Innovative approach and digital technologies to increase coffee value chain transparency and market access
01
Challenges

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Collection of geo-coordinates and data

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Gap assessment and improvement measures
01 Challenges
Smallholder growers face several challenges. E.g. they are affected by impacts of climate change, leading to increased pressure on land resources.

**Smallholder Growers Challenges**

- Lacking knowledge on agricultural practices, (soil health, pruning, water management, etc.)
- Decreasing yields due to aging plantations
- Often vulnerable to the impact of climate change
  - Increasing unpredictable rainfalls
  - move up-hill to colder regions
  → Increasing deforestation
- Pests and diseases
- Smallholder incomes are often low
- Access to finance is often lacking
- Aging farmers. Coffee production is not attractive for the young generation
Pressure on land can be reduced by the implementation of a traceability system

Goal: Reduce pressure on natural resources

Improve agricultural practises and income

- Improve access to finance
- Replanting of aging trees
- Yield increase programs
- Improve market access

Starting point: Traceability

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There are three basic options to implement full traceability:

**Option 1:** Paper documentation from final product to farmer

**Option 2:** Database solution from final product to farmer

**Option 3:** App-based solution
The application of digital technologies, such as mobile apps, has several advantages compared to alternative options

**Disadvantages of Option 1 and 2**
- Paper documentation requires often high administrative efforts
- Documentation can be misplaced

**Option 2**
- Adding data to database portals could be challenging for non-experts
- Complex systems and non-user-friendly interfaces often keep users from applying the systems

**Both**
- No polygons are collected
- No yield verification and monitoring

**Advantages of Option 3**
- Application of user-friendly mobile apps are applicable by non-experts, also by smallholders
- Data is stored in a database with an easy-to-use user interface
- Polygons can be collected
- Collection of other required data, which can be used to identify gaps
- Data is stored in a secure database and can be accessed location-independent
- Yield monitoring over time
- Automated environmental risk assessments

→ Increased traceability back to smallholder level

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Increasing traceability helps to improve smallholder livelihoods
02 Collection of geo-coordinates and data
Geo-coordinates and polygons already provide information about traceability and sustainability

<table>
<thead>
<tr>
<th>Point coordinates</th>
<th>Polygons</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Rough estimation of location</td>
<td>▪ Determination of field size</td>
</tr>
<tr>
<td>▪ Check deforestation and protected areas within a buffer around the coordinate</td>
<td>▪ Identify exact location and shape of fields</td>
</tr>
<tr>
<td>▪ Area size based on questionnaire or other secondary information</td>
<td>▪ Check deforestation and protected areas within the field polygon</td>
</tr>
<tr>
<td></td>
<td>▪ Yield estimations can be conducted for each field</td>
</tr>
</tbody>
</table>

![Point coordinates example](image1)

![Polygons example](image2)
The ISH field app allows to collect data and polygons and to upload them to a database

**Upload of, e.g.:**
- Basic data
- Field outlines
- Automated check against environmental risks
- Field size
- Number of trees
- Yields per month/year
- Chemicals used
- Financial information
- Picture of smallholder
- Picture of documents
Taking polygons is not just a technical exercise, it is important part of an improvement program

Walking around the field can be used to gather information from the farmer:

- Survey can be conducted
- Identification of main challenges/ problems
- Identification of potential diseases
- Soil analysis (e.g. with sensor or samples)
- Receive information about social circumstances
- Etc.

Gap identification → corrective actions
Traceability tools
Challenge: The complexity of traceability is increasing the further one goes back in the supply chain.
The Tracking App allows to trace coffee back to smallholders

The tracking app allows to:

- **Trace back** coffee to smallholder level
- Identify the **amount of delivered coffee** per smallholder
- Identify **amount sustainable produced coffee** (e.g. check according to environmental criteria)
- Individual **quantities** are **automatically transferred**
- Information is uploaded to the **database** and linked to other smallholder data
- Data will be accessible in a user-friendly **Traceability Dashboard**
- **Monitor** and analyse volumes of coffee
- **Assess** the amount of coffee delivered to the mill
- **Identify** and avoid **fraud**

**Fully traceable coffee**
Gap assessment and improvement measures
Transparency and traceability help to identify methods for improvement

- ISH yield development known
- ISH income monitored
- ISH risks transparent

Possibilities

- Access to finance
- Peer learning
- Improvement program
Improvement programs help to enhance agricultural practices

**Good agricultural practise training**

- Knowledge and access to professional planting material
- Knowledge and access to adequate fertilisers and pesticides
- Knowledge to improve soil quality
Example: Potential steps for a yield improvement program

Step 1: Mapping and delivery data collection/documentation

Step 2: Environmental risk assessment

Step 3: Yield assessment

Step 4: GAP training and yield increase program (e.g. replanting)

Step 5: Monitoring

Improvement livelihood for smallholders and reduce environmental risk
How to make access to finance and yield increase happen

Yields are often decreasing due to aging plantations or diseases

Proof of concept

- Mapping helps to
  - Collect data and field polygons of smallholders
  - Monitor yield improvements

- GAP trainings help to
  - Improve agricultural management practises
  - Get access to finance
  - Support replanting

Yields increase
Increasing traceability will improve the livelihoods of smallholders and reduce deforestation

- Collecting farmer data
- Mapping (e.g. polygons)
- GAP training
- Implementing GAP measures
- Tracking deliveries

Increase traceability

Improvement livelihood for smallholders

- Facilitate access to finance
- Replanting and improvement management practices
- Increase yield
- Increase smallholders income

Reduce pressure on natural resources and deforestation
Thank you for your attention!

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