Landmapp is a mobile platform to affordably map and survey smallholder farmers. We are unlocking the value of land by creating reliable data products for the smallholder, cooperative, buyer, and service provider.
**IMPACT FOCUS - LONG-TERM KEY INDICATORS**

Landmapp contributes to economic and social development by collecting and distributing reliable data and knowledge to all stakeholders (including the farmers themselves).

1. Farmer productivity increase
2. Farmer annual income from crop farming
3. Curbing deforestation and forest encroachment
4. Strengthened land tenure and farmer empowerment through increased access to data

Sources: WRI, FAO, CFS, Own research

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**WHY NOW**

What makes Landmapp unique?

1. **Mobile Technology**
The cost of mobile devices and high-end GPS devices are now at a level where scalable mapping solutions can become affordable.

2. **Land Tenure**
Countries across the world are putting in place much needed legislation allowing their rural populations to access land tenure for the first time.

3. **Traceability**
For major consumer brands certification is a growing necessity in order to prove that their supply chain is up to standard.
Our Approach

We collect high-accuracy data from the field in a scalable and affordable way. Landmapp can provide a full solution including assessment, dataset design, hardware, software, imagery, data hosting, training, and reporting. Organizations can also choose a customized approach, covering some items themselves.

A mapping project can include data about land, land use, land rights, crops, soil, farming practices, household, services, economic activities. Altogether, these items combine into a virtual “land-user profile” for each farmer, which is used for purposes like technical assistance, providing inputs, forecasting, certification, traceability, credit assessment, land certification, and insurance tracking.
Pilot Design

- Users: 60 to 100 smallholder farmers + control group
- Partners: Farmer Cooperative, expert NGO
- Hardware: 3 to 5 preconfigured mobile devices
- Period: 6 to 8 weeks

Assessment
Prep cultural, economical, geographical, legal and technological determinants

Field visit
[graph] Getting out there to talk with users and further on-the-ground assessment

Customization and planning
Getting the technology and the team ready to deliver and schedule trainings

Kick-off training
First engagement with end-users. Instructions on using the mobile platform

Intermediate review
Reviewing collected data; iterative adjustments based on findings

Closing training
Getting all the mapped data out and facilitating the validation activities

Product
Mapping Solution

Global Setup
- Mobile app
- Cloud database

Local Setup
- High-accuracy GNSS
- Satellite imagery
- Tablets with pre-configured app
- Power source
FARMER PRODUCT
LAND PROFILE WITH ACCURATE CROP-RELATED METRICS
(printed data product)

FARMER PRODUCT
LAND CERTIFICATE DELIVERED AT SIGNIFICANTLY REDUCED PRICE
(printed legal product)
FIELD OFFICER PRODUCT
FARMER REGISTRATION AND REVIEW (mobile device)

MOBILE TECHNOLOGY PACKAGE FOR INSPECTION, MAPPING AND ASSISTANCE (mobile device, GPS device, manual)
**VALUE CHAIN DASHBOARD**

VILLAGE AND AREA MAPS
(web interface and/or printed)

**Data Architecture**

**MOBILE APP**

**CLOUD**

**WEB UI/API**

**SMALLHOLDER FARMERS**

**AGENT**

**LANDMAPP DASHBOARD**

**BUYER**

**SUPPLIER**

**GOVT**

**BANK**

**INSURER**

**GOVT BANK**

**BUYER INSURER**
**Data Architecture**

- **Field Officer**
- **GIS and DB Manager**
- **Farmer**
- **Farmer, NGOs, CSOs, and Government**

**Online Dashboard**

**Land Profile and Certificate**

**Data Scrubbing and QA**

**Mobile App**

**Cloud Database**

**Web UI/ API**

**Data Architecture**

- **Data Collection Model**

  - **Geodata**: boundaries, slope, location of resources, crops
  - **Household data**: demographics, economic activity
  - **Crop data**: land use, yield, productivity
  - **Needs data**: services received and required, satisfaction
  - **Soil data** (optional)
  - **Satellite data** (remote sensing) (optional)
## Our Field Activity

### Requirements
- Selected mappers
- Configured product package

### Activities
- Training
- Mapping & data collection

### Deliverables
- Farmer database
- Management dashboard

### Our Field Activity

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Activities</th>
<th>Validation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selected mappers</td>
<td>Training</td>
<td>Community feedback</td>
</tr>
<tr>
<td>Configured product</td>
<td>Mapping &amp; data collection</td>
<td></td>
</tr>
</tbody>
</table>

**Validation**
- 1 day per mapper
- 8 plots per day
Field training

Field mapping
Community Validation

Differentiation
Mapping Solution

<table>
<thead>
<tr>
<th>Existing tools</th>
<th>Landmapp</th>
<th>New technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional use</td>
<td>Professional use</td>
<td>Consumer use</td>
</tr>
<tr>
<td>High accuracy</td>
<td>High accuracy</td>
<td>Low accuracy</td>
</tr>
<tr>
<td>Complex, manual</td>
<td>Ease-of-use</td>
<td>Ease-of-use</td>
</tr>
<tr>
<td>expensive</td>
<td>Affordable</td>
<td>Free</td>
</tr>
</tbody>
</table>
Mapping Package

- A single device package that includes GPS + survey + maps
- Map polygons by walking and on-screen adjustment
- Build custom forms and surveys
- Collect and manage data in the cloud
- Import government layers and satellite maps
- Preparations, training and support by GIS experts
- Custom output: village maps, land profiles, datasets
- Option to include remote sensing and analysis
- Fully customized to local language and using icons
- Very high accuracy positioning possible (< 1 meter)
High Accuracy

Emlid Reach RTK
- Runs on open-source software
- Bluetooth + WiFi
- Very affordable
- Requires customization & coding

Bad Elf GNSS Surveyor
- Proprietary product
- Bluetooth
- Affordable
- Ready to use

GIS/PGIS

Profile and Map Creation

**ArcGIS**
- Data scrubbing
- QA Phase I
- GDB creation
- QA Phase II
- Table import
- QA Phase III
- Mapping Phase I
- Mapping Phase II
- Mapping Phase III

**QGIS**
- Data scrubbing
- QA Phase I
- DB creation
- Relation import
- Mapping Phase I
- Mapping Phase II
- Mapping Phase III
- Mapping Phase II
- Mapping Phase III
### GIS/PGIS

**Profile and Map Creation**

<table>
<thead>
<tr>
<th>ArcGIS</th>
<th>QGIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Ghana</td>
</tr>
<tr>
<td>4 villages</td>
<td>3 villages</td>
</tr>
<tr>
<td>1 province</td>
<td>3 regions</td>
</tr>
<tr>
<td>108 profiles (A4)</td>
<td>205 profiles (A5)</td>
</tr>
<tr>
<td>4 overview maps (A0)</td>
<td>3 overview maps (A0)</td>
</tr>
</tbody>
</table>

### Averages

**Indonesia**
- 35 minute mapping time
- 27 parcels mapped per village
- 1 out of 10 Sumatran provinces
- Less than 5 percent female farmed/owned

**Ghana**
- 55 minute mapping time
- 69 parcels mapped per village
- 3 out of 10 regions
- More than 25 percent female farmed/owned
Landmapp Data Types
- String
- Date
- Integer
- Boolean
- String
- Real/Double

Landmapp GIS DB Structure
GDB
- File
- Server
- Proprietary
- Local Storage

SQL
Data Relationships

DB
- Server
- Open Source
- Cloud Storage
- ORACLE
Key Findings

- Level of land conflict is lower than expected
- Providing detailed profiles to farmers has created a data integrity feedback loop
- Community mapper training investment selection
- Ability to cut land registration cost by 50%
WHY NOW

Current Partnerships

Ghana
ABOCFA
Kuapa Kokoo Farmers Union
Kumasi University
Licensed Surveyor, Accra

Indonesia
BPN Lampung
Kakoa
WWF Indonesia

Europe
De Brauw Blackstone Westbroek
EIT Climate-KIC
IIASA, Vienna
Tony’s Chocolonely
Wageningen University

TEAM

Simon Ulvund
Managing director

Thomas Vaassen
Managing director

Jon Nordling
Tech development lead

Katie Picket
GIS specialist

Anne-Wil Broersma
Operations

Mariko Takeuchi
Customer research

Kim van der Leuwe
Value chain expert

Tjeerd Wits
Field/training expert
OUR ACTIVITIES - AROUND THE WORLD

Amsterdam, The Netherlands
Landmapp, Headquarters

Indonesia
Lampung
Focus on cocoa and coffee farmers

Ghana
Beachhead market
Focus on cocoa farmers

WHY NOW

What are we looking for?

1. **Expert input**
   - Feedback and comments on our approach
   - Caveats/pitfalls to consider
     - From academia, surveying community, and NGOs
     - To improve and strengthen our approach and ensure a positive impact on smallholder farmer livelihoods

2. **GIS/Data manager**
   - Position opening in January 2016
   - Combining GIS software skills with knowhow on agricultural mapping
   - Strong data management and processing competency required

3. **Partnerships**
   - With satellite imagery company
   - With National Land Agency and licensed Indonesian surveyor
   - With hardware company
Thank you
We look forward to your reply.