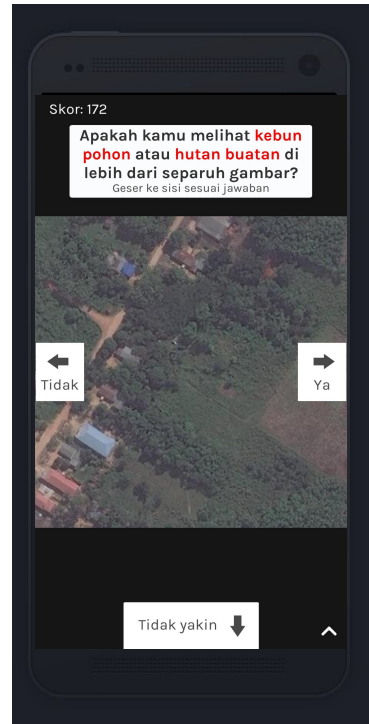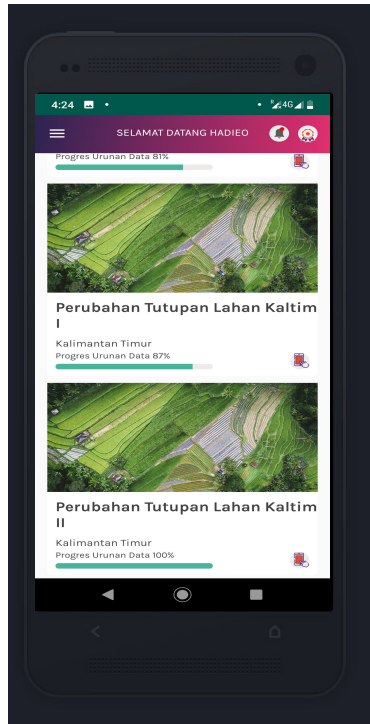**Target Groups:** Universities

Various piles of high–resolution imagery

Rapid assessment

Yes / No sorting

Expert inputs for QA

Leaderboards

① Land Cover Analysis

Focus: Onboarding & Engagement
Target Groups: Universities

14 Universities

1,123 subscribers
676 active users

9 Local news outlets

1.74 million data contributions

2 Crowdsourcing in–situ validation

Focus: On–site validation of target locations
Target Groups: University students, Researchers, Field officers, NGO workers

VEGETATION STRUCTURE
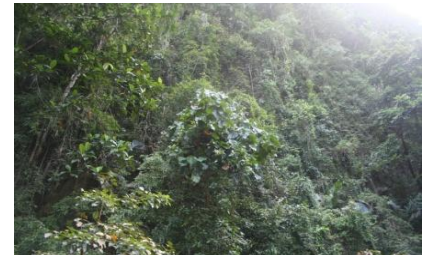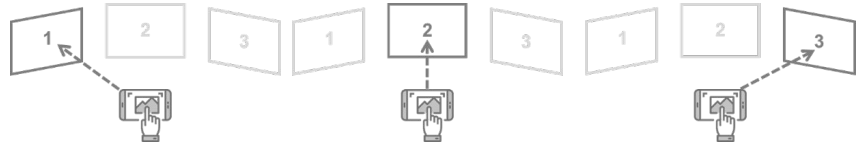
SPECIES COMPOSITION

DOMINANT VEGETATION HEIGHT

FAUNA

EVIDENCE OF DEFORESTATION

ESTIMATED YEAR/DATE OF DEGRADATION

LAND COVER HISTORY

DEGRADED (YES/NO)

3 Restoration Preferences

Focus: Local & community–driven restoration potential
Target Groups: University students, Researchers, Field officers, NGO workers

LOCAL–LEVEL CONSULTATION WITH COMMUNITIES

ADDRESSING SPECIFIC DEGRADATION CHALLENGES

CHOOSING FROM SPECIFIC RESTORATION OPTIONS
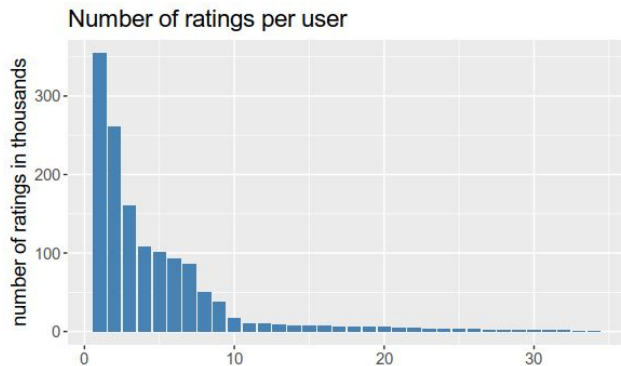
LEVERAGING MOBILE TECHNOLOGY AND URUNDATA COMMUNITY

Urundata Change Campaign

Total number of ratings: 1394718
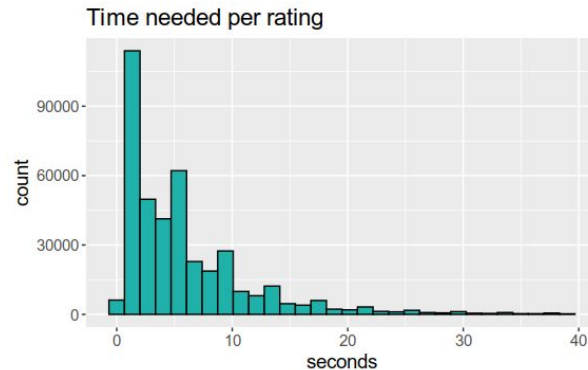**Number of unique images:** 7232

Total number of volunteers in change campaign: 92

Number of ratings per user

Hypothesis about relying on contribution of power users confirmed

12 power users (more than 10000 ratings) **collected 92.6% of the data**

Time needed per rating

Rapid collection of the land cover change data

Users on average need **~ 7 seconds** to decide on either there is change on an image

Urundata Change Campaign

Majority rating vs expert rating		Expert		
		No change	Yes change	
Majority	No change	268	34	**88.74%**
	Yes change	56	153	**73.21%**
		82.72%	**81.82%**	**82.39%**

Quality assurance

- Expert validations as a part of workflow

- High agreement with our experts supporting validity of such approach to post-change land cover assessment
- Ratings provided by independent users
- Difficulty of the classes

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