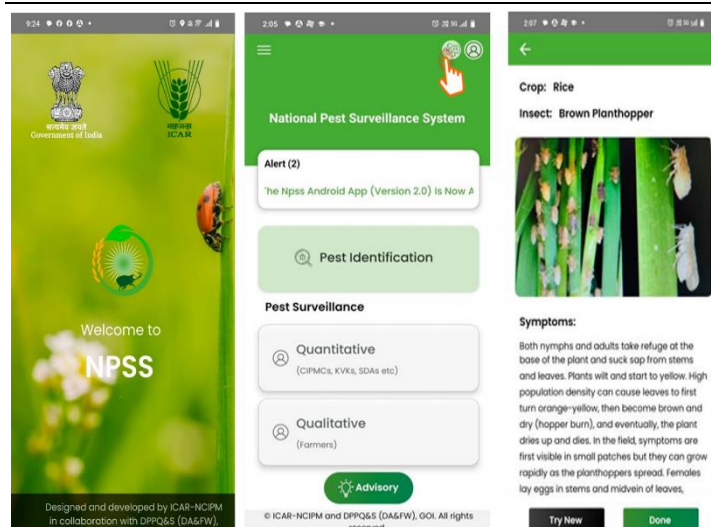


National Pest Surveillance System

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On the occasion of India's 78th Independence Day Hon'ble Union Agriculture and Farmers welfare Minister, Sh. Shivraj Singh Chouhan launched National Pest Surveillance System (NPSS), an AI based mobile app and webportal to assist the farmers for effective agriculture pest management.

The National Pest Surveillance System (NPSS) is an initiative of the Ministry of agriculture and farmers welfare, Government of India with the aim to provide the instantaneous solution to the farming community to overcome the destruction caused by the pest attack by use of latest AI/ML technologies for pest forecasting, real-time pest monitoring, issuance of timely advisories, and effective pest management strategies.

The NPSS is a significant step to protect crops from pest attacks, reduce economic losses, and promote sustainable agricultural practices. By leveraging the power of technology NPSS helps to provide farmers with the tools and information they need to make informed decisions and take timely action against pests and diseases.

NPSS make sure that the pest management advisory reaches all the concerned regions where the pest attack is prevalent. NPSS collaborates with experts from various organizations and provides GIS-based pest information, mobile app and a portal for pest-related advisories. The system aids farmers in managing pest issues through AI and ML tools, and

data is stored digitally for tracking pest trends. NPSS is developed by ICAR-NCIPM with the support of DPPQ&S and IT partners from DA & FW.

Key features of NPSS

- **AI-Based Pest Identification module:** Enabling accurate and efficient pest/disease identification. Currently pest/disease identification model identifies important pests/diseases of 61 crops.
- **Surveillance module:** Currently it is available in 15 major crops of the country (rice, cotton, maize, chilli, wheat, apple, banana, blackgram, brinjal, grapes, redgram, pomegranate, soybean, sugarcane, tomato) more crop modules will be added in due course of time.

a) Quantitative surveillance (Scientific based): To be used by scientific staff and need to logged in through credentials for scientific surveillance.

b) Qualitative surveillance: For farmer/layman who need not give extensive information & to choose among 3 levels of infestation (i.e., among Severe, Moderate, and Low) and login ID & Password are not needed. Further they will able to see instant advisory i.r.o pest/disease corresponding to particular intensity.

c) Trap based surveillance module: To be used by scouts for taking observations from trap catch data through pheromone traps (Currently cotton based models are available)

- **Advisory module:** Subject experts would issue crop/pest/area specific advisory through web portal will be made available to farmers can be accessed through advisory module.

Partners working for development of NPSS

- Directorate of Plant Protection, Quarantine and Storage (DPPQ&S)
- ICAR- National Research Centre for Integrated Pest Management (ICAR-NCIPMC), New Delhi
- ICAR- Indian Agricultural Statistics Research Institute (ICAR-IASRI), New Delhi
- Private IT Partners, Plantix and Wadhwani AI

NPSS Mobile app

NPSS app can be downloaded through play store (both Android and iOS) by typing NPSS. The following is the link to open NPSS app in mobile or else users can type NPSS in Google play store/IOS play store. And can download the app. https://play.google.com/store/apps/details?id=com.npss&pcampaignid=web_share.

This app can work both in online & offline to enable to work in fields to be used by field scouts/farmers and surveillance data will be repositied in digital forms which gives idea on development of epidemics, pest/disease trends, identification of pest hotspots etc thus helps the farmers to get expert advisories on time for management of pest/disease, ETL based decision making *etc.* The app is currently available in 2 languages i.e, English and Hindi. In future it will be available in multiple languages.

Currently few features of the app accessible to all farmers/users (need not login through scout ID) they are

- Pest/disease identification
- Pest data entry through Qualitative pest surveillance
- Access to advisories.

1. Pest identification module: Currently pest identification model can identify various pests and diseases of 61 important crops. In this module the user can directly capture photo from mobile camera or can upload from Phone Gallery. Further, an AI-based system will analyze the uploaded image, identify the pest using the available database, and provide information on the symptoms caused by the identified pest. It will also instantly suggest Integrated Pest Management (IPM) practices for effective pest control.

2. Pest surveillance module: It is the need of continuous pest monitoring in real time manner for surveillance.

A. Quantitative surveillance (Scientific based): Can be done by scouts which need registration (It is needed to avoid irrelevant data) It is for specialists of CIPMCs, State Agri/Horti Dept., KVKs *etc.* It involves taking of scientific observations randomly in the field which varies from pest to pest. This module Cannot be accessed by users who doesn't have Scout ID & Password.

Entry of details: Details up to sub district will be accessed by app through GPS and user have to choose village, season, crop, Date of observation (cannot be future date), field type (fixed field/random field), crop stage, crop condition further shows. Pest type (insect/disease), pest field (nursery/main field), pest name and one table and data to be entered in table as per given instructions which varies from pest to pest and user can upload few

images below and remarks also to be submitted. Once the data is submitted the coordinates of the area also will be recorded & can be verified through expert login ID & admin login ID through NPSS webportal.

Trap based Quantitative surveillance (Scientific based): For taking of trap observations of pheromone traps, currently it is available for pink boll worm and American boll worm in cotton only. This module Cannot be accessed by users who doesn't have Scout ID & Password. This can be used in the fields where traps are installed, scouts can either enter the number of insects trapped in trap (trap wise), and more number of columns can be added for trap data as per requirement. Scouts can either upload photograph showing insects trapped inside the trap, it will automatically count the number of insects and pest intensity will be reported to experts through web portal.

Image upload: Uploading of as many as numbers of good quality photographs of pests/diseases for pest/disease AI modelling purpose and for getting real time pest situation which can be accessed by experts through web portal. Uploaded photos are validated by expert through NPSS Web portal. Uploaded images could be basis for planning survey by experts.

B. Qualitative surveillance or roving or farmer survey: For farmer/layman who need not give extensive information & to choose among 3 levels of

infestation (i.e., among Severe, Moderate, Low) and login ID & Password are not needed.

Details of state, district, block, village, farmer name & mobile number, date of observation, crop name, type of pest (insect/disease/beneficial organism), name of pest & level of infestation (i.e., among Severe, Moderate, Low). On submission of information advisory alert will be shown in the display (advisory corresponding to level of infestation i.e., Severe, Moderate, Low).

3. Pest Advisory module: In this module farmers and scouts can view advisory issued by expert from NPSS web portal specific to village or whole region. To view the Advisory issued by expert in your location or in different region, Details of state, district, block, and Village (You can select particular village or all the village in the block), name of Crop & Pest name and date. On submission of information on advisory alert will be shown in the display.

NPSS Web portal

Only selected experts of Central IPM Centres and nodal officers of state agriculture Department could have access to NPSS web portal. The following is the link to open NPSS web portal by using expert IDs. <https://npss.dac.gov.in> Through the web portal delegated experts can

- View the agriculture pest/diseases situation of the country through seeing image upload data and pest surveillance data in real time manner through NPSS dashboard.
- Issue advisories to the locations where pest/disease infestation is observed and these advisories will be reached to farming community.
- Create login credentials for scouts to be used in quantitative pest surveillance.

Expected benefits/Outcomes of NPSS

For Farmers

- Simplifies the identification of pests and diseases.
- Facilitates early detection of pest incidents, enabling prompt action to contain outbreaks.
- Provides direct access to pest management experts.
- Delivers instant advisories for managing pests and diseases.

- Supports timely pest management, helping to prevent economic losses.
- Encourages the responsible use of pesticides, thereby protecting the environment.
- Utilizes real-time data from field workers and lead farmers.
- Provides farmers with easy and timely access to expert advice for pest identification and surveillance-based management.
- Help in Minimizing the crop loss by using real-time data submitted by trained resources and lead farmers.

For Government/Public Agencies

- Contributes to the formation of a national repository of pest incidences.
- Enhances coordination among stakeholders involved in plant protection activities.
- Assists in forecasting pest and disease outbreaks on basis of accumulated data
- Prevents pest outbreaks through timely interventions, avoiding pest epidemics.
- Assists public agencies in identifying hotspots and forming effective policies.
- Offers a national pest scenario repository to public agencies, helping them identify pest hotspots and formulate effective plant protection policies.

For Researchers and Experts

- Emphasizes Integrated Pest Management (IPM) practices, promoting the conservation of natural enemies, the use of biocontrol agents, and the judicious application of chemicals as a last resort.
- Leverages collected data for advanced pest management solutions and for development and improvement of image identification models
- Supports the development of AI-based solutions for various crop-pest combinations using extensive data collection.

For Ministry of Agriculture/ Policymakers

- Encourages the responsible use of pesticides, thereby protecting the environment.
- Contributes to the formation of a national repository of pest incidences.

<ul style="list-style-type: none">• Offers a national pest scenario repository to public agencies, helping them identify pest hotspots and formulate effective plant protection policies.• Assists in forecasting pest and disease outbreaks, aiding in national pest management strategies. <p>So, the NPSS app serves as a valuable resource for stakeholders in agriculture, providing timely pest</p>	<p>identification and expert advisories for effective pest management. Farmers and others interested in agricultural practices are encouraged to download and utilize the app to protect their crops. For further assistance, the nearest Central Integrated Pest Management Centre (CIPMC) can be contacted, with their details available on the NPSS website. This tool aims to support a more resilient and productive agricultural community.</p>
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