

FIG  
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# XXVI FIG CONGRESS

8-11 May 2018, İstanbul



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# Validation of a cadastral map created using satellite imagery and automated feature extraction techniques: A case of Nepal

Divyani Kohli, Eva-Maria Unger, Christiaan Lemmen,  
Rohan Bennett, Mila Koeva, Jordan Friis, Biplov Bhandari

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## Outline

- Overview
- Feature extraction methods - Remote Sensing
- Comparison of boundaries
- Examples
- Future research direction

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## Real world -Technology

To assist in solving problems



Image-based identification



Information on land parcels



Image source: Google Earth

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## Remote Sensing for Parcel Boundaries

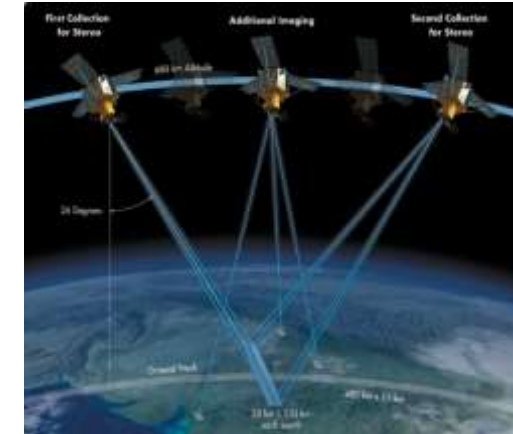
Technological development in photogrammetry, RS, computer vision, machine learning, robotics etc.

**NEW opportunities for the domain of fit-for-purpose LA especially where there are still large unmapped areas !**

## Remote Sensing

Very high resolution images can be used for low-cost and up-to-date solutions by creation and upgrading of cadastral maps

Luo, Bennett et al. 2017, Wassie, Koeva et al. 2017



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## Objective

- Compare the results of an automatic feature extraction method in support of cadastral map creation with boundaries collected by different methods
- Additionally, we explore the use of a mobile application in the field for mapping farm boundaries

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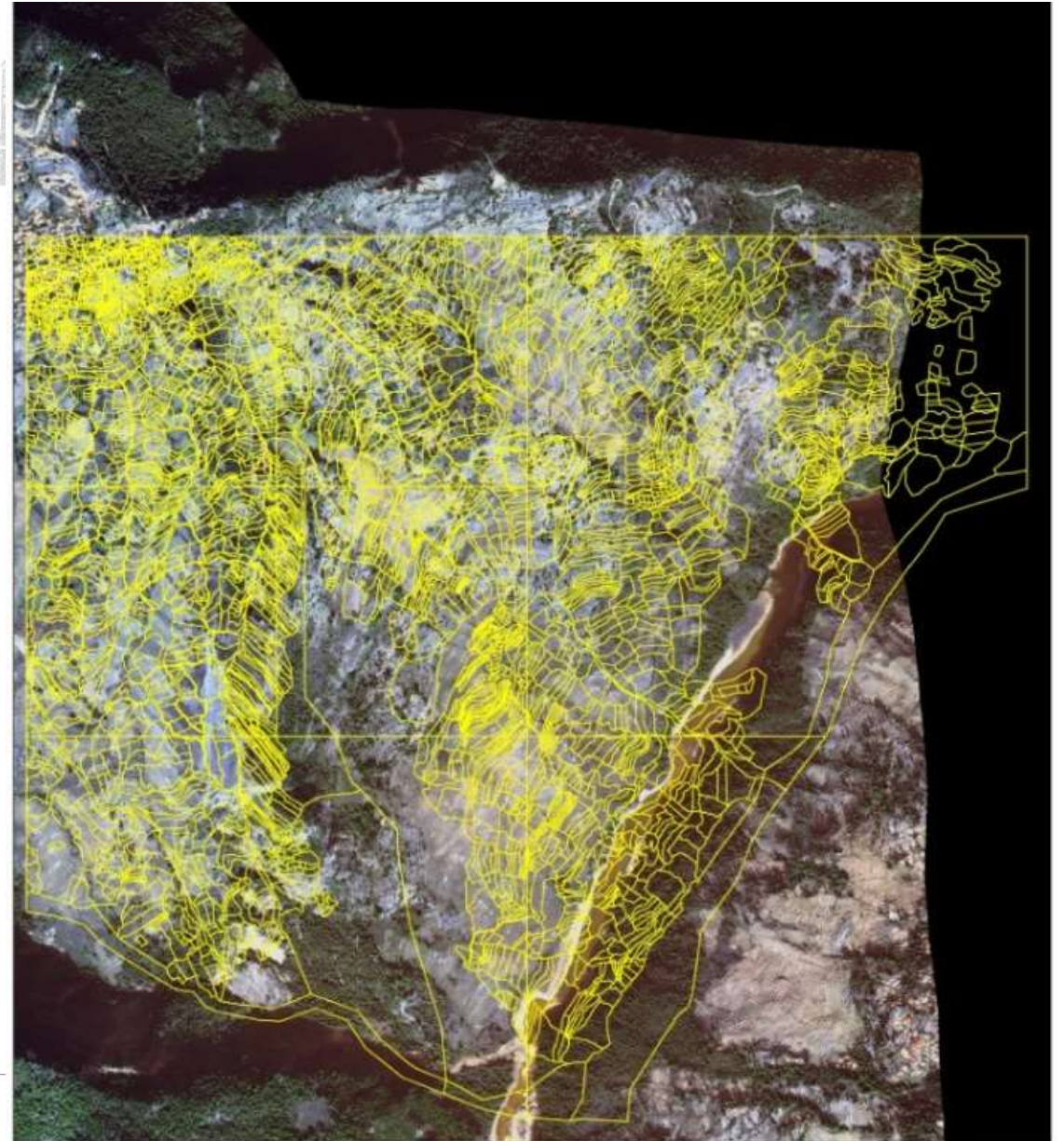
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# Cadastral map overlaid on Worldview-3 satellite image



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0 250 500 1,000 Meters









# Participatory Approach

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# Participatory Farm Boundaries

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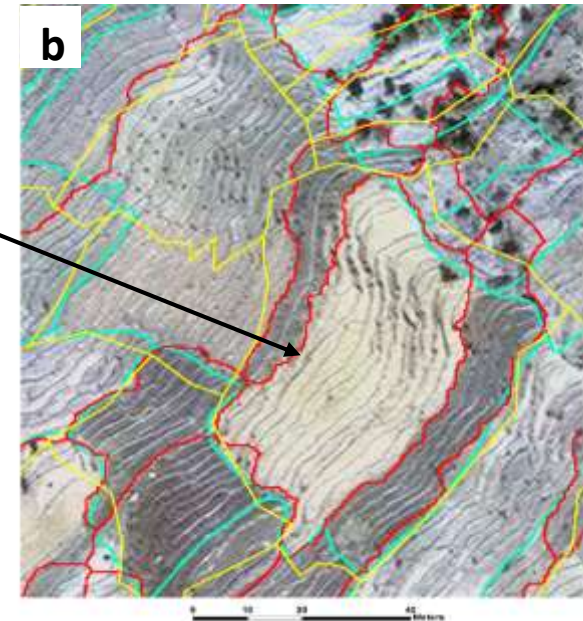
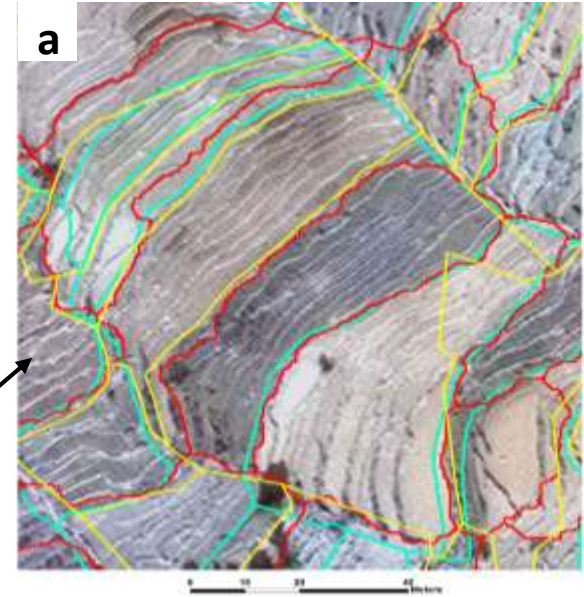
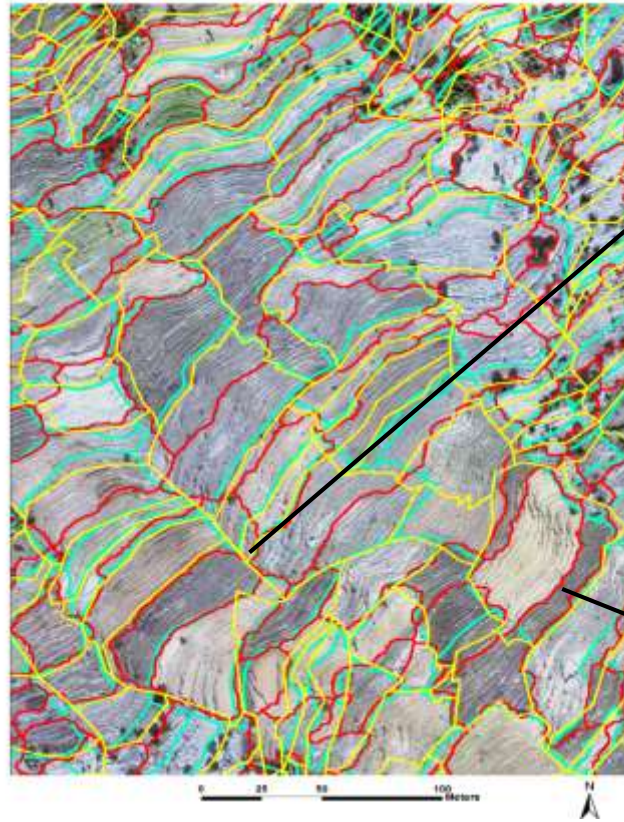
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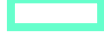






# Opportunities – what looks promising



- Boundaries**
-  Extracted plots
  -  Parcels
  -  Participatory Farms



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## Mobile Mapping using MapIt



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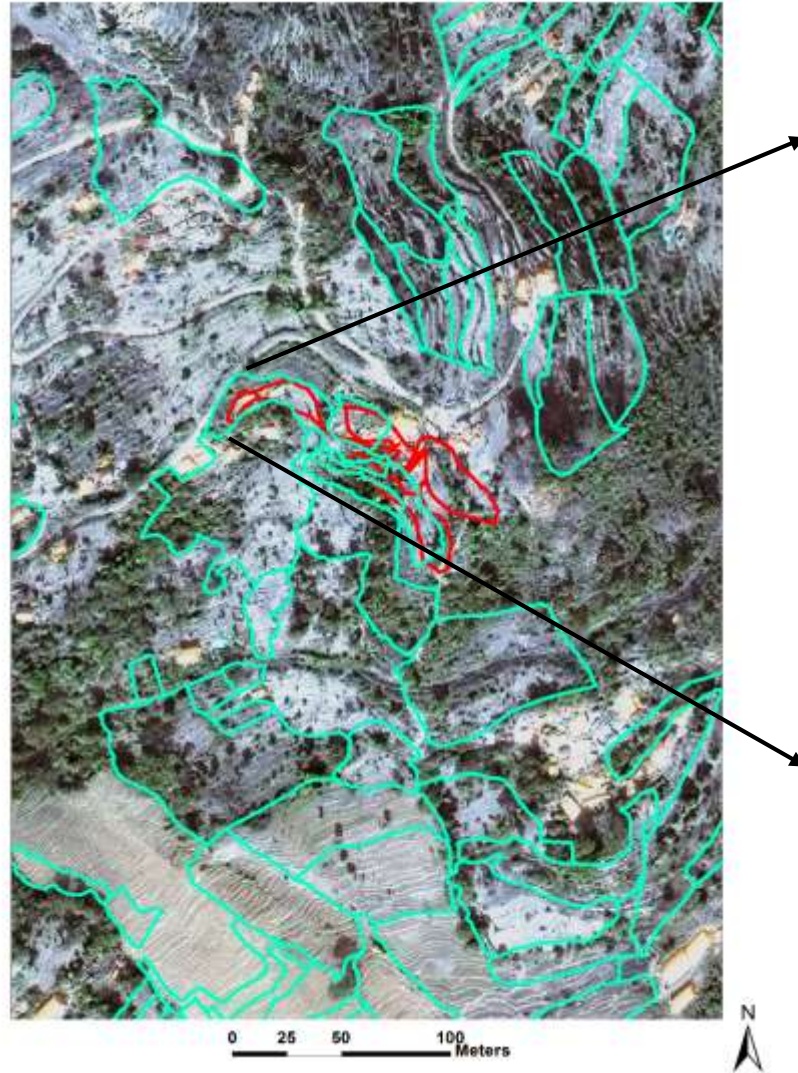
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# Results - Mobile mapping



Boundaries



Mapped farms

Participatory Farms



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## Brazil - automatic feature extraction



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## Opportunities and insights

- Small holder farms, seems to have maximum potential
- Images of different seasons - could improve results
- Large farms, comprising of multiple plots were challenging
- The automated feature extraction method is fast and can be used to extract plot boundaries
- Still needs to be optimized to avoid false positives

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## Research Direction

- Further research to assess the quality of existing cadastral maps
- A step towards understanding morphological diversities
- Basis for further analysis where image-based methods can be used
- To find editing tools that could be used easily on a tablet/phone and taken to field together with the results.

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