



GEOPOTATO

Geodata to control potato late blight in Bangladesh

2016 - 2019



The aim of the project “Geodata to control late blight fungal disease in potato in Bangladesh (GEOPOTATO)” was to sustainably improve resource use efficiencies and profits in potato production in Bangladesh by providing a decision-support service (DSS) to smallholder farmers to control the late blight (*Phytophthora infestans*) fungal disease.

Late blight is globally the most important, highly destructive, fungal disease in potato crops. Annual yield losses due to late blight in Bangladesh have been estimated at 25-57%. Late blight can be controlled by frequent and costly applications of fungicides. The resulting level of control heavily depends on the timing of the fungicide application and the use of fungicides in relation to local weather conditions, crop development and disease pressure. The

1 NO POVERTY



2 ZERO HUNGER



8 DECENT WORK AND ECONOMIC GROWTH



13 CLIMATE ACTION



15 LIFE ON LAND



17 PARTNERSHIPS FOR THE GOALS



efficiency of late blight control in potatoes can be considerably improved through informing farmers timely about the predicted infection periods and effectiveness of past spray applications.

The DSS is provided to potato farmers in three districts of Bangladesh: Munshiganj, Rangpur, and six upazillas (sub-unit of a district) in the Dinajpur district.

The GEOPOTATO consortium consisted of Wageningen Plant Research (lead partner from the Netherlands), Agriculture Information Service (government institution from Bangladesh for dissemination of modern agricultural information and technology), the Bangladesh Centre for Advanced Studies (research and policy NGO), CORDAID (Bangladesh branch of a Dutch development NGO), mPower (social enterprise from



Bangladesh specialised in ICT for development) and TerraSphere (Dutch company specialised in satellite crop analytics).

Provided Services

The core of the GEOPOTATO DSS is an epidemiological late blight model using temperature and relative humidity as drivers to predict infection events. Crop development since the last fungicide application is an important indicator of the need for a new protective fungicide application. GEOPOTATO uses satellite data to keep track of crop development by monitoring the increase of the leaf area index (LAI). To do this Sentinel 2 and Landsat images are used. A crop growth model runs in the background for situations where actual LAI measurements are lacking because of cloudy conditions.

The DSS integrates the weather and satellite-based information and issues a spray advice to farmers when necessary. An infection risk calendar based on a historical weather analysis

is used to replace forecasted weather data which were found too unreliable for the purposes of this project. Satellite crop reflectance is used to derive crop growth since the last spray event. Spray advice is issued three days prior to the predicted infection event. When a farmer uses a common fungicide the potato crop is protected for five subsequent infection events. A spray advice can be triggered by excess foliar growth since the last spray or when more than five infection events have occurred since the last spray. The minimum spray interval is set at five days. Thus, the GEOPOTATO system prevents under-spraying as well as over-spraying.

The potato farmers can subscribe to the GEOPOTATO service through interactive voice response (IVR) or through local extension officers. The farmers mobile phone number,

upazilla and planting date are then registered in the GEOPOTATO database.

The communication channels are phone text messages, phone voice messages and contacts with extension workers.

Business Model

Smallholder farmers are the direct beneficiaries. Paying clients for the provided services could be potato processors or agro-input suppliers. Provision of the service is relatively expensive because farmers must renew their subscription prior to each new potato growing season (November – March). The service is not active outside this period when commonly rice is grown in the same fields. This means that sufficient scale is needed to make operations profitable.

After project ending, Bayer has adopted the service and pays the service owner mPower for the service provision during the potato growing season. Service level agreements have been reached with WUR and TerraSphere.

Impact

GEOPOTATO provides added value to farmers' potato cultivation. Most surveyed farmers



considered the service reliable and followed recommendations. The farmers that followed the recommendations reported higher yields.

Bayer's cooperation with GEOPOATO proved beneficial, as the GEOPOTATO service increased sales and brand recognition for the input supplier.

Still, bundling with other services (e.g., for rice cultivation) is recommended, as dependency on ground weather stations and a limited potato growing season increases service costs. The limited mobile phone coverage in rural areas is also a bottleneck. Taking this into account, through cooperation with partners, such as Bayer, there are opportunities to scale up to the whole of Bangladesh and to expand to other countries. Currently, Bayer has expanded the service area to West Bengal and Uttar Pradesh in India since 2021.

13% more yield
in demonstration plots

Financial gains of
€ 173 per hectare
per growing season

>50,000 farmers
subscribed to the service

>50,000
hectare covered

**Numbers are approximations based on M&E results.*



Get inspired

The Geodata for Agriculture and Water Facility is a grant programme by the Netherlands Ministry of Foreign Affairs within the policy priorities for food security and water, which is executed by the Netherlands Space Office (NSO). G4AW established 25 public private partnerships in 15 countries to develop and support satellite based information services which positively impact the lives of smallholder food producers in developing countries.

g4aw.spaceoffice.nl



This is a publication of Netherlands Space Office, in collaboration with Ministry of Foreign Affairs © Netherlands Space Office (June 2023)

Disclaimer: No rights can be derived from the information provided in this notice. The policies and provisions laid down in the publication of the G4AW Facility in the Government Gazette are leading.