Integrated Disease Management (IPM) for potato late blight

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Geopotato

- Funded by the Netherlands Space Office Geodata for Agricultural and Water Program (G4AW)
  - Satellite and mobile data supporting food security.
  - Combination of mobile connectivity, satellite services and private investments.
  - How to reach 100,000 small poor farmers?

- 17 projects have been awarded
- Project sizes: 2 – 4 million Euro
- Project durations: max. 3 years
# GEOPOTATO Partners

<table>
<thead>
<tr>
<th>Partners</th>
<th>Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wageningen University &amp; Research (NL)</td>
<td>Disease risk model; Weather forecasting; Crop biomass monitoring; Management</td>
</tr>
<tr>
<td>TerraSphere (NL)</td>
<td>Satellite data</td>
</tr>
<tr>
<td>mPower (private sector- BNG)</td>
<td>Telecom infrastructure; service owner</td>
</tr>
<tr>
<td>ICCO (NGO - BNG)</td>
<td>User engagement; potato network</td>
</tr>
<tr>
<td>Agriculture Information Service (MoA-BNG)</td>
<td>User engagement; Call centre; Licence to operate</td>
</tr>
<tr>
<td>Bangladesh Centre for Advanced Weather Studies (NGO-BNG)</td>
<td>Weather monitoring; groundtruthing satellite data</td>
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</table>
Introduction to GEOPOTATO

- **Project goal:**
  Improve profits and resource use efficiencies in BD potato production by providing a decision-support service (DSS) for controlling late blight to 100,000 small farmers.

- **Yield losses due to LB estimated at 20 – 60%**

- **Output and outcome indicators:**
  - Increased potato yields
  - Increased farmer net profit (expected 100 – 250 €/ha)
  - More effective use of inputs, especially fungicides
  - 100,000 farmer subscriptions in 3 years
  - Commercially viable late blight DSS for farmers
GEOPOTATO: How does it work?

crop growth model -> weather forecasting -> observed weather -> crop development

Late blight DSS -> spray advice
DSS in detail

![Decision Support System Flowchart](image-url)
Service provision in detail

Figure 1. Basic farmer registration process (project year 1) and information flow triggering a SMS/voice message.
Success factors for potato late blight control

- Integrated Disease Management:
  - Sanitation
    - Remove primary sources
    - Crop Rotation
    - Clean seeds
  - Resistant potato varieties
  - Timing of fungicide application: DSS
  - Product choice
  - Dose rate
  - Spray technique
Late Blight population easily adapt

Mechanism of adaptation

- Mutation
- Selection

(significance of the fittest)

Significant population change = Trouble!
Late Blight in Mushiganj, January 2016
Current Late Blight situation in Mushiganj

Current control strategy:

- Wait for blight (in area)
- Spray Mancozeb
- Switch to Ridomil (Metalaxyl + Carbendazin)
Current Late Blight situation in Mushiganj

10 samples:

- All Blue13 clonal lineage
  - Highly aggressive (fast)
  - Metalaxyl resistant
Late Blight in Rangpur, January 2017
Fungicide availability

- Preventive ai:
  Mancozeb, Metiram, Propineb, Acrobat, Melody, Revus

- Curative ai: **problematic**!
  Resistance to Metalaxyl!

- Eradicant: NOT available
Training (off season; ToT)

- IPM
- Use of the GeoPotato system
- Training of trainers (e.g. DAE, AIS, ..)
- User trainings
- Demonstration fields
An infection period is predicted for the next Wednesday. If your last spray is more than 3 days ago, please apply a preventive fungicide before Wednesday.

Operational

for Munshiganj 2016/2017

for Rangpur 2017/2018
Demonstration Fields 2016 – 2017 season

- Munshiganj
- 111 farmers receive SMS + DAE & AIS
- 6 Demo trials
  - Common Practice / Framer practice
  - Geopotato Manozeb
  - Geopotato new fungicides
- Field days
Demonstration Fields
Field trial Results

- **Munshiganj 2016 – 2016**: severe blight season
- **Munshiganj 2016 – 2017**: light blight season
- **Rangpur 2016 – 2017**: Severe blight season

<table>
<thead>
<tr>
<th>Field average</th>
<th>Farmers Practise Average</th>
<th>Dithane M45 Average</th>
<th>GEOPOTATO Average</th>
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<tr>
<td>Yield</td>
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1 € = 90 BDT

<table>
<thead>
<tr>
<th>Field average</th>
<th>Farmers Practise €/ha</th>
<th>Dithane M45 €/ha</th>
<th>GEOPOTATO €/ha</th>
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<tr>
<th>selling potato for</th>
<th>BDT/kg</th>
<th>FP</th>
<th>Dithane</th>
<th>GeoP</th>
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<table>
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<th>&quot;profit&quot;</th>
<th>BDT/kg</th>
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<td>max</td>
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<td>8,238</td>
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Conclusions

- Geopotato develops IPM late blight DSS for BD farmers:
  - 1 way system
    (no feed back apart from telephone number)
  - Location roughly known
  - Nothing more
- Limited to preventive advice
- Limited fungicide spectrum
- Many other sub-optimal growing practises
How much potato can be carried on a bicycle?