**Terms of Reference for the concerned stakeholder for the**

***Implementation of ePest surveillance system***

# Background and Rationale

**Pest Surveillance activity** involves regular pest monitoring; recording & reporting; collection of associated information on crops, weather, natural enemies, altitude with GPS - for establishing pest development in time and space for tracking development of potential epidemics.

The services that will be generated through such pest surveillance activity will form the core plant protection (PP) services for preempting crop losses to pest organisms. Therefore, the importance of gathering pest information through the pest surveillance activity on the android device on regular and timely basis as per the prescribed guideline is highly critical for not only generating pest management technology, but also for taking pest management decisions.

The android device on which the pest surveillance software is hosted is equipped with a GPS system which will allow tracking the development of a specific pest(s) within its own ecosystem. This would mean that particular pest(s) could be tracked both in time (through the season; and also from year to year) and in space (over a geographical area). Such information base will provide locally specific pest information that has reference in both time and space. Given that the system is designed for collection of information related to not only pest organisms, but also data on associated parameters like natural enemies, weather parameters and altitude information, the information base will be of vital importance to numerous future agriculture development activities that are locally specific.

Specifically, for pp services the information gathered will be used to generate early warning and forecasting system; facilitation of real time pest management decisions; facilitation of pp input services based on information gathered on pest development over a period of time to mention a few.

Besides the few specific pp services mentioned, the information collected could also be utilized for developing locally specific projects/programs that will have objective(s) of solving problems associated with: pp input utilization and health and environment safety issues; local bio-diversity and crop loss association; pest risk assessment for implementing organic programs/projects; water quality and health risk in relation to pp input utilization and so on.

Given these vital importance, proper utilization and care of the android device is found imperative so that crucially important information on pest organisms could be gathered on time and from locations where pest occurrences are a concern for crop production. Information gathering should therefore consummate into effective delivery of services that will result in crop loss prevention. Therefore, the android device and the surveillance system are also designed to reflect the gaps in the discharge of our services.

The ToR presented for the stakeholders with their specific roles and responsibilities are also presented to facilitate service delivery by the agencies or officials involved. However, in the field much more may be required to be undertaken by the stakeholders than that could be highlighted here under the ToR. Hence, it is also expected that agencies/officials involved will deliver necessary services for making pest surveillance activities successful.

# Objectives

1. To ensure the efficient functioning of ePest surveillance system
2. Timely collection and reporting of the information by the assigned geog extension and RDC officers
3. Timely analysis and feedback/response to the client
4. Proper functioning of ePest ICT system
5. To ensure proper management of android device

# Terms of Reference

To ensure successful implementation of ePest surveillance system through proper coordination amongst the stakeholders, the roles and responsibilities are outlined in the following:

## National Plant Protection Centre (NPPC) shall:

1. Co-ordinate overall functioning of ePest surveillance system implementation including monitoring, data validation/assessment, report generation and sharing of data;
2. Ensure that information in the central database is maintained correctly and updated regularly;
3. Coordinate pests surveillance capacity development, procurement of android gadgets, and software up-gradation;
4. Develop guidelines for surveillance methodology and survey techniques involving survey methods and sampling;
5. Validation and authentication of the data before officially published.

## Information and Communication Services (ICS)/MoAF shall:

1. Manage and maintain central server ( software and hardware);
2. Coordinate the ePest surveillance system up gradation and improvement in collaboration with NPPC;
3. Facilitate the minor rectification and maintenance of android device.

## District Agriculture Sector (DAO) and PD RDCs shall:

1. Maintain the inventory of android devices;
2. Ensure the timely conduct of pest surveillance by the assigned extension and Research Officer in the field;
3. Ensure that proper management of device as specified under distribution agreement;
4. Maintain handing-taking inventory at the time of transfer/resignation of an extension/ Research Officer;
5. Coordinate with Dzongkhag/RDC ICT officer to rectify minor issues of the device and its applications;
6. Ensure that internet service facilities are provided and cost of maintenance allocated within their annual budget.

## Geog Agriculture Sector/Extension Centre (Extension Officer/Supervisors) and RDC Officer shall:

1. Maintain the inventory of device ( Gewogs only)
2. Be responsible for all the data collection and submission from the field as per the guidelines/manuals provided by the NPPC;
3. Ensure that pest surveillance activity is included under their annual work plan;
4. Coordinate with Dzongkhag ( Extension Officers) for device maintenance and rectification if not functioning properly and PDs for assigned RDC officers;