

GENS IMPLEMENTATION FRAMEWORK

Version 1.0

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Improving Safe Trade in Plants and Plant Products

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ACRONYMS

BPA	Business Process Analysis
CPM	Commission on Phytosanitary Measures
ePhyto	Electronic Phytosanitary Certificate
ESG	ePhyto Steering Group
GeNS	Generic National System
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
IT	Information Technology
KPI	Key Performance Indicator
NPPO	National Plant Protection Organization
SOP	Standard Operating Procedure
UAT	User Acceptance Test
UML	Unified Modelling Language
UN/CEFACT	United Nations Centre for Trade Facilitation and Electronic Business
UNNExT	United Nations Network of Experts for Trade Facilitation
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNICC	United Nations International Computing Centre
XML	Extensible Mark-up Language

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1. Introduction and purpose

The Generic ePhyto National System (GeNS) is a fundamental component of the ePhyto Solution developed by the International Plant Protection Convention (IPPC).

While the GeNS is relatively easy to set up and configure in a country, it is essential that the transition from a paper-based phytosanitary certificate (PC) system to the ePhyto approach is thoroughly planned prior to implementation in order to maximise the potential benefits. It is also crucial that all key stakeholders, in both government and business, are fully engaged in the process from the outset.

The purpose of this GeNS Implementation Framework (framework) is to provide countries with a step-by-step guide to planning and implementing the GeNS and ensuring its sustainability. It provides details of the core elements of GeNS project planning and includes guidance on how to undertake the necessary Business Process Analysis (BPA) of the underlying PC processes.

2. Background

ePhyto is short for “electronic phytosanitary certificate”. An ePhyto is the electronic version of a paper-based phytosanitary certificate in XML¹ format. All the information contained in a paper-based phytosanitary certificate is also in the ePhyto. ePhytos can be exchanged electronically between countries and/or the data printed out on paper (for non ePhyto destination countries).

The IPPC Commission on Phytosanitary Measures (CPM) started considering the advancement of electronic certification for phytosanitary certificates in 2011. To support this purpose, the CPM established an ePhyto Steering Group (ESG)² at its eighth meeting in 2013. The ESG took on responsibility for increasing the understanding and awareness of ePhyto, supporting its implementation and assisting in the development of systems to support electronic phytosanitary exchange.

At its ninth meeting in 2014, the CPM approved a technical appendix to the International Standards for Phytosanitary Measures Standard 12 (ISPM 12)³. This Appendix 1 describes the format and content of electronic phytosanitary certificates. All electronic ePhyto exchanges between National Plant Protection Organizations (NPPOs) should be produced in accordance with the Appendix.

After several years of analysis, discussion and development under the guidance of the ESG, the IPPC launched the ePhyto Solution in 2018 to exchange ePhytos between NPPOs through a central Hub, operated and maintained by the United Nations International Computing Centre (UNICC) under contract from the IPPC.

The IPPC ePhyto Hub currently handles the exchange of approximately 50,000 ePhytos per month between participating countries. As of January 2021 (see latest data on the IPPC Website (www.ephytoexchange.org), 49 countries were actively exchanging ePhytos through the Hub. Of these, 9 are utilising the GeNS while the remaining 40 use their own National System. Of these 40, 26 are EU Member States that are connected to the Hub through the EU TRACES System. This significant user base of 49 active countries is fully available to all GeNS implementors for exchanging ePhytos.

In addition to the above, 19 additional countries are in the testing and development stage, and a further 23 countries have registered with IPPC as interested in joining the initiative. Thus, a total of 91 countries are either actively exchanging ePhytos, are in the testing phase, or have registered their intent with IPPC to explore the possibility of joining the IPPC ePhyto initiative, and the numbers are growing on a regular basis.

¹ Extensible Mark-up Language (XML) - see <https://www.w3.org/XML/>

² The ESG consists of representation from 6 FAO regions – see <https://www.ippc.int/en/ephyto/ephyto-steering-group/>

³ See ISPM 12 - <https://www.ippc.int/en/publications/609/>

The GeNS countries currently exchanging ePhytos through the hub are Dominica, Fiji, Ghana, Guatemala, Jamaica, Myanmar, Samoa, Sri Lanka and Uganda. The IPPC Secretariat, along with various donors, is now working to encourage and support additional countries to implement the GeNS. The development of this framework is intended to support these efforts.

3. IPPC ePhyto solution overview – functions and capabilities

The IPPC ePhyto Solution consists of three main elements:

- **Standardization and harmonization:** Globally harmonized approach for electronic phytosanitary certification (ePhyto) and exchange in accordance with the adopted International ISPM 12 (*Phytosanitary Certificates*)⁴
- **A central server (Hub):** to facilitate the transfer of electronic phytosanitary certificates between NPPOs, either through their own National System or through the **Generic ePhyto National System (GeNS)**⁵.
- **A Generic ePhyto National System (GeNS):** a web-based system that can produce and receive ePhytos, to allow countries that do not have a national system to produce, send and receive ePhytos⁶.

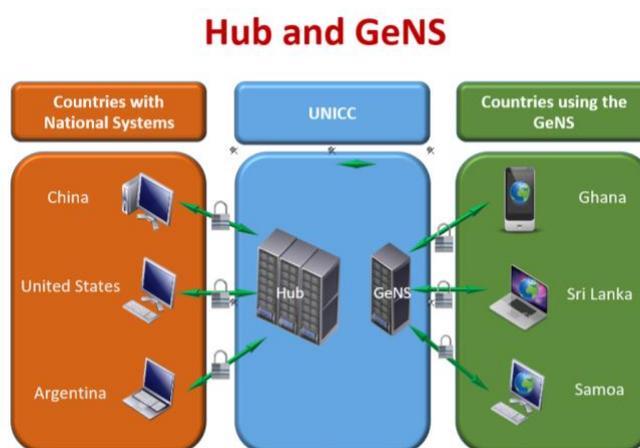


Figure 1: The main components of the IPPC ePhyto Solution.

3.1 IPPC Generic ePhyto National System (GeNS) versus the ePhyto National System?

Countries wishing to exchange ePhytos through the IPPC ePhyto Hub can either do so through their own electronic Phytosanitary Certificate National System (if one exists) or through the IPPC developed Generic ePhyto National System (GeNS).

Establishment of a National Systems generally involves the automation of all or most of the internal and external process related to the issuing and receipt of a PC, including application for a PC by a company, arranging for the goods inspection, and review and issuing of the PC by the NPPO. The processes for the receipt of import PCs may also be similarly automated in the National System. National System are typically integrated with other trade related systems in the country, such as Customs and/or the National Single Window System.

In order for the National System to be able to exchange ePhytos with other NPPOs, it must be connected to the IPPC ePhyto Hub. The level of complexity of achieving this connection to the Hub depends on the technical structure of the National System, and in particular the structure of the ePhyto messages, and some customisation is generally required. The IPPC and UNICC can assist countries with this adaptation and connection to the Hub and the Global Alliance can also support such actions.

⁴ For more details see <https://www.ephytoexchange.org/landing/harmonization/index.html>

⁵ For more details see <https://www.ephytoexchange.org/landing/hub/index.html>

⁶ For more details see <https://www.ephytoexchange.org/landing/gens/index.html>

Development and implementation of a National System typically takes at least 2 years and costs over US \$ 1 million.

If an NPPO does not already have a National System, or is not already well advanced in the process of developing one, they can implement the Generic National System (GeNS) which is developed by the IPPC and is available for free to all NPPOs. GeNS is a fully functional Web based National System, and requires minimal technical infrastructure. Implementation of the GeNS typically takes less than six months and costs between US \$100,000 and \$500,000, depending on the number of users and number of GeNS locations established.

The development of an electronic Phytosanitary Certificate National System is a considerably larger and more complex project than GeNS implementation and is beyond the scope of this framework. However, interested parties may refer to (www.ephytoexchange.org) for further information on the ePhyto National System approach.

The focus of this framework is on the implementation of GeNS in an NPPO.

3.2 GeNS details

As indicated above, the GeNS is a secure web-based system that enables NPPOs that do not have a National System to connect to the IPPC Hub to submit and receive ePhytos with their trading partners via the IPPC global Hub. GeNS also helps NPPOs to automate and simplify the underlying processes through which they organise and manage the issuance and receipt of PCs, conduct export inspections, handle import PCs, issue and replace certificates, maintain records and produce reports.

GeNS also has the potential to allow traders to directly enter PC requests online, obtain and review information regarding their certificate applications, update and/or correct data previously submitted, and request a replacement certificate, if required. This amounts to a potentially radical transformation and enhancement of the PC processes within an NPPO and offers major benefits to both the NPPO and companies alike.

Through a user-friendly web-based interface, the GeNS can provide the following functions:

- entering consignment related information for an export PC request - by the trader or NPPO Assistant, depending on the customization options chosen by the implementing NPPO
- checking, and changing if necessary, this data - by the trader or NPPO inspectors
- arranging an appointment for an inspection by an NPPO Officer (if the GeNS NPPO requests it as a part of national customization)
- approval of the certificate request - by NPPO inspectors
- issuing an ePhyto - by the NPPO officer
- printing a paper phytosanitary certificate - ready for signing and stamping - for export to countries that cannot yet receive ePhytos
- sending ePhytos to the IPPC global Hub
- receiving ePhytos from the IPPC global Hub
- cancelling of an ePhyto, if required
- issuing a replacement ePhyto, if required
- storage of ePhytos for later reference.

On a technical level, the GeNS:

- facilitates data entry
- is designed to be used in a low-bandwidth environment and work with most of the common desktop/devices and Internet browsers
- uses internationally standardized codes/lists

- produces ePhyto with data compliant with the ePhyto message format as specified in ISPM 12 Appendix 1 - compliant with the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) format and content
- provides translations of pest and plant names for export.

For more detailed technical information on GeNS and the IPPC ePhyto Solution please refer to the following websites:

- the IPPC ePhyto Solution: <https://www.ippc.int/en/ephyto/>
- IPPC Guide to Implementing the Generic ePhyto National System https://www.ephytoexchange.org/doc/IPPC_Guide_Implementing_GeNS.pdf
- ePhyto for Beginners: https://www.ippc.int/static/media/files/publication/en/2018/02/2018-02-20_ePhyto_for_beginners_finalized.pdf
- IPPC ePhyto Video: <https://www.youtube.com/watch?v=gjDz7aOv-Ys>

4. GeNS implementation – step by step framework

As with most projects, implementing GeNS in an NPPO proceeds in a series of steps, from the initial concept and outline plan to the final implementation and evaluation. These steps are detailed below. It is important to understand, however, that some steps may be undertaken in parallel, and the sequence may vary depending on the situation in a specific country. Indeed, depending on the level of maturity of the overall planning process in the NPPO, some steps may be omitted altogether. The key is to be pragmatic and results-oriented while at the same time ensuring that the key stakeholders are consulted and are onboard, every step along the way. It is particularly important to ensure that the senior management of the NPPO are fully informed and committed to the project from the start, and that they fully understand and support the proposed changes that emerge from the stakeholder consultation process and the Business Process Analysis (BPA).

This GeNS Implementation Framework, therefore, covers all key areas, including:

- Project Initiation and Conceptualization
- Project Governance and Stakeholder Engagement
- GeNS Strategi Plan Development
- Undertaking the BPA
- Designing the future scenario under GeNS
- GeNS Implementation
- Project Review and Evaluation

Each of these Phases are discussed in detail below.

4.1 Project initiation and conceptualization

Project initiation and conceptualization involves gathering and analysing background information on the IPPC ePhyto and GeNS concepts; identifying the relevance and potential benefits of the project for your NPPO; detailing the problem(s) or issue(s) that the project could potentially address; specifying the potential risk factors in undertaking the project; and developing an initial estimate of the total cost of the project. There is a range of background material available on the IPPC ePhyto website (<https://www.ippc.int/en/ephyto/>) that can assist in this analysis.

A project scoping team should be established at the outset to undertake the conceptualisation exercise. This team would typically consist of at least 2 or 3 NPPO Officer directly involved with issuing or reviewing PCs, a representative of the NPPO Information Technology (IT) department, and a representative of the NPPO management. The outcome of the conceptualization and scoping exercise would be a short and succinct report that includes:

- an explanation of the essential ideas behind ePhyto and the IPPC ePhyto Solution, including the GeNS

- a statement of the relevance of ePhyto and GeNS to the specific NPPO and country – the specific benefits that may be realised and the specific problems or issues the ePhyto will address
- an indication of potential risks or areas of concern if the project is initiated
- the potential costs and other resource requirements (in brief and summary form)
- the proposed next steps.

Once finalised by the project scoping team, the report should be presented to the NPPO senior management for consideration and decision regarding whether or not to proceed with the project implementation projects.

If the decision of the NPPO Management is to proceed with the implementation of the GeNS, the management needs to establish a project governance framework and initial budget. These are described in Sections 4.2 and 4.3 below

4.2 Project governance and stakeholder engagement

The project governance framework specifies who is the project owner, the composition and role of the project team, how project decisions are taken, and the stakeholder identification and engagement strategy. Each of these areas are described below.

4.2.1 Project owner

In a GeNS project, the project owner is typically the senior NPPO management or a specific senior manager appointed by the head of the NPPO.

4.2.2 Project team

The project team would typically include members of the scoping team, other representatives of the NPPO management, relevant officers of the NPPO, and external stakeholders of the PC process, such as representatives of business organizations, other government agencies (such as Customs), and other relevant parties. The project team would manage areas such as stakeholder engagement, development of the projects detailed goals and objectives, implementation GeNS implementation and training, and all other related areas.

The NPPO senior management should appoint a project manager to lead the team, and the project manager would report back to the project owner, namely the NPPO senior management.

4.2.3 Registration with IPPC

One of the first actions of the project manager would be to complete the official IPPC GeNS [onboarding document](#) followed by the submission of a letter to the IPPC Secretariat (ippc@fao.org) expressing interest to implement GeNS. This establishes the NPPO as a potential GeNS user and initiates support from the IPPC. Following registration, the IPPC Secretariat will follow up with further communications and instructions.

4.2.4 Stakeholder identification and engagement

Another priority tasks of the project team is to identify and engage the key stakeholders. Stakeholders are those individuals, organizations or institutions who have a strong interest in the project and who will impact, or be impacted by, the project outcome, either positively or negatively. These include the NPPO management, the various officers of the NPPO that deal directly with issuing and processing PCs, the export and import companies that use PCs, the banks, brokers, freight forwarders, other government agencies (such as Customs and Ministry of Agriculture, food safety organization), and business organizations (such as Exporters' Association, Freight Forwarder Associations). It is important to identify all potential stakeholders as early as possible, irrespective of their level of interest or power to influence the project (the stakeholder assessment exercise is discussed in Section 4.2.4.1). It may be useful to draw a simple chart of the stakeholders as per the example below.

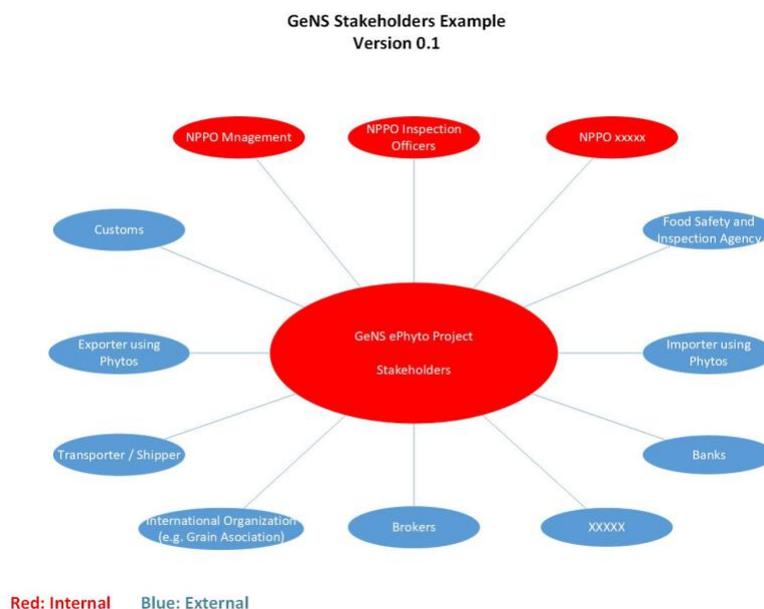


Figure 2: Examples of GeNS stakeholders.

4.2.4.1 Stakeholder Assessment

Not all stakeholders will be interested in or impacted by the introduction of GeNS ePhyto to the same extent. Some may pay only passing interest while for others, the introduction of ePhyto may be transformative. In order to map the relative influence and interest of specific stakeholders regarding the project, it is best to prepare a stakeholder matrix. A hypothetical example of a GeNS stakeholder analysis is provided below.

Table 1: GeNs stakeholder assessment

Stakeholder	Influence	Interest	Specific Issues	Project Strategy
NPPO Mgmt.	H	M	Essential to have fully on board - may need to be further motivated	Engage fully from the outset. Communicate frequently – develop project champion(s) within management
NPPO Officers	H	H	Important to emphasise benefits and to allay any fears of job displacement	Engage fully from the outset. Communicate frequently – provide full training and explanations of impact of new processes
Ministry of Agriculture	H	M	Need to show how this fits into overall MoA eDocument strategy	Be fully open. Provide full technical and other details
Exporters	M	H	Need to see the benefits and ease of use	Promotional brochures, face to face meetings, training
Importers	M	H	Need to see the benefits and ease of use	Promotional brochures, face to face meetings, training
Brokers	H	L	Need to get Brokers on board and committed to the project	Face to face meetings, explanation of benefits, encouragement from key companies
Transporters/ Shippers	M	L	Need to see the benefits and ease of use	Promotional brochures, face to face meetings, training
Customs	H	H	Important to work out internal process and interfaces	Engage directly from the outset

Banks	M	H	Important to work out payment process and interfaces	Engage directly from the outset
Food Safety Authority	M	M	Keep informed and on board	Engage directly from the outset
International Business Organizations	L	H	Keep informed and on board	Promotional brochures, face to face meetings, training

Codes: High (H), Medium (M), Low (W)

In addition to the above Table 1, it can be very helpful to visually illustrate the mapping of the stakeholders influence and interest visually, as per the diagram below. The diagram indicates the relative power or influence specific stakeholders may have over the outcome of the project on the vertical axis, and their level of interest regarding the project outcome on the horizontal axis.

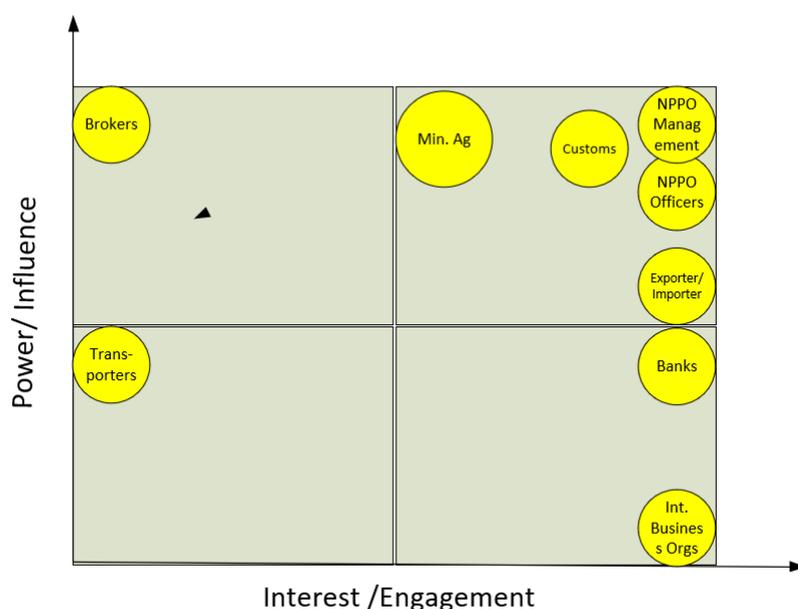


Figure 3: Mapping of the stakeholders influence and interest

Within this diagram, stakeholders with the highest level of influence and interest in the project would be placed in the top right-hand quadrant. These are the top stakeholders that need to be fully engaged to ensure their support throughout the project development and implementation.

The top left-hand quadrant is for stakeholders who have a lot of potential influence on the project, but are less interested in or engaged with it. These stakeholders need to be fully informed regarding the project and the project team may have to work to enhance their level of interest and commitment, in order to shift them into the top right-hand quadrant.

The bottom two quadrants are where less influential stakeholders are placed, those with more interest being placed in the lower right-hand quadrant, and those with less interest in the lower left-hand quadrant. All of these stakeholders need to be informed throughout the project and their potential for engagement noted.

Stakeholder analysis and mapping is a relatively simple exercise and can be done with the entire project team present. It helps focus the attention of the team on the top stakeholders critical to the success of the project, whilst not neglecting all other stakeholders.

4.2.4.2 Stakeholder Consultation and Communications

Once the stakeholders have been identified and assessed by the project team regarding their potential impact on, and interest in, the project, the next step is to determine how best to engage the stakeholders in the design, development and implementation of the project. This can be done in various ways, which are not mutually exclusive. These include:

- holding an initial stakeholder meeting to present the project and get feedback / buy-in.
- holding individual one-on-one meetings with key stakeholders to ensure that they understand the project and to gain their support
- holding focus group meetings
- surveying the stakeholders to gather critical information on their potential level of engagement and cooperation (or oppositions!).

It is important at this stage to fully describe the project to the stakeholders and explain how it will likely impact and improve the NPPO operations of issuing and processing phytosanitary certificates, and the specific benefits that are expected. However, it is essential not to oversell the project, and to be clear on what issues or areas the project will not address.

Once there is general agreement amongst stakeholders regarding the potential value of the project, it is recommended to expand the project team to include some of the key external stakeholders.

4.3 GeNS project budget

Possible costs associated with implementing GeNS are both initial set up costs and ongoing operational and enhancement costs. These are:

- Initial set up costs may include expenses related to the following:
 - any additional IT related equipment (this will depend on what equipment is already in place and what, if any, additional equipment may be required) – see Section 4.7.4 regarding the required IT infrastructure.
 - enhancing the Internet connection and services, if required
 - undertaking the BPA of the existing PC services
 - designing the new “to be” ePhyto services
 - training for NPPO staff and external users
 - establishing backup procedures and facilities
 - automation of the PC Payment system – if required
 - linkage to other government agencies (if possible and/or required).
- Ongoing operational costs may include the following:
 - equipment maintenance
 - equipment replacement budget (It is suggested that the value of 1/3 of the total cost of the equipment be assigned a yearly budget for replacement of equipment on a 3 year cycle)
 - office charges
 - additional staff costs (if any)
 - internet service charges
 - ongoing training
 - funds to support engagement with the IPPC ePhyto developments (attendance at ePhyto Conferences, etc.).
- Cost savings could include:
 - Savings in official PC Paper printing costs (this can be considerable!)
 - Overall efficiency savings through the optimized procedures

A typical budget for a GeNS implementation could be between US \$100,000 and \$500,000 depending on the level of the existing IT infrastructure and services, and also the size of the country (and the number of ports etcetera where the GeNS would be established).

It is noted that, apart from the initial set up costs, the introduction of GeNS ePhytos should not result in a significant increase in the operating costs of an NPPO. Indeed, if anything, the introduction of GeNS should reduce the administrative cost of issuing and managing PCs.

4.4 GeNS strategic plan - setting project vision, goals, objectives, and kpis

Setting the vision, goals and objective for the GeNS project will focus and direct all future work. All key stakeholders should be involved in this process, to the extent possible. However, depending on the culture of the particular NPPO, senior management may prefer to do this exercise internally first, and then open it to external stakeholders.

Although some goals and objectives are common to all GeNS projects (e.g. establish a functional exchange of ePhytos with key trading partners), others may vary considerably from country to country. It is important to capture all views in this process to ensure all key points are incorporated. The following questions, directed at a business audience, could help this scoping exercise:

- What specific problems or issues would you expect the ePhyto system to address
- What key features would you hope to see in an ePhyto system
- What would you anticipate as the main benefits from the introduction of ePhyto?
 - From a business perspective
 - From a government perspective
- What do you see as the major constraints to using the ePhyto system?
- What specific issues should the NPPO take into consideration when developing the ePhyto system?
- What specific issues should the NPPO take into consideration when implementing the ePHYTO system?
- How do you think the business community can best support the implementation of ePhyto?
- What other issues should be considered?

Taking these and other issues into account, the GeNS project vision can be distilled, as illustrated in the diagram below:

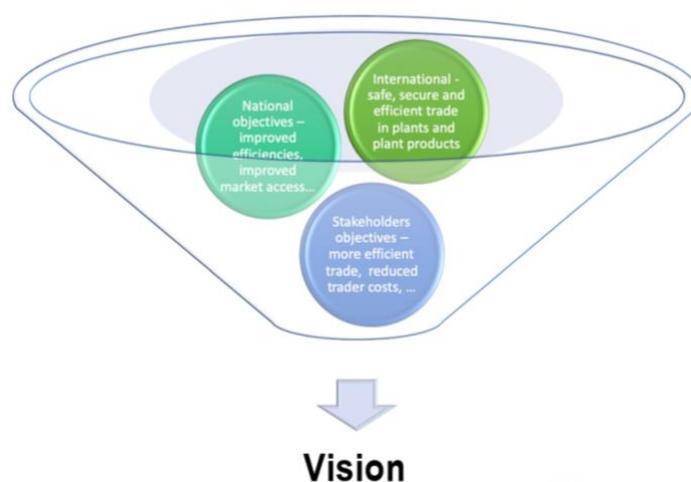


Figure 4: GeNS project vision

A possible Vision for the GeNS project could be:

“A completely paperless, efficient and effective process for issuing, reviewing and exchanging Phytosanitary Certificates in XXXXXX [Country Name] by YYYYYY”

When defining the GeNS project Goals and Objectives, a SMART framework approach is recommended. Specifically, the Goals should be⁷:

- **Specific:** Goals should be concrete. They should be defined in an explicit and unequivocal way, with no room for interpretation. Tip: a good starting point is defining Goals based on the Six Ws (Who, What, When, Where, Why, How).
- **Measurable:** Goals should include criteria that will help in assessing the progress made and whether goals were reached.
- **Attainable:** Goals should be realistic but still challenging. Goals that are too easy or too difficult to accomplish could result in the demotivation of stakeholders.
- **Relevant:** Goals should be meaningful and relevant to the NPPO. They should contribute to the achievement of the ePhyto vision.
- **Time-bound:** Goals should be framed in time. For that purpose, goals can include deadlines. Tip: Defining a time-frame might be useful even before defining a goal. Stakeholders should start answering the question: what could be reached in this particular period of time? This helps in managing expectations and ensuring that discussions among stakeholders remain realistic. Within a given period of time it is easier to figure out what is possible and what not.

A typical Goal for a GeNS project could be:

The goal of the XXXX [Country name] ePhyto GeNS project is to achieve paperless exchange of Phytosanitary Certificates between XXXX [Country name] and our major trading partners for plants and plant products by YYYY [date], thus reducing the time and cost of export process by XXX and YYY respectively, while at the same time enhancing security and reducing fraud.

4.4.1 Key performance indicators

The Key Performance Indicators (KPIs) flow from the Goals and Objectives, and are essential for measuring and monitoring the performance of the GeNS project, and for evaluating it at a later stage. Typical KPIs for a GeNS project could be:

- the average time to issue a PC is reduced from xxx to yyy minutes or by XXX%
- the number of PCs rejected by importing countries is reduced by XX%
- the cost (to the company or to the NPPO itself) of issuing a PC is reduced by XX%
- the average time to secure a replacement PC (in the country of import) is reduced from X days to Y minutes
- the number of PCs issued as ePhytos reaches xx% by YYYYY
- the number of countries with which the NPPO is exchanging Production ePhytos reaches XXX by YYYYY
- the value of goods lost through delays at import borders is reduced by XX% by YYYYY
- the satisfaction level of users shall be XX by YYYYY.

4.4.2 Risks and assumptions

As with any project, the risks and assumptions of introducing the GeNS should be clearly articulated.

Risks could include such factors as:

- poor internet services
- failure of the IT system

⁷ Source: UNECE Guide to Drafting a National Trade Facilitation Roadmap

- lack of support from the NPPO senior management
- opposition from NPPO staff itself
- lack of support from the business community
- lack of support from the Ministry of Agriculture
- lack of other government support.

Similarly, the assumptions of the project should be clearly spelled out. These may include:

- continued support from NPPO Senior Management
- continued support from the Business Community
- government willing to back any legal changes required
- IPPC will continue to operate and support GeNS and the Hub
- financial support from a donor
- support from the IPPC and UNICC
- political stability.

4.4.3 Sustainability

The sustainability of the project also needs to be articulated. This includes the financial sustainability of the ePhyto service, the maintenance of equipment, the storage of data, and a long term provision of the service. Some specific issues to consider are as follows:

- Are sufficient funds available to pay for the internet connection fees on an ongoing basis?
- Is there a budget for equipment maintenance and replacement?
- Is there a budget for staff training?
- Is there a succession plan for key NPPO staff involved with ePhyto?
- Is there a plan to have ongoing consultations with the business community?
- Is there a plan to engage with IPPC in the ongoing enhancement of the GeNS ePhyto?

4.4.4 Change management

Change management focuses on ensuring that all individuals involved in the ePhyto project fully understand and support the logic and reason behind the introduction of the GeNS, the issues it intends to address, the benefits that are expected to ensue from the project, and the impact that it may have on their own individual work. The key to change management is ensuring that everyone is informed, and that any potential fears or anxieties of affected stakeholders are fully expressed and addressed in an open transparent and supportive way, and that appropriate action is taken by management to address such concerns, to the maximum extent possible.

It is important to provide ongoing information on the project to stakeholders regarding how the project will be delivered, the timeframe, the support and training that will be provided, and the mechanisms for dealing with staff objections or concerns about the project.

It has been shown that lack of attention to change management is one of the major factors in the failure of projects throughout the world, so it is imperative that this area is given adequate attention.

A good reference publication on change management is *Managing Transitions* by William Bridges⁸.

4.5 Undertaking the business process analysis⁹

The implementation of the GeNS in an NPPO provides an excellent opportunity for the organization to undertake a full review of its existing processes and procedures related to issuing export and examining

⁸ Bridges, William and Bridges Susan, *Managing Transitions*, Da Capo Press, 2016

⁹ This section of the GeNS Implementation Framework draws heavily on the UNNExT Business Process Analysis Guide, used with kind permission of the United Nations Economic and Social Commission for Asia and the Pacific

import PCs. Clearly, the implementation of the GeNS itself will involve significant changes to the core PC procedures, as the NPPO shifts from paper PCs to ePhytos (or maintains a parallel paper and electronic approach). There are also many related activities that can be enhanced during the implementation of the GeNS. It is imperative, therefore, that the NPPO properly documents the existing paper based PC procedures and reviews these in order to maximize the benefits that may be made while introducing GeNS.

Business Process Analysis (BPA) is an excellent tool for undertaking this optimization exercise, as it clearly documents and illustrates the specific steps and flow of work and can identify where inefficiencies, overlaps or redundancies exist. BPA involves the documentation and analysis of the sequence of steps, from start to finish, involved in any business procedure - such as issuing and receiving phytosanitary certificates. The BPA illustrates:

- the order in which specific activities within the business process are undertaken
 - the decision points
 - the business process expert¹⁰ that perform those activities
 - inputs and outputs of each activity
 - the criteria for entering and exiting the business process
 - how business process experts relate to one another.
 - how information flows throughout the business process
 - associated rules and regulations
- quantitative indicators, such as number of steps, as well as time and cost required to complete a particular business process.

The documentation of existing business processes in precise but brief descriptions and simple diagrams helps create a common understanding on working norms and operational procedures among relevant stakeholders, as well as increasing stakeholders' knowledge about the entire business processes. Additionally, it serves as a basis to identify areas for the optimization of these processes. It thus helps policy makers to redesign processes and make necessary modifications in an informed and targeted manner, as well as justify those changes.

The United Nations Network of Experts for Trade Facilitation (UNNExT) has developed a Business Process Analysis Guide¹¹ that is used extensively throughout the world in trade process optimization, and we will draw on this Guide in our description of the BPA process.

4.5.1 The BPA exercise

There are basically two phases to the BPA. The first phase is documenting the existing procedures in order to establish what is known as the “as is” scenario. This documentation is important as it will be the key reference point for measuring and comparing all changes and improvements that are realized with the introduction of GeNS.

The second phase is to review and re-engineer the existing procedures as necessary, to make them more efficient and effective with the introduction of the GeNS, and, for example, to identify areas where automation can eliminate the need for traders to physically come to the NPPO to submit or collect certificates or other documentation. This second phase is called development of the “to be” scenario

(UNESCAP) – see <https://www.unescap.org/resources/business-process-analysis-guide-simplify-trade-procedures>.

¹⁰ The term “business process expert” is used to signify a party that takes an action (e.g. an exporter that submits a request for a PC) within a specific process. In BPA literature, the term generally used to denote a business process expert is “actor”. However, as the term “actor” is often confusing for readers, so the term “business process expert” will be used throughout this document to refer to such individuals.

¹¹ <https://www.unescap.org/resources/business-process-analysis-guide-simplify-trade-procedures>

Documentation of the steps in the BPA process is recorded in three formats. The first is to simply record in textual format (termed “process descriptions”) the exact steps taken in the current NPPO PC process. The second involves mapping the written descriptions into visual diagrams (called “activity diagrams”) to facilitate easy discussion amongst stakeholders; and the third is a set of time/cost diagrams to indicate the time and cost taken for each process.

Throughout the documentation of the “as is” and “to be” scenarios, extensive engagement with the stakeholders (both within the NPPO and externally) is essential.

4.5.2 Who Should Carry Out the BPA in the NPPO

The BPA should be carried out by an external expert or by an in-house officer that has already been fully trained and has experience in the BPA methodology. The person selected to undertake the BPA will be referred to as the “BPA analyst” throughout the remainder of this document.

The BPA Analyst should have following skills:

- *Familiarity with NPPOs existing phytosanitary certificate processes and operations.* Although the BPA analyst does not need to be an expert in PC matters, they should have a good overall understanding of the processes and the core objective and purpose of the phytosanitary certification service.
- *Analytical skills:* Ability to think analytically. They should be able to accurately capture relevant information from interviews with process experts and written documents. They should be able to summarize the information, as well as formulate and document the business processes.
- *Interpersonal/ communication skills:* The ability of the BPA analysts to effectively communicate and interact with other project members is crucial to project success. They should have the ability to create and sustain reasonably good relationships with project members.
- *Business/ organization skills:* It is important that the BPA analysts have access to, the individuals delivering or using the PC services. This includes NPPO Officers, companies using PCs, and other relevant stakeholders.
- *Technology skills:* Knowledge of UML notations, especially in use case diagrams and activity diagrams.
- Previous work experience in the phytosanitary certification area would be an asset.

If an external expert is hired to undertake the BPA analysis, it would be useful for the NPPO to select one or more officers to work with the expert so that they could learn the methodology and, subsequently, be in a position to repeat the process, as and when required.

4.5.3 Documenting the Existing PC Processes

When documenting the existing procedures, the BPA analyst will conduct extensive interviews with all related business process experts. In the GeNS context, this will include NPPO officials, exporters or importers, business organizations such as the Exporters’ Association, and intermediaries such as freight forwarders, shippers, banks, etc.

The analyst will first need to identify all the business process experts involved in the PC process, and develop a “Case Diagram”. This is to ensure no significant party is omitted from the analysis.

The main business processes related to the issuance and review of PCs are as follows:

- Create an ePhyto (from certificate request to issuance):
 - (1) Create an ePhyto for destination countries that are members of the HUB
 - (2) Create a PDF for printing paper Phytosanitary certificates for non-ePhyto countries
- Certificate Withdrawal
- Certificate Replacement:

- (1) The original is sent with replace status code
- (2) A new certificate is issued following the ‘create an Phyto’ workflow
- Re-export Certificate: Same as ‘create an Phyto’ workflow except that:
 - (1) Original Phyto is embedded as a PDF file
 - (2) Some fields in the XML/Paper certificate are different from the ‘original’ certificate
- Receive/Review Import ePhyto

The Use Case Diagrams for the above processes are as follows:

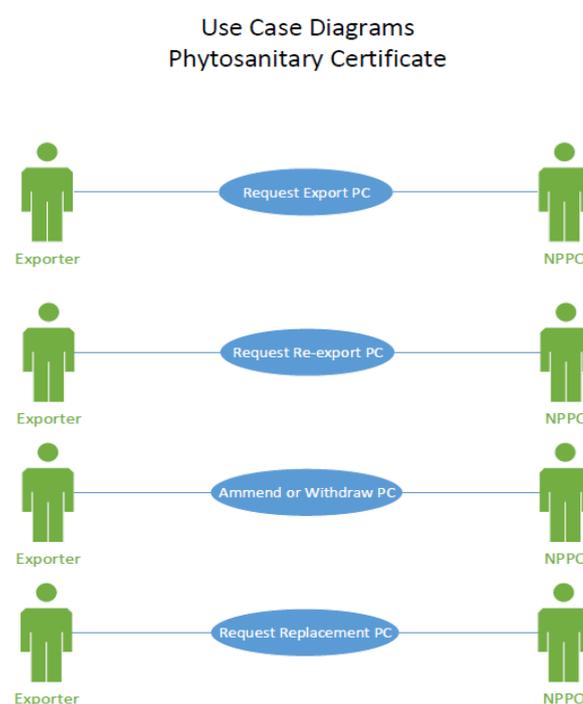


Figure 5: Use case diagrams

The BPA analyst should record details for all of the steps (activities) that must be completed for each of the above PC business processes, and cross verify these details with the relevant business process experts to ensure maximum accuracy. Each step in the description is numbered and, if possible, the time taken and any costs involved in the step are identified. Each step in the process should have a short title, starting with a verb and ending with a noun, e.g. “issue certificate”. Further, any and all documents or information elements required to undertake the step or emanating from the step, should be identified and recorded. Similarly, all data exchanged in undertaking the step is recorded.

During the initial recording of the existing scenario, the analyst should ask probing questions to the business process experts to try to better understand the rationale or logic of the existing procedures. A basic rule of thumb for a BPA analyst is that they should question the value/need/legitimacy of every step and every documentary or data requirement in the process, to determine if it is really required and adds value to the intended outcome. This does not imply that a specific step or document/information is not necessary, per se. Rather, the process seeks to verify this need in the current environment, as in some instances, procedures and steps that were introduced to address a specific need at a specific time may no longer be required. During this information gathering process, therefore, the BPA analyst typically notes all possible opportunities and options for improving the existing process that could be considered at a later date.

In the context of implementing the GeNS, the BPA analyst will first look at the entire existing process related to issuing an export or re-export paper PC, or processing an import PC. This will involve interviews with all NPPO staff associated with the PC issuing and review processes, exporters and importers using PCs, brokers, banks, and other government agencies such as Customs and Department of Agriculture.

Once the step by step “Process Description” is recorded in textual [written] format, the BPA analyst then creates the visual representation of the steps. This visual representation is called an “Activity Diagram”.

An example of a BPA Use Case, Process Description and Activity Diagram is presented below.

**Example of use case diagram; process description and activity diagram
for concluding a sales contract**

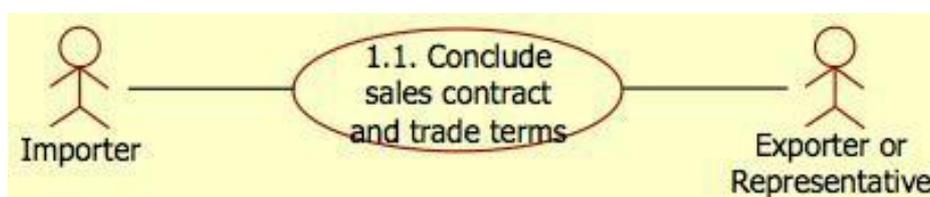


Figure 6: Use case diagrams

Table 2: Process description

Name of a process area	1. Buy
Name of a business process	1.1. Conclude sales contract and trade terms
Related laws, rules, and regulations	Incoterms
Process participant	Importer Exporter or Representative
Input and criteria to enter/ begin the business process	Exporter has a list of jasmine rice potential buyers. Exporter is eligible to export rice. The qualifications of exporter meet regulatory requirements outlined in Ministry of Commerce Regulation on the Export of Rice No. 1 (B.E. 2534), 5(B.E. 2637), and 7 (B.E. 2539).
	As required by Rice Trading Act (B.E. 2489), exporter has already received a permission from Department of Internal Trade (a government agency under the administration of Ministry of Commerce) to trade rice with overseas trading partners (general classification). The application form for a request of a permission to trade rice with overseas trading partners costs 5 THB. The permission to export rice costs 20,000 THB yearly. In line with Export Commodity Standards Act (B.E.2503 and 2523), exporter has successfully registered itself as a registered jasmine rice exporter with Office of Commodity Standards, one of the divisions in Department of Foreign Trade. The registration takes less than 1 working day and costs 2,500 THB. It expires on December 31 of every year. To register with Office of Commodity Standards, exporter must have the qualifications listed in Ministry of Commerce Regulation on the Export of Products under the Standard Scheme (B.E. 2504).

<p>Activities and associated documentary requirements</p>	<p>Exporter prepares Quotation to inform an importer about quoted price and sales terms.</p> <p>Importer reviews the Quotation and determines if the quoted price and sales terms are acceptable. If the quoted price and sales terms are not acceptable, importer requests exporter to revise the quoted price and sales terms.</p> <p>If the quoted price and sales terms are acceptable, importer confirms exporter the purchase of goods with Purchase Order.</p> <p>Exporter prepares the delivery of goods accordingly.</p> <p>Exporter acknowledges the receipt of Purchase Order and confirms that the jasmine rice will be delivered according to established conditions and terms by sending importer Proforma Invoice.</p> <p>Importer receives Proforma Invoice.</p>
<p>Output criteria to exit the business process</p>	<p>Importer and exporter have concluded trade contract and terms.</p> <p>Based on a purchase order, an exporter can prepare goods for export.</p>
<p>Average time required to complete this business process</p>	<p>2 Days</p>

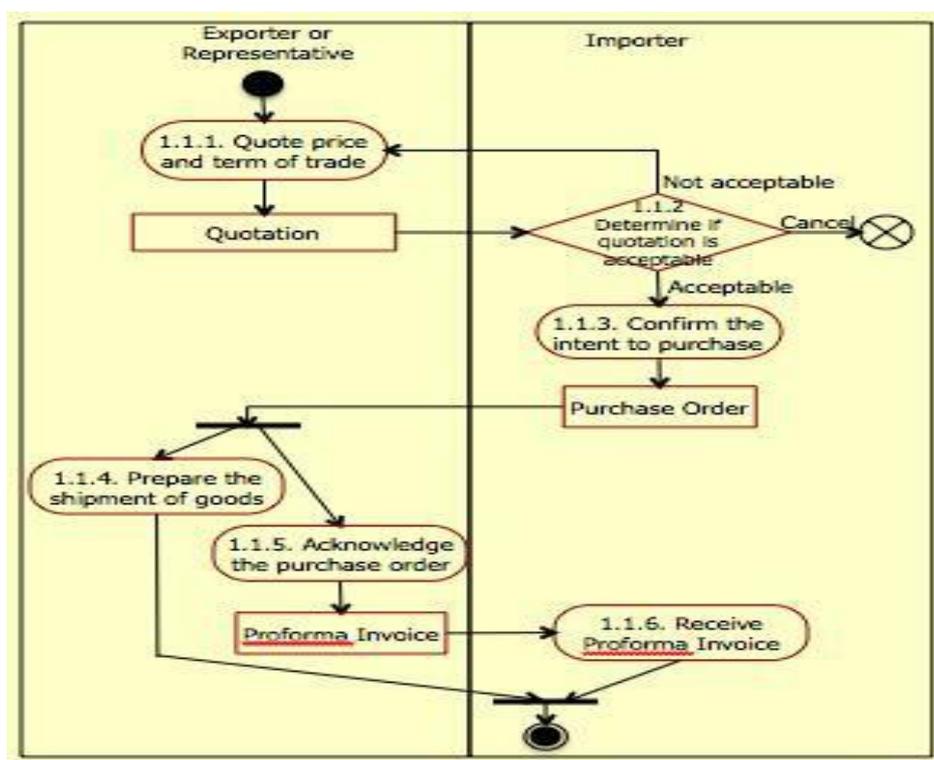


Figure 7: Activity diagram

Business Process Example

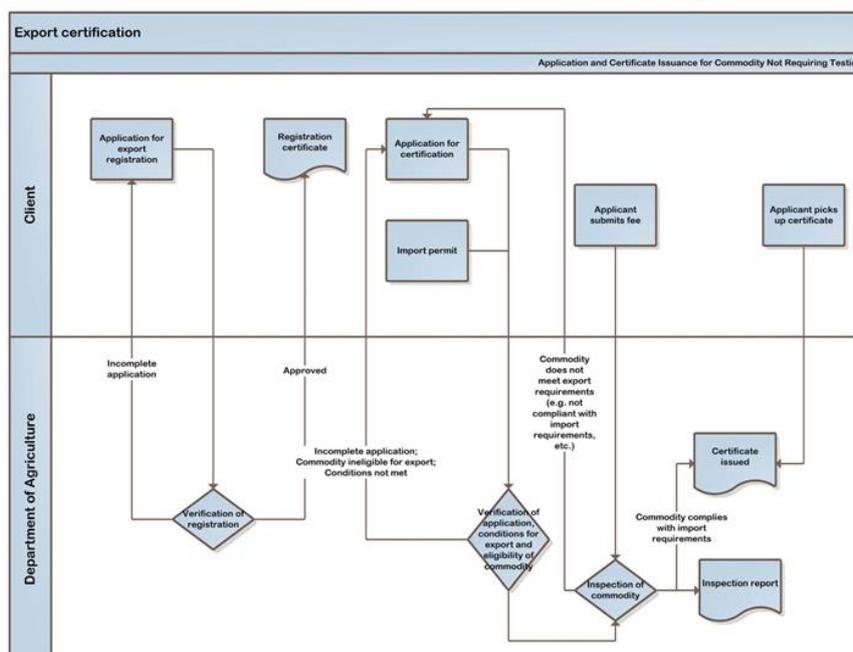


Figure 8: Activity diagram

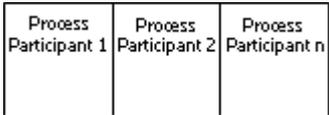
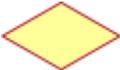
The Use Case and Activity Diagrams can be developed with simple drawing tools, or with general office software such as Microsoft PowerPoint, OpenOffice Impress, iWork Keynote. However, this can be quite cumbersome, especially for more complex activity diagrams. Specialist diagramming software programs, such as Microsoft Visio, OpenOffice Draw, SmartDraw, and Lucidchart, can greatly simplify and facilitate the preparation of process maps.

The symbols used in the activity diagram are based on an international standard call Unified Modelling Language (UML)¹². The advantage of using an international standard to prepare the activity diagram is that all experts from any country can immediately understand it, and easily make comparisons with process in similar organizations. A description of the basic activity diagram shapes is provided below

Table 3: Activity Diagram notations

Notation	Description and instruction for use
●	Initial State - Represents the beginning of a set of activities - Can only be one initial state for each activity diagram
⊗	Final Flow State - Is used to stop the flow of activities - Indicates that further activities cannot be pursued within the described context
●	Final Activity State - Is used to indicate the completion of the business process

¹² <https://www.uml.org/what-is-uml.htm>

	<p>Swimlane</p> <ul style="list-style-type: none"> - Is used to break up individual actions to individuals/ agencies that are responsible for executing their actions - Is labelled with the name of the responsible individual, organization, or department - E.g., Exporter or Representative, Department of Agriculture
	<p>Activity</p> <ul style="list-style-type: none"> - Represents a non-decomposable piece of behaviour - Is labelled with a name that 1) begins with a verb and ends with a noun; and 2) is short yet contains enough information for readers to comprehend
	<p>Object</p> <ul style="list-style-type: none"> - Represents a document or information that flows from one activity to another activity - Is labelled with a name of a document - Commercial Invoice, Packing List, Export Permit
	<p>Decision</p> <ul style="list-style-type: none"> - Represented by a diamond - Refers to the point where a decision, depending on the outcome of a specific prior activity, has to be made - Has multiple transition lines coming out of a decision point and connecting to different activities - Label each transition line that comes out of 'Decision' with the condition, such as Yes / No; Approved / Not Approved
	<p>Transition line</p> <ul style="list-style-type: none"> - Indicates a sequential flow of activities and information flows in an activity diagram
	<p>Fork (Splitting of Control)</p> <ul style="list-style-type: none"> - Is used to illustrate a set of parallel activities or concurrent flow of activities
	<p>Join (Synchronization of Control)</p> <ul style="list-style-type: none"> - Is used to indicate the termination of a set of parallel activities or concurrent flow of activities

4.5.4 Why prepare an activity diagram

The main value of an activity diagram is that it provides a clear visual representation of the relevant business process, and this greatly facilitates discussion amongst stakeholders. It clearly illustrates the sequence of the procedure, the documentation required, the data required, the decisions that must be

made and the outcomes of such decisions. Availability of a clear visual representation of the business process helps avoid circular discussion on points which might otherwise not be clear to everyone.

4.5.5 Time / cost diagrams

Gathering time and cost estimates for the PC processes and activities during the “as is” BPA is an extremely important exercise, as this provides the baseline for measuring any improvements in the process with the implementation of GeNS. It can sometimes be quite difficult to get this information from business process experts, and even more difficult to get accurate information, but even rough estimates can be very helpful.

When gathering time information, the BPA analyst will seek to determine:

- How much time, including waiting time, on average, in minutes, hours or days, does it take to complete the entire business process from beginning to end? What is the maximum and minimum time?
- At a more granular level, how many minutes, hours, days does it take to complete a particular activity within this business process?

Similarly, when gathering the cost information, the BPA analyst will seek to determine:

- How much on average does it cost to complete a particular process or activity in this business process, or to process a particular document/set of documents?

This information can then be presented in both tabular and graphical format. An example of a time chart for exporting a specific product is presented below:

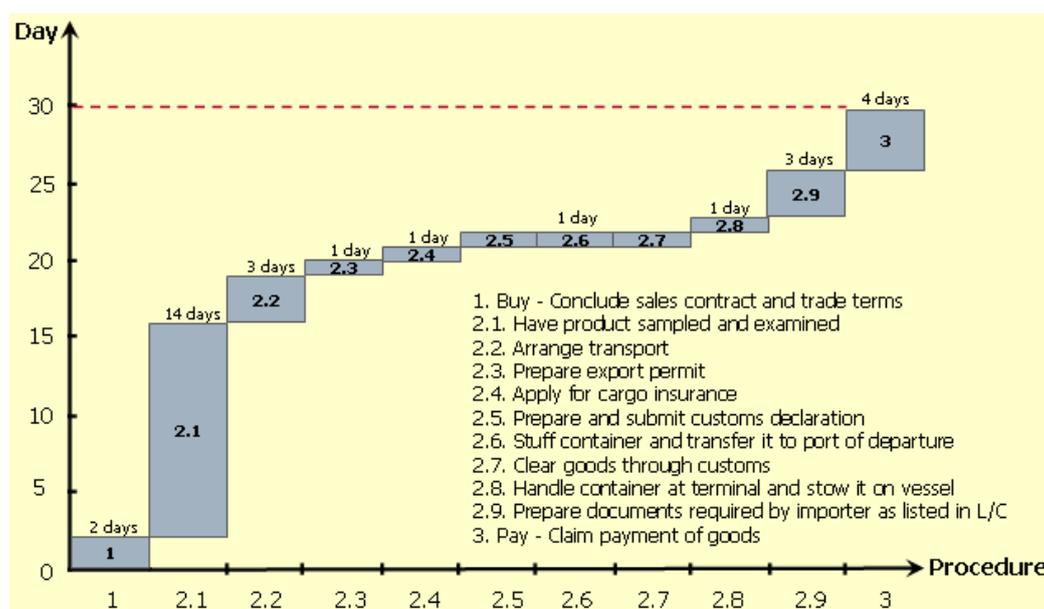


Figure 9: Time / cost diagram. Source: UNNEXt BPA Guide.

The UNNeXT BPA Guide suggest using the PERT¹³ calculation for estimating the time taken for a specific process or activity, using the following formula. **Process / Activity Time Estimate** = (Optimistic Time + (4 * Most Likely Time) + Pessimistic Time) / 6

Table 4. An example of the PERT calculation.

Activity Number	Optimistic Time	Most- Likely Time	Pessimistic Time	Estimated Time
1.0	5	8	10	7.83
2.0	2	4	5	3.83

For the cost estimates, a similar approach can be taken, using the same type of charts and calculations.

4.5.6 Verifying the data collected

The BPA analyst will typically make a first draft of the process descriptions, activity diagrams, and time/cost charts and tables, based on the initial interviews, and will then check these for accuracy with individual process experts and make any necessary changes to ensure that all the steps have been accurately recorded, and in the correct sequence. In some cases, the analyst may require the business owner of a particular process to sign off on a final version of the diagram and description, to indicate their agreement with its accuracy.

In addition, the analyst may call a group meeting of all key process experts in order to go through the activity diagrams collectively. This has two purposes. The first is to ensure the accuracy of the interactive nature of the process and steps and decisions, and the second is to ensure that all process experts have the same understanding of the entire process. It can sometimes be quite surprising to learn how little awareness individual process experts have of the entire scope of the process, and the actions and steps that other process experts have to take in order to complete the entire process. This enhanced understanding of the process is a benefit in and of itself, and it greatly facilitates the development of a simplified and improved business process.

4.6 Designing the future ePhyto scenario under GeNS

Once the documentation of the existing (as is) PC process is finalized and agreed with the relevant parties, the GeNS project team can start considering how best to re-engineer the process to take maximum advantage of the introduction of the GeNS. This is a joint exercise that the project team and the BPA Analyst will do with the stakeholders. It will first require extensive discussions within the NPPO itself - with management and the relevant officers, and subsequently with external stakeholders.

Clearly, the fundamental objective and intent of the PC related service provided by the NPPO will remain the same under GeNS. However, in the transition from a paper-based PC system to the ePhyto, the manner in which the services are delivered will change considerably, as well as the specific roles and responsibilities of NPPO officers, and this will need administrative support and approval and senior management agreement. It will also likely require revisions to the Standard Operating Procedures (SOPs) for the NPPO officers. It is expected that the GeNS will actually reduce the administrative burden on the officers and this can have a significantly positive impact on job satisfaction. It should also enhance the quality of service provided by the NPPO to the exporters and importers.

The full range of the GeNS capabilities include the following:

- (1) online request and data entry for export certification
- (2) issuance/authorization of an ePhyto
- (3) sending of an ePhyto through the Hub to the NPPO in the importing country
- (4) printing of the sent certificate data on paper
- (5) receipt of ePhyto through the Hub from the NPPO in a partner exporting country

¹³ PERT - Project Evaluation and Review Technique

- (6) ability to check the authenticity of an ePhyto after receipt
- (7) ability to amend, cancel or issue a replacement ePhyto, if required
- (8) extraction of data from an ePhyto
- (9) printing of the received certificate data on paper
- (10) ability to store ePhytos for later reference
- (11) reporting.

The standard GeNS process flow is described below. As mentioned previously, individual NPPOs have the option to select all or part of these processes in implementing the GeNS, and part of the implementation process is customising the installation to the exact requirements of the NPPO, to the extent possible.

Process 1: Enter and provide certificate information: The exporting country needs to issue an ePhyto to a trading partner in another country. A certificate request is created in the GeNS by entering the consignment information and the details about the transportation. This process can be initiated by either the company or the NPPO officer.

Process 2: Verify and Issue the ePhyto (in XML): The certificate request is reviewed by the NPPO Officers, and an inspection of the commodity is planned and performed. If all the requirements are met, the certificate is submitted for issuance.

Process 3: Send ePhyto to the IPPC ePhyto Hub: The certificate is reviewed by the NPPO Officer, approved and issued. If the destination country is registered and actively receiving messages on the HUB, the system will automatically send the ePhyto to the destination country through the HUB.

Processes 4 & 5: Receive the ePhyto from the HUB: The GeNS in the importing country reads the xml from the HUB, validates the format and registers the importing ePhyto for further inspection. The GeNS is able to receive from all the countries linked to the HUB, whether the importing country has its own national system, or it uses GeNS.

Process 6: Import process - Acknowledge the receipt: The GeNS automatically acknowledges the receipt of the import ePhyto envelope, for the delivery of the certificate to be completed. In the future, the GeNS will also be able to send the SPS Acknowledgement with the status and details from the receiving country.

All of these processes are fully established and operational within GeNS.

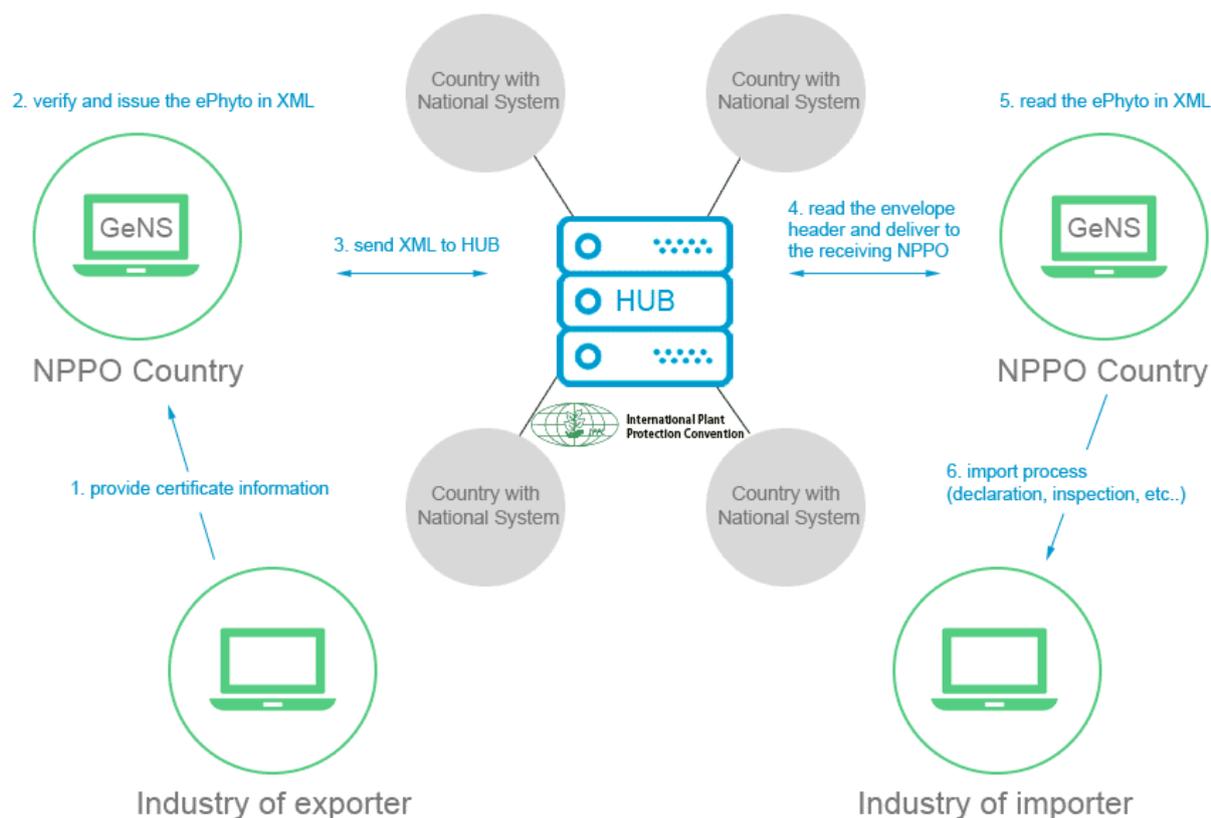


Figure 10: The standard GeNS process flow

4.7 Implementing GeNS

As GeNS is a predesigned Web services system developed by IPPC, the focus of the implementation is on the customization of the system to the needs of the NPPO, as distilled through the BPA reengineering exercise detailed in Section 4.6 and the stakeholder consultation exercise described in Sections 4.2.4.2 and 4.4. Based on this customisation, the specific rolls of the NPPO Officers in delivering the new ePhyto Service under GeNS can be established and the appropriate training and support organized for the NPPO officers and business users. Each of these aspects are described below.

4.7.1 GeNS customization

The implementing NPPO can arrange with IPPC for the customization of GeNS to its own requirements. Within this customization process, some of the key questions the NPPO will have to consider are:

- To what extent will companies be given direct access to the GeNS
 - i.e. will companies be given online access to allow them to enter PC requests directly from their local computer?
 - will they be allowed to track the progress of their application online?
 - will they be enabled to make appointments online for inspection through the system?
 - how will they be notified when an import ePhyto is received by the NPPO for one of their consignments?
 - what process would be followed if there is an error or some correction required to the PC for either export or import?
 - how can a company request a replacement PC?

- How will the internal processes for reviewing and approving PC requests be reorganized within the NPPO with the introduction of GeNS? What opportunities exist for simplifying and streamlining the existing processes?
 - How will PC related information be exchanged between the NPPO and other government agencies (such as Customs or Ministry of Agriculture)?
 - Will a parallel process for paper and ePhyto be maintained, and if so, how will this be managed?
 - Which countries will the NPPO initially focus on for ePhyto exchanges?
 - What changes, if any, will be required to the NPPO legal framework in the transition from the paper system to the new ePhyto system?

The IPPC hopes that all implementing NPPOs will fully explore the possibilities of providing companies with online access to GeNS wherever possible; simplifying processes; removing unnecessary steps; and fully embracing the paperless ePhyto concept. In particular, the possibilities for companies to interface directly to GeNS to input their PC request, to track and trace progress, to receive approvals electronically, and make an online request for replacement PCs, if required, should be exploited to the full.

The BPA processes descriptions and activity diagrams described in Section 4.5 can help enormously in the documentation of the desired new (“to be”) processes and service. In particular, the BPA Activity Diagrams provides a graphic representation of what the new process would look like compared to the old ones, and this can help greatly in discussions with NPPO staff and other stakeholders. The BPA Analyst will work with the project team to prepare these new “to be” process descriptions and activity diagrams.

Once an initial conceptualization of the “to be” scenario is documented and agreed within the NPPO, this should be discussed fully and openly with all other stakeholders. This can first be done on an individual basis with key external stakeholders such as Customs, business associations, and other government agencies, and then more openly with a full meeting of all key stakeholders.

Use of the “to be” activity diagrams is extremely helpful in this consultation exercise with external stakeholders, as they provide a clear visual picture of the steps that are being considered for the new scenario. In actuality, the activity diagrams from both the “as is” and “to be” scenarios are usually shown in parallel, to illustrate the proposed changes from the old to the new scenario.

4.7.2 GeNS roles

Specific roles and responsibilities for managing and operating the GeNS processes have been developed by the IPPC and UNICC in order to ensure the proper function of the system. These are as follows:

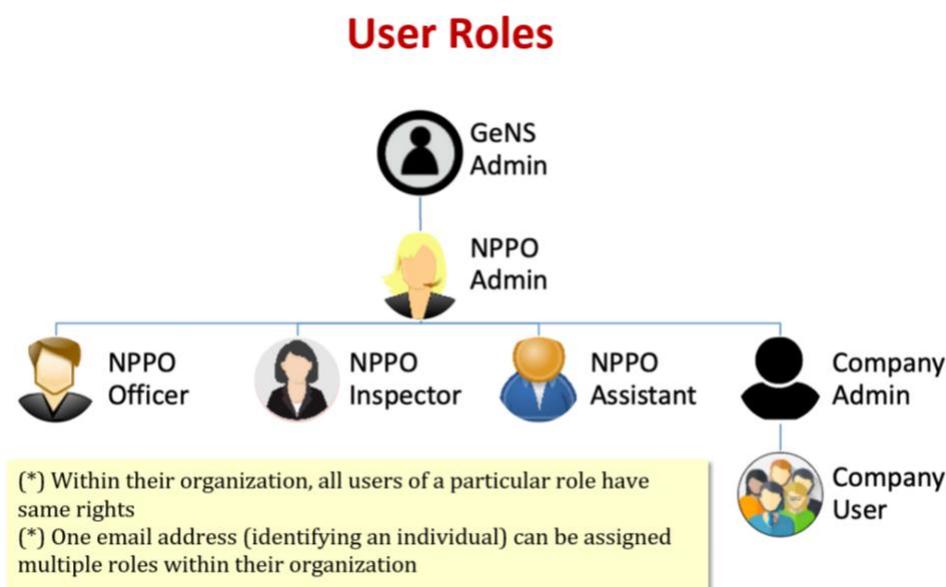


Figure 11: GeNS user roles

GeNS Administrator (UNICC/IPPC- ‘read-only’ account)

- Creates & manages NPPO Admin
- Manages technical information within the system
- Account password for NPPO Admin given over phone/SMS
- NPPO ⇌ HUB configuration
- Maintain certain lookup lists

*** Once assigned, the admin roles can only be revoked by the next higher role*

NPPO ROLES

NPPO Administrator (in-country) manages the activities at the *NPPO level* (including adding Company) and managing reference data. The Administrator also:

- Creates NPPO account
- Authorizes or de-authorizes additional users or amends the status of users
- Creates and manages Company Admin and Records
- *Can assign NPPO Admin role to another user from same NPPO***
- Creates and manages NPPO user accounts & assign them NPPO Office(s)
- Maintains the **user’s profiles** and the **list of companies**.
- Maintains certain lookup lists

Some specific tasks of the administrator include:

- Users Management: the NPPO Administrators will be able to see only users in their country, and assign the following roles: NPPO Administrator, NPPO Officer, NPPO Assistant, and Company Administrator, as well as manage the locations to which the user belongs – (Important: users can be assigned to more than one location).
- The NPPO Administrators will be able to assign roles to other NPPO users and implement delegation of rights in the event of absence.

- **Company Management:** the NPPO Administrator can create, edit, remove and de-activate companies and is also responsible for approving access for Companies that self-register. The NPPO Administrator may only manage Companies registered under their country.

NPPO Officer: This is the only role authorized to issue, withdraw or replace ePhytos:

- Issue (transmit the certificate to the hub) withdraw, replace or cancel an ePhyto
- Approve/reject an application for an ePhyto
- Create/delete an application

NPPO Officers have access to the certificate requests that are updated, reviewed and submitted by the NPPO Inspector.

NPPO Inspector: In-field inspectors:

- Update the certificate requests and initiate other workflows.
- Submits request for issuance of ePhytos.
- Can view all ePhytos under his/her NPPO

The NPPO Inspector reviews certificate requests and then submits them to the NPPO Officer for further action. Inspectors have access to the pending certificate requests, submitted by the company users

NPPO Assistant: Administrative role to initiate different workflows and view all ePhytos under their NPPO. The Assistant can:

- List and search for previously issued ePhytos
- List and search for ePhytos for imported consignments
- Print paper versions of ePhytos issued
- Run reports on certificates issued and received
- View information on certificates (e.g. reports, views treatment certificates issued or received, etc.)
- Input data or other information supporting the issuance of certificates

The NPPO Assistant can create certificate requests, apply for inspection, issuance, and request to withdraw and replace certificates that have been previously issued. The Assistant can search for imported consignments and see all certificates under the assigned NPPO office locations.

INDUSTRY ROLES

Note: Provided that the NPPO has agreed to the concept of providing companies with online access to the GeNS, any company (exporter agent or the primary exporter) can request a GeNS User Account from their NPPO. The company can visit the NPPO's GeNS website and fill in an online request form & provide the necessary details (company address, registration number etc.) and submit the request for an account with an email address. The NPPO does an 'off-line' verification and then the NPPO Officer may approve the application for account. This enables the company to access the GeNS. The account that is created (for the given email address) will have company administration rights. Once approved, the company can access the GeNS to apply for ePhytos.

There are two functional roles for a company; the Company Administrator and the Company User. These are described below.

Company Administrator

- Registers the company with the NPPO
- Create and manage Company User
- *Can assign 'Admin' role to another user from the same company***
- Create and manage 'partner' company list and company users

The Company Administrator can create and add users and delegate the administration role to others within the company. The company administrator can also maintain the list of exporters and consignees (acting as agent).

Company User

- Applies for, cancels application or requests cancellation of ePhytos to initiate different workflows
- Can view ePhyto related information held under the company's account (previous ePhytos, pending applications etc.)
- Adds, views, edits, removes information related to certificate issuance (e.g. importers, commodities, etc.)
- Add/remove data supporting the issuance of a certificate

Company users are allowed to view and work only on documents for their company. They do not have visibility to other company's certificates. A Company User can create certificate requests, apply for the issuance of certificates, and request certificates to be withdrawn and replaced.

GeNS support and maintenance

In addition to the above functional roles, the NPPO will also need to decide how the GeNS system and services will be maintained and supported, and by whom. For example:

- Who will provide helpdesk support to staff/clients?
- Who will be the business/technical administrator? (access permissions, registration of users, address issues of users etc.)
- Who will define and maintain the currency of users, workflow roles, workflow users and workflow tasks?
- What reports will be obtained and how will these be used?

4.7.3 Selection and training of NPPO staff and companies

The NPPO will have to select and train existing staff members to fill all of the above NPPO roles, or hire additional staff if necessary. It has generally been found that existing staff are capable of undertaking the above roles if properly trained, as they are essentially similar to existing staff roles within an NPPO, albeit undertaken under a different and automated process.

The NPPO will also have to review and revise as necessary their Standard Operating Procedures (SOPs) for the issuance and review of PCs, in order to cover the new procedures under GeNS. Appropriate discussion, explanation and training on the new SOPs for all relevant staff will be required. A review of staff performance measurement criteria may also be necessary.

The IPPC has prepared a series of online training programmes to cover all of the key roles for both NPPO and Company users of GeNS. These are as follows:

- **GeNS for Company Users and Company Administrators:** The course is meant for the Company users with the roles of Company User and/or Company Administrator, showing the activities granted by these roles and how those actions are performed in the GeNS system.
- **GeNS for NPPO Assistants:** The course is meant for the NPPO users with the roles of NPPO Assistant, showing the activities granted by this role and how those actions are performed in the GeNS system
- **GeNS for NPPO Officers and NPPO Inspectors:** The course is meant for the NPPO users with the roles of NPPO Officer and/or NPPO Inspector, showing the activities granted by these roles and how those actions are performed in the GeNS system.

- **GeNS for NPPO Administrators:** The course is meant for the NPPO users with the roles of NPPO Administrator, showing the activities granted by this role and how those actions are performed in the GeNS system

The above courses may be accessed at <https://training.ephytoexchange.org/>

It is suggested that the training be organized in house by the project team and delivered by NPPO officers familiar with the ePhyto system. This can be complemented by trainers from the IPPC or UNICC, if required. Projects that are implemented under a donor assistance programme may also benefit from additional training resources.

On the technical level, more intensive technical training is also available for the initial set up of the GeNS, including how to set up and exchange test ePhytos in the ePhyto User Acceptance Test (UAT) environment. Generally, once a country is accepted on-board, a testing incidence is created in the UAT for that country. The Country, in coordination with the UNICC/IPPC can populate the users list and begin immediately to exchange ePhyto test certificates.

The UAT test platform for ePhyto should be used extensively throughout the training program so that officers can become fully conversant with the actual process of issuing export ePhytos and reviewing import ePhytos.

4.7.4 Establishing the necessary IT infrastructure

GeNS is a “web-services” IT system, based on “web-technology” and each location (e.g., NPPO Head Office, seaport or airport) where the GeNS is operational, it will require the following:

- good quality PCs
- file storage capabilities
- strong Internet service with good bandwidth (fiber connection if possible) and close to 100% reliability is essential
- a backup provision of Internet service is recommended.
- additional equipment required includes a scanner, printer, backup power supply, etc.

In addition, a fully documented and implemented secure backup and file storage procedure is essential. This should include both on-site and off-site storage of key ePhyto related data.

Company Users simply need a PC and good internet access (and appropriate training, of course).

It is strongly recommended that a technical Help Desk be established within the NPPO to assist users with technical questions, especially during the early days of GeNS usage. Similarly, an operational Help Desk should be established to help users with process related questions, again especially during the initial phase of implementation.

The IPPC has prepared a GeNS “On Boarding” document that basically takes an inventory of the NPPO’s ICT capacity, in order to best plan for the customization of GeNS in the country. This inventory includes questions related to:

- the NPPO’s Computer Hardware (Computers, Laptops, etc)
- the Computer operating system used (Windows, Mac, etc)
- web Browsers used
- network infrastructure (Internet access, bandwidth, backup, etc)
- file Sharing Infrastructure
- backup Capacity
- staff technical levels.

The On Boarding document is available at https://www.ephytoexchange.org/doc/On-boarding_document.pdf

4.7.5 *Legal issues*

The movement from paper-based PCs to ePhytos may require some changes to the legal framework within which the NPPO operates. This will require a thorough analysis by a legal expert within the NPPO, or this expertise may have to be brought in from the outside.

Some key questions prepared by IPPC regarding the legal framework for GeNS are as follows:

- Does your current legislation support the issuance and receipt of electronic documents?
- Does your current legislation allow for receiving electronic information from your clients?
- Do you have an electronic transaction law and does your legislation align with it?
- Does your country have the necessary legal and institutional infrastructure to handle electronic signature?
- Does your legislation address:
 - misuse of the ePhyto system
 - illegal access to the ePhyto system
 - security (e.g. does it require encryption of documents)
 - sharing information with other government agencies and international stakeholders
 - electronic transactions for evidence, information accuracy and timeframes
 - is electronic submission going to be mandatory under the law?
 - is electronic payment covered within your legislation?
 - if you require changes to your legislation who will undertake the legal changes?
 - how long will it take to make any changes?
 - does your legislation ensure you own the data?
 - does your legislation allow for the ePhyto data to be stored offshore if you are using the GeNS?
 - under your legislation how long must information/data be stored?
 - how long do you want data to be stored and accessible?

If it is deemed necessary to make changes to the legal framework and regulations to accommodate ePhyto, it is suggested that this process be started as early as possible in the project, as such changes often require government approval and this may take considerable time.

4.7.6 *Test ePhyto exchanges*

The UNICC/IPPC ePhyto solution provides a User Acceptance Test (UAT) environment to allow the NPPO to send and receive test ePhytos to and from the Hub. This is used in the testing stages when the NPPO is setting up the GeNS and before the NPPO sends live ePhytos to partner countries.

The UAT testing environment is a live system with the latest release of the system that is constantly available to test the implementation of the client application connection to the HUB. Self-Signed certificates and ad-hoc credentials can be provided in order to facilitate the activities.

Technical details of the test environment can be found in Section 4 of the HUB Web Service API IPPC ePhyto HUB v1.16 - https://www.ephytoexchange.org/doc/HUB_Web_Service_API_EN.pdf

5. Launching GeNS

Once all of the preparatory work has been completed, the NPPO is ready to launch the GeNS. The following check list has been prepared to help NPPOs in this regard:

Area	Completed (Yes/No)
Management approval to proceed	
NPPO request to IPPC to register for GeNS completed	
Stakeholder support confirmed	
Communications and outreach to Stakeholders completed	
Project Goals and Objectives agreed	
KPIs established	
GeNS BPA "as is" completed	
GeNS BPA "to be" completed	
GeNS Customization completed	
New NPPO procedures agreed and revised SOPs in place	
NPPO Roles assigned	
NPPO officers trained on GeNS	
Decision made regarding company access	
Company registrations completed	
GeNS Onboarding inventory completed	
GeNS IT Equipment in place in NPPO	
Internet Facilities established and tested	
All legal issues resolved	
All GeNS stations fully prepared	
Company training completed	
Test Exchanges successfully	
Products and countries selected for Pilot	
Selected partner countries/NPPOs notified and prepared for live exchanges	
Help Desks established (technical and operational)	
Contingency plans established	
Communications to Industry and all stakeholders completed prior to launch	

5.1 Pilot ePhyto Exchanges

When all of the above items have been completed, the NPPO is ready to exchange live ePhytos with another NPPO. It is recommended that this be done on a pilot basis initially, selecting one specific partner NPPOs for live exchanges. This allows the implementing NPPO to address any issues or problems that may arise through the pilot.

The IPPC will assist the NPPO in all the technical issues associated with sending live ePhytos through the Hub. Technical details regarding sending production ePhytos can be found in the IPPC website at https://www.ephytoexchange.org/doc/HUB_Web_Service_API_EN.pdf.

It is suggested that the pilot partner NPPO be one with which the implementing NPPO has a good relationship with and can easily discuss any problems or issues that arise. Exchanging with one of the countries with a member on the ePhyto Steering Group for piloting purposes may be a good approach as ESG members are more familiar with the technical aspects of the system.

5.2 Evaluate Pilot and Make Any Required Adjustments.

The evaluation of the pilot need not necessarily be overburdensome. Basically, the NPPO needs to know if the export ePhytos were successfully received by the importing NPPO and if so, were there any technical issues with them. Similarly for import ePhytos. Further, it is important to review how the processes worked internally within the NPPO, and how this process works with the exporter or importer, as the case may be. A joint review by all parties involved in the pilot is recommended. A check list for assessing the success of the Pilot exchanges is presented below:

Area/Issue	Yes/No	Comment / Remedial action
Were all export ePhytos transmitted and received successfully?		
Were all re-export ePhytos transmitted and received successfully?		
Were all import ePhytos received successfully		
Was it possible to make changes or amendments to ePhytos?		
Was it possible to cancel or withdraw ePhytos?		
Were any replacement PCs issued and if so how did this work?		
Did the ePhyto SOPs provide an accurate guide to the new processes?		
Do any internal processes need to be further amended? If so, which ones?		
Was the NPPO IT equipment adequate for the job?		
Did all NPPO post implementation of GeNS work successfully		
Was the Internet service adequate?		
What was the uptime for Internet percentage wise?		
Were any training gaps identified?, be specific		
Were there any issues or problems issuing paper PCs?		
Were any unexpected delays encountered? If yes, please explain.		
Were companies able to access the GeNS system OK?		
Did companies indicate any specific issues or problems?, be specific		
How well did the Help Desks function?		
List any other issues , problems , or comments that emerge from the pilots.		

5.3 Moving to full ePhyto implementation

The transition to full implementation of the GeNS follows logically from the pilot. Clearly the potential is to exchange ePhyto with all other countries that have implemented ePhyto and the list of these countries is growing daily. It is up to the NPPO to decide with which countries they will exchange

ePhytos. It is likely that the NPPO will take this incrementally, and start exchanging with the top priority countries with which they export or import plant and plant products. It is noted that the European Union has implemented ePhyto through TRACES and this automatically gives any NPPO implementing the GeNS the capacity to send export ePhytos to all 26 EU member states.

6. Project review and evaluation

Upon completion of the GeNS implementation project, and certainly within 6 to 12 months of the launch of live ePhyto exchanges, a formal review of the project, via benefit analysis, should be undertaken. The purpose of this review will be to assess the extent to which the project reached its stated goals, objectives, and KPIs; to evaluate the effectiveness of the new process put in place for the GeNS, to assess the functioning of all related equipment and IT infrastructure, to consider lessons learned, and to determine what steps might be taken to enhance the performance of GeNS for the future.

Specific areas which could be covered in this review are as follows:

- The number of ePhytos (export and import) exchanged, both in absolute terms and as a percentage of the total PCs for the country
- The ease in which changes, retractions, deletions and replacements of PC's were made
- The extent to which the project reached its stated goals, objectives
- The extent to which the KPIs were met, with specific measurement in terms of cost, time and other factors identified in the original KPIs
- The level of satisfaction of the Company Users of the system
- The level of satisfaction of other stakeholders
- An evaluation of the Help Desk performance, both technical and operational
- An assessment of the value (savings) generated by the GeNS, in terms of cost and time saving and also in relation to the value of goods saved through more immediate release
- Assessment of the training provided and any suggestions for enhancement
- The effectiveness of the communications program
- The extent to which stakeholders felt engaged in the process
- The adequacy of the ICT infrastructure
- The extent to which the internet service was available
- The adequacy of the legal framework
- The adequacy of the NPPO staff and company training
- The comprehensiveness of the new SOPs, and the level of adherence to these
- Review of the level of expenditures on GeNS implementation compared to expected expenditures - and the capacity to cover future expenditures
- The consideration of the value of moving to a national system sometime in the future
- Overall assessment of the GeNS - and indication of any areas that may require strengthening
- Suggestions for enhancement of the GeNS from the user community

A survey of users would be a useful compliment to the above exercise, along with a formal meeting of all stakeholders to discuss the operation of the system over the past period 6 months to one year. In addition to providing feedback to the NPPO, such a meeting is also an opportunity to promote the service and to promote the future direction in which the NPPO may develop service in the future.

6.1 GeNS Implementation Review and Enhancement

In addition to the above first formal review of the GeNS implementation, it is suggested that an ongoing review process be established, with a formal meeting of stakeholders held on an annual basis.