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Report on DBT Agricultural Research Project: Potato Disease Survey, Diseased Leaf Image Collection and AI-Based Early Disease Detection

Year: Jan 2024 till going on

1. Background

The University School of Information, Communication and Technology (USICT), Guru Gobind Singh Indraprastha University, Delhi, is carrying out a research project funded by the Department of Biotechnology (DBT) that applies machine learning and imaging to potato crop health. Under this project, the research team surveys potato fields and trial plots, collects images and samples of healthy and diseased plants, and uses these data to develop computer models for the early detection of potato diseases such as early blight, late blight and bacterial wilt. This report records the disease surveys and image data collection carried out in 2025.

2. Project

Project	Funding agency	Investigators	Sanction, duration and funds
Application of Machine Learning for Hyperspectral Imaging and Remote Sensing aimed at Early Detection of Fungal Foliar Diseases and Bacterial Wilt Disease in Potato Crop (Reference No. BT/PR45388/133/58/2022)	Department of Biotechnology (DBT), Ministry of Science and Technology, Government of India	Prof. Amit Prakash Singh (PI) Prof. Anuradha Chug (Co-PI)	Date of sanction: 24 January 2024 Duration: three years (ongoing) Total fund for GGSIPU (three years): Rs 69,98,740

3. Potato disease survey and image data collection

Date	Place (village, block, district)	Survey and data collected
7 February 2025	Mahmoodpur, Madapur and Datiyana villages, Hapur district, Uttar Pradesh	Disease survey; photographs and leaf samples of healthy and diseased plants collected
7 February 2025	ICAR-CPRI Regional Station, Modipuram, Meerut district, Uttar Pradesh	Disease survey of trial plots; photographs and leaf samples collected
16–17 July 2025	ICAR-CPRI, Shimla and CPRI Regional Station, Kufri, Shimla district, Himachal Pradesh	Late blight observation; diseased leaves collected and photographed

Partner institutes: ICAR-Indian Agricultural Research Institute (IARI), New Delhi; ICAR-Central Potato Research Institute (CPRI), Shimla, and its Regional Station at Modipuram, Meerut.

4. Work carried out

- **Disease data collection:** potato fields and trial plots were surveyed, and the presence and level of early blight and late blight were recorded. Photographs of healthy and diseased leaves were taken, and leaf samples were collected.
- **Laboratory confirmation:** ICAR-IARI, New Delhi, confirmed the diseases found in the field through laboratory tests.
- **Models for early detection:** the collected images are used to develop computer models that identify healthy, early blight and late blight leaves and estimate how severe the disease is, so that disease can be detected at an early stage.

5. Outcomes

Early blight was recorded in all the fields surveyed in Uttar Pradesh, and late blight was common in the Shimla region. Images and samples from these sites were added to the project's potato leaf image collection, which now covers healthy, early blight and late blight leaves from both the plains and the hills. These data have been used to develop models for early detection and severity estimation of potato diseases. The next stage will add hyperspectral images and sensor data, with the aim of detecting disease before symptoms are clearly visible.

6. Contribution to the Sustainable Development Goals

The work is aligned with the following goals. These describe the intended direction of the research rather than measured impacts.

SDG and target	How the work contributes
SDG 2: Zero Hunger (2.4)	Field data on potato diseases and models for early detection support timely disease management, which can help reduce crop losses and sustain food production.
SDG 9: Industry, Innovation and Infrastructure (9.5)	The project builds research capacity in AI-based crop disease detection, using images collected from real fields and trials.
SDG 12: Responsible Consumption and Production (12.4)	Detecting disease early can support well-targeted spraying and help avoid unnecessary use of crop protection chemicals.
SDG 13: Climate Action (13.1)	Disease records from the plains and the hills help in understanding how different growing conditions affect potato disease.
SDG 17: Partnerships for the Goals (17.17)	The work is carried out jointly by GGSIPU, ICAR-IARI and ICAR-CPRI, combining computing and plant pathology expertise.

7. Photographs

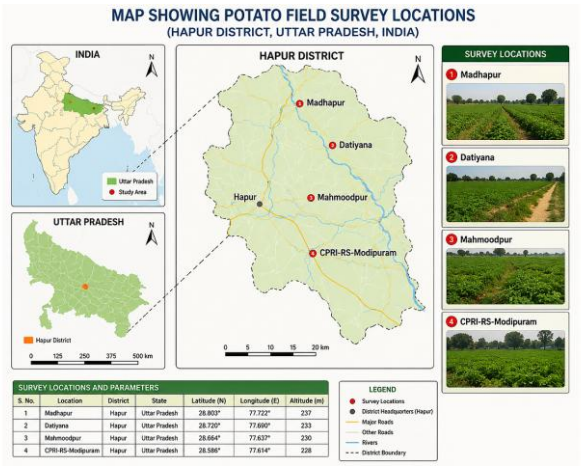


Figure 1. Potato field survey locations, Hapur district, Uttar Pradesh.



Figure 2. Disease survey in a potato field at Mahmoodpur, Hapur, 7 February 2025.



Figure 3. Survey at ICAR-CPRI Regional Station, Modipuram, Meerut, 7 February 2025.



Figure 4. Project team at ICAR-Central Potato Research Institute, Shimla, July 2025.



Figure 5. Team examining potato plants for disease symptoms at ICAR-CPRI, Shimla, July 2025.



Figure 6. Inspecting potato plants and collecting leaf samples at ICAR-CPRI, Shimla, July 2025.





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