Citizen Science in the EO*GI Sector

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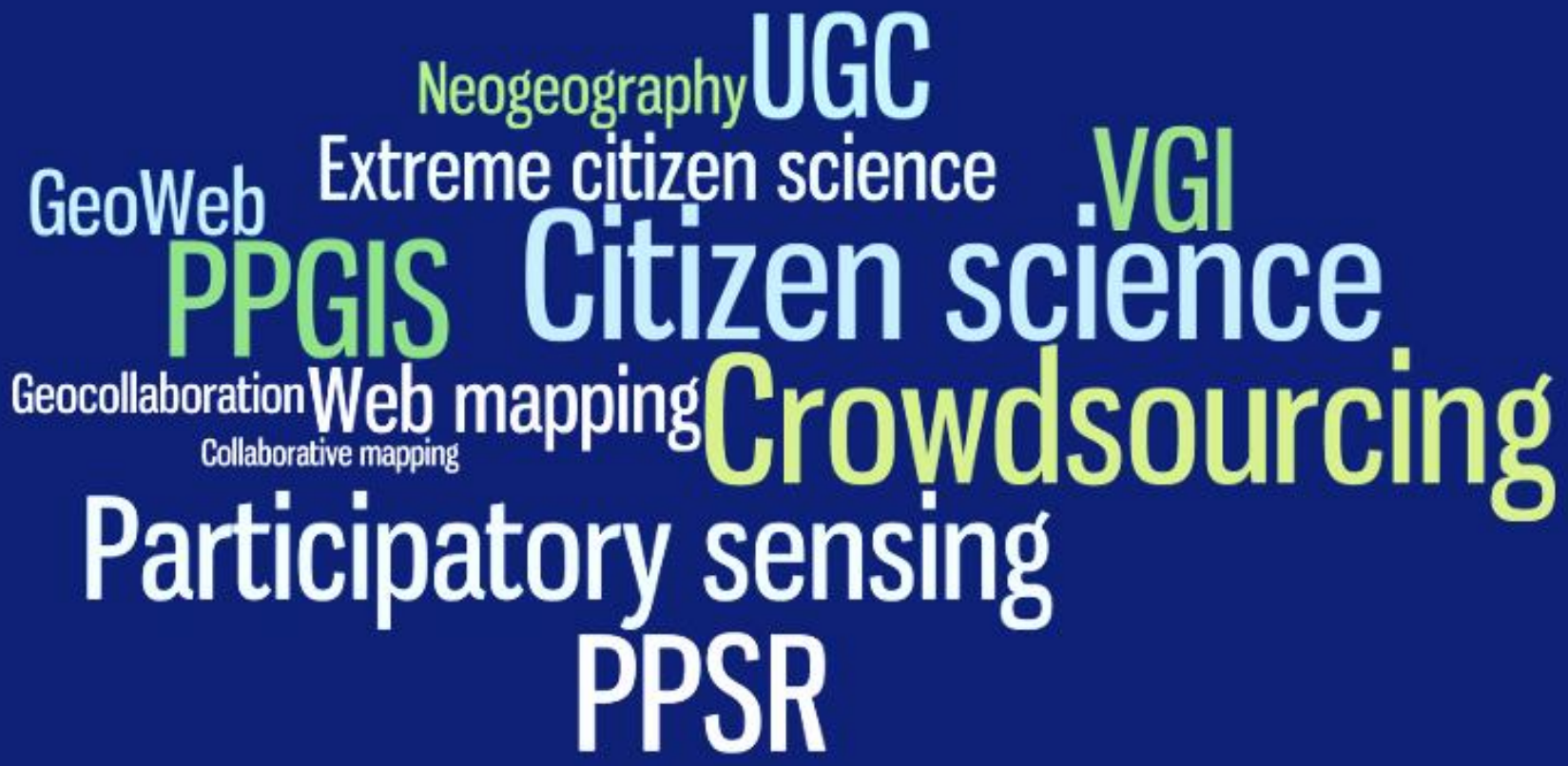
Citizen Science in EO*GI Sectors

Strategic Objective 5 in the Sectoral Skills Strategy

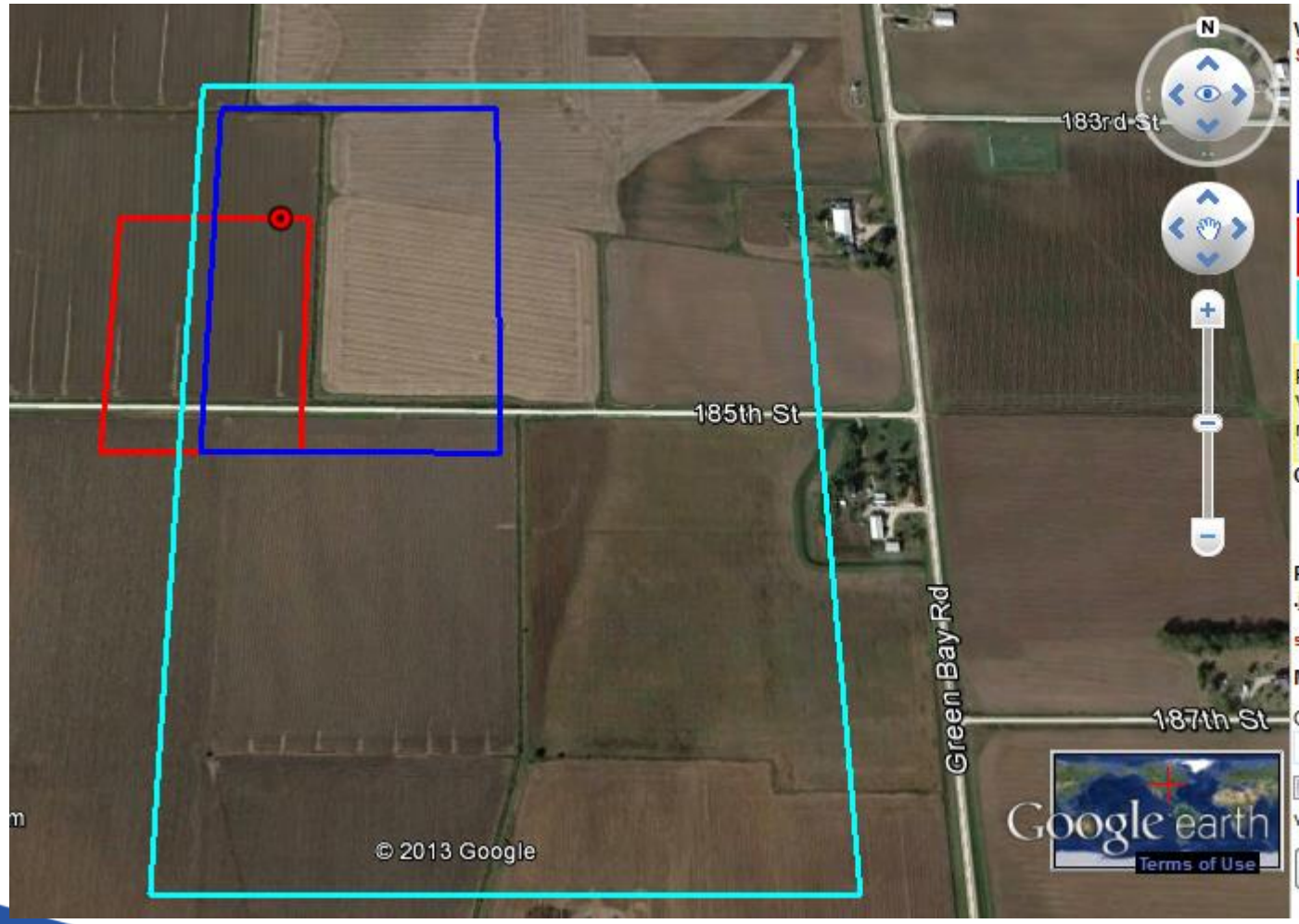
- Encourage **citizens' engagement**, **citizens' science practices** and **hands-on activities** enhancing the inclusion/ recognition of EO*GI applications' value in everyday aspects of life


Neogeography
UGC
Extreme citizen science
GeoWeb
VGI
PPGIS
Citizen science
Geocollaboration
Web mapping
Crowdsourcing
Collaborative mapping
Participatory sensing
PPSR

Citizen Science and EO*GI

- Lack of reference data, e.g., for training algorithms, validation of products, for monitoring (environmental data, SDGs, perceptual data, etc.)
- Types of tasks that can engage citizens:
  - Visual interpretation of imagery
    - Very high-resolution satellite imagery, e.g., Google Maps, Microsoft Bing
    - High resolution satellite imagery, e.g., Planet, Sentinel
    - Drone and aerial imagery
    - Geo-tagged photographs, Street View imagery
  - In situ data collection
    - Via mobile phone, e.g., land cover/land use, species and habitats, thermal comfort
    - Via low costs sensors, e.g., air pollution, temperature, wearables
  - Stakeholders in co-creation of solutions/Living Labs/building DIY kits
- Raised awareness (e.g., of Copernicus) / empowered citizens

Example 1: Geo-Wiki for Image Interpretation



Validate the landcover of the polygons:
Show instructions

	good	not sure	bad	
MODIS:	○	○	○	Croplands
GlobCover:	○	○	○	Closed to open grassland
GLC-2000:	○	○	○	Tree Cover, broadl, 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:

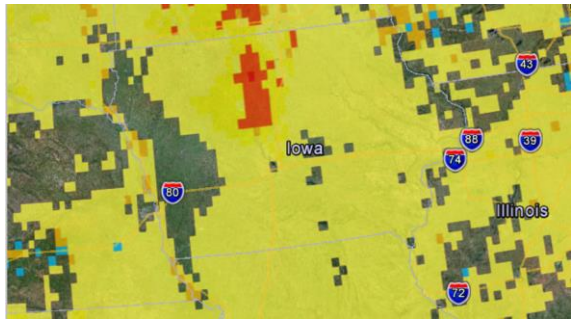
show

More information about validation:

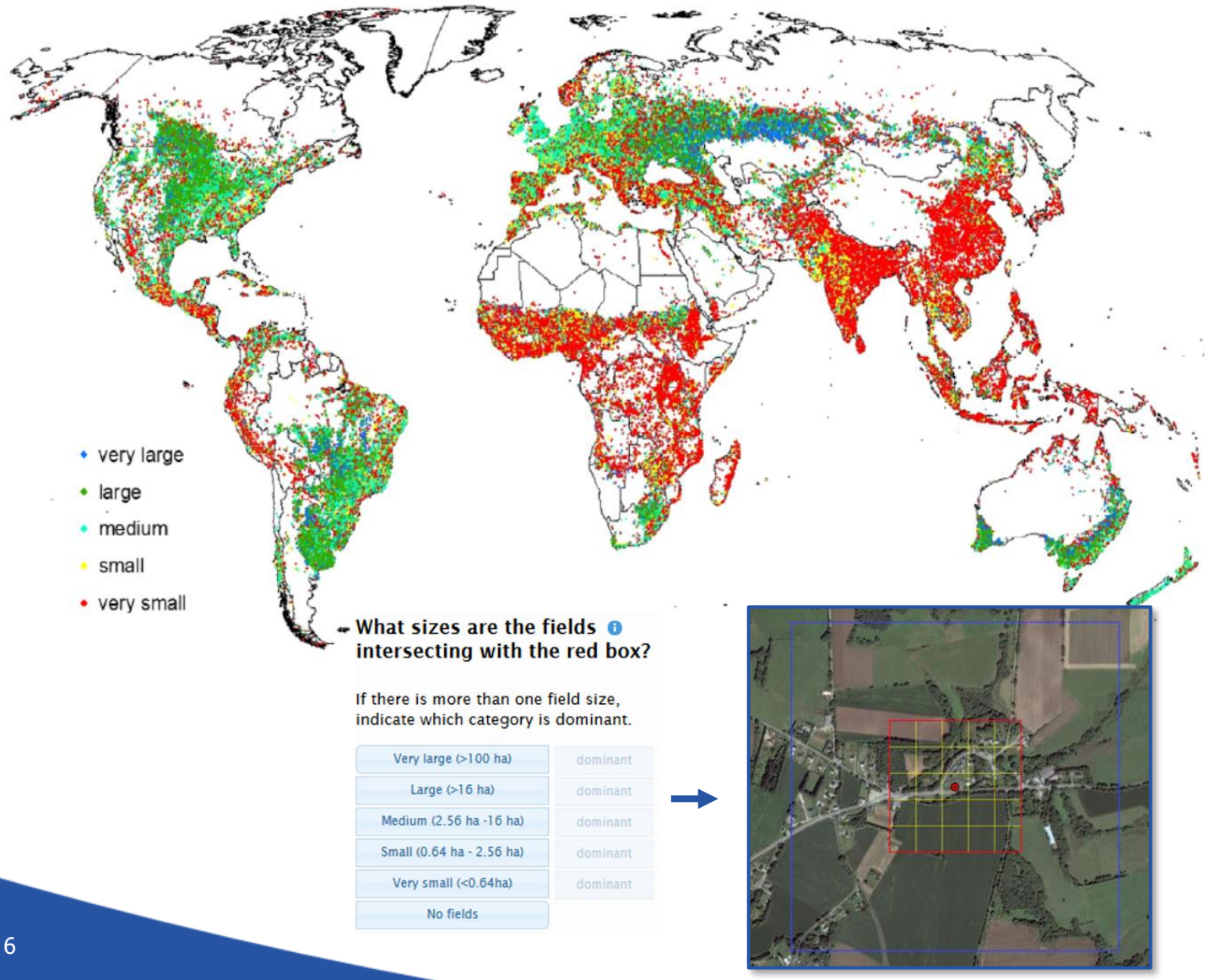
Google Image Date:

☐ I used Google Earth high resolution to validate show help

Submit Cancel



Example from the Global Field Size Campaign



130 participants

390 K+ observations

4 weeks

110 K+ unique locations validated at least 5 times each

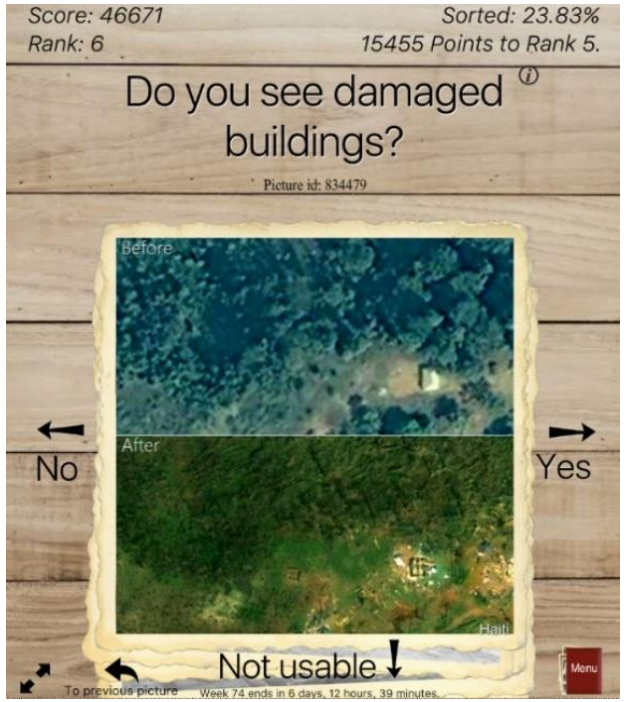
- Data published here: https://pure.iiasa.ac.at/id/eprint/15526/
- Paper published in Global Change Biology journal: https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.14492

Paper on Geo-Wiki campaigns:

https://iopscience.iop.org/article/10.1088/1748-9326/ac6ad7/meta

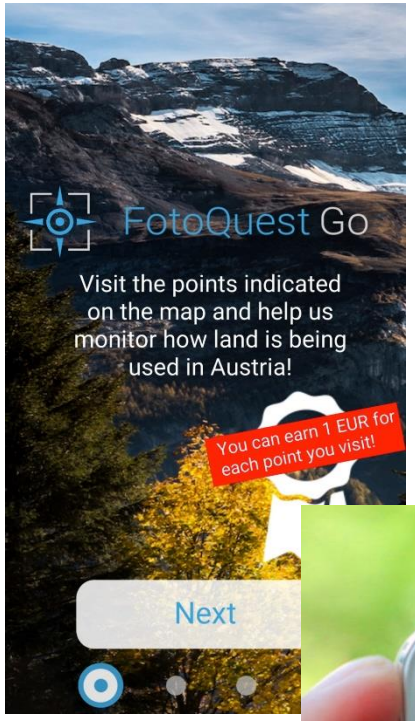
Example 2: Picture Pile

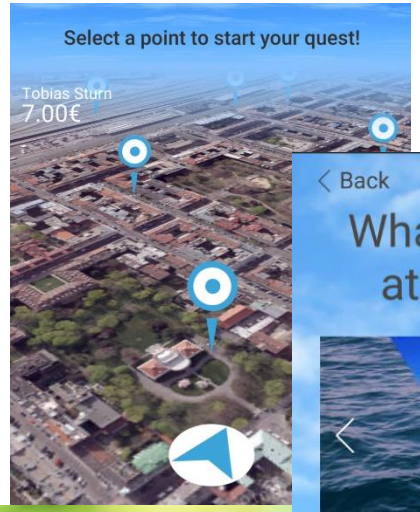
- Rapid image classification
- Single or pairs of images (for change detection)
- Wilderness, deforestation, building damage assessment
- Yes/no/maybe mechanic
- Yes/No/Maybe mechanic modified for categorical and continuous variable data collection
- Picture Pile Platform

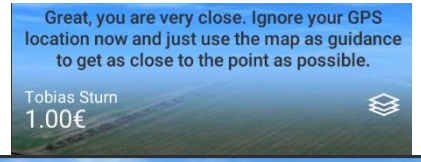


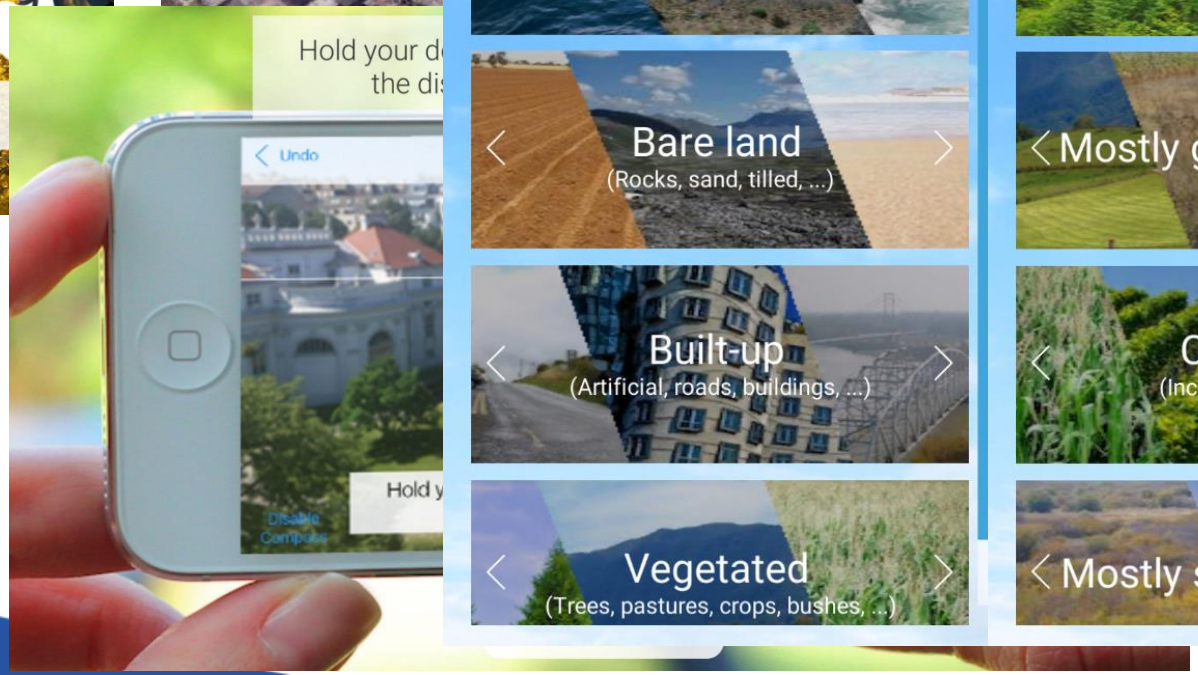
Paper on Picture Pile:
https://www.sciencedirect.com/science/article/pii/S1462901121003208

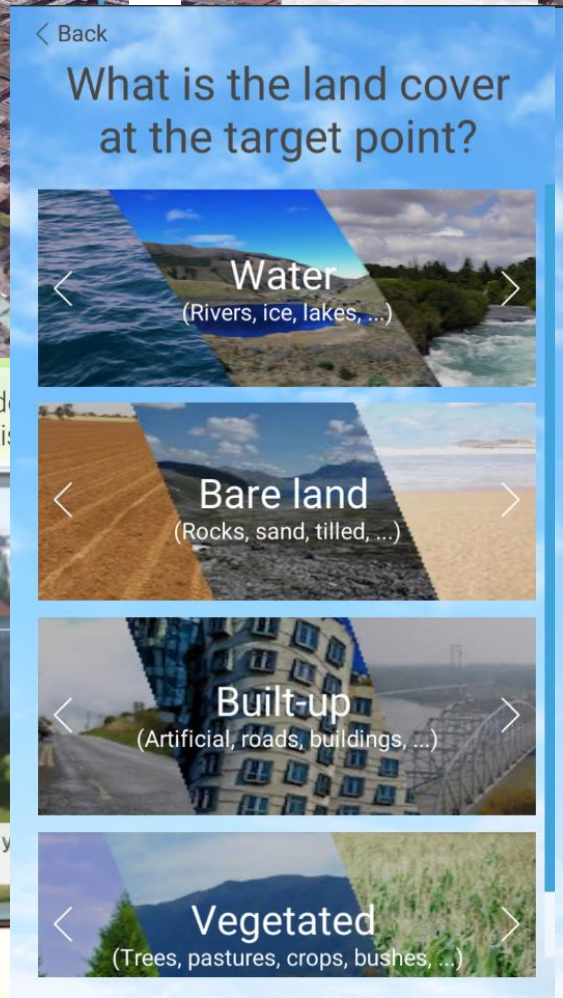
Example 3: FotoQuest Go for In Situ Data Collection

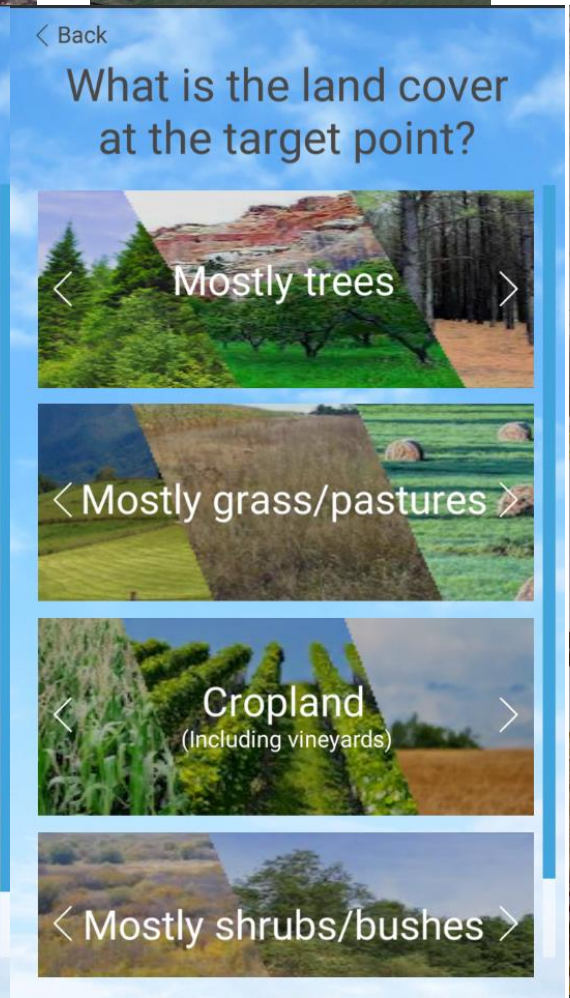


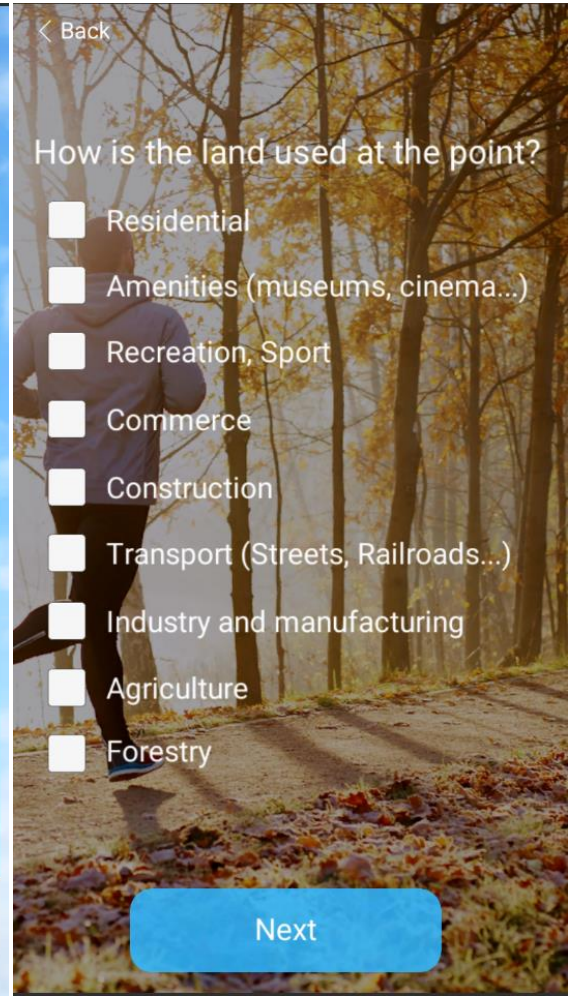






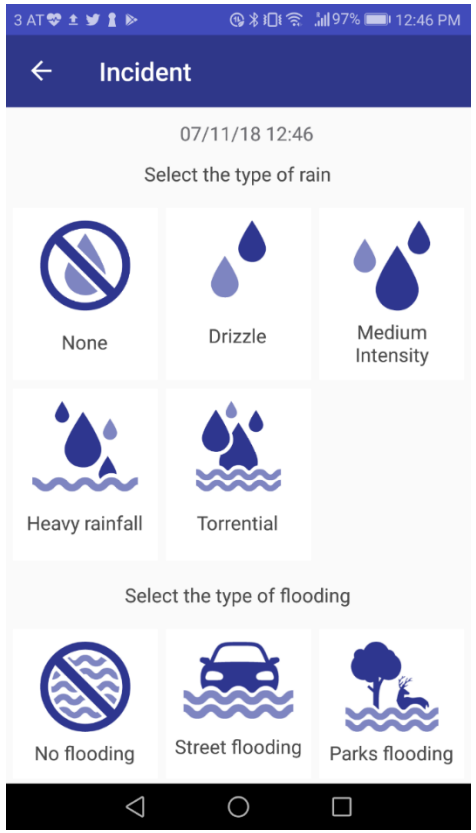






Paper on FotoQuest Go:
https://www.mdpi.com/2073-445X/9/11/446

Example 4: FloodCitiSense Urban Living Lab



Co-design of an early warning system for pluvial flooding with citizens

Types of Skills Required/Gaps

- Programmers (web mapping, app developers, game developers, graphic designers)
- Data analysts (Spatial databases and GIS, statistics, AI/machine learning/data fusion/computer vision, data quality, open data, data standards)
- Skills in engagement (project management, project design, recruitment, sustaining participation, communication/social media savvy, training, storytelling, fundraising, proposal writing)

Bridging the Skills Gaps (from Sectoral Skills Strategy)

- To promote and reach out to 'end-user' communities, and to engage citizens through various events, especially at the local level, on job opportunities, internships and apprenticeships, roadshows (OO51)
- To provide a platform/forum for collecting and testing ideas from 'end-user' communities (OO52)
    - Raise awareness of existing sites/tools/networks, e.g., European Citizen Science Association, https://eu-citizen.science/
- To increase efforts to develop skills and stimulate innovation and entrepreneurship, to foster an attractive work environment (OO53)
- Use of dynamic learning environments: sandboxes / Living Labs

Bridging the Skills Gaps

- Embed citizen science into the curriculum at primary/secondary school levels, e.g., GLOBE Observer, Dutch Kadaster, senseBox.de, internships at IIASA
- Embed citizen science into higher level education, e.g., UCL's MSc in Citizen Science (https://www.ucl.ac.uk/biosciences/study/masters/msc-citizen-science), YSSP at IIASA
- Provide more opportunities for involvement, e.g., through hackathons, mapathons, community-based monitoring, public participation

Foundations of Citizen Science

Computational Methods in Biodiversity Research

Designing and Managing Citizen Science

AI for the Environment

Technology for Nature

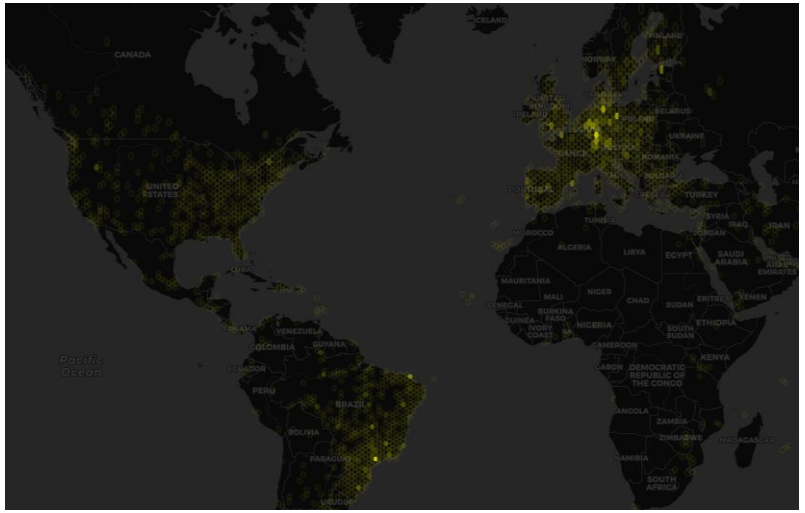
Our latest project: CAMALIOT

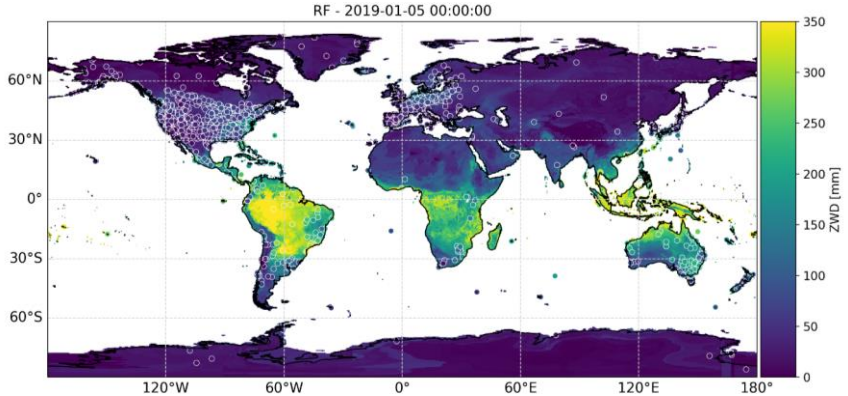
https://www.camaliot.org

- Collection of raw GNSS data from mobile phones to improve weather forecasting

Types of skills in the project:

- Working with GNSS data
- AI/machine learning
- Programming a mobile app
- Web mapping
- Gamification
- Citizen engagement and communication





Thank you! Questions?

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https://www.iiasa.ac.at