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Terminal Report

FAO/MULTILATERAL TRUST FUND

AN EPHYTO SOLUTION: ENHANCING SAFE TRADE IN PLANTS AND PLANT PRODUCTS THROUGH INNOVATION

GLOBAL

PROJECT FINDINGS AND RECOMMENDATIONS

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

ROME, 2020

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Report prepared for
the participating governments
by
the Food and Agriculture Organization of the United Nations

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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PROJECT INFORMATION

Beneficiary Global
Project number and title PROJECT: MTF/GLO/688/STF AN EPHYTO SOLUTION: ENHANCING SAFE TRADE IN PLANTS AND PLANT PRODUCTS THROUGH INNOVATION
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Implementing Agency International Plant Protection Convention (IPPC) Secretariat
Partners United Nations International Computing Centre

LIST OF ABBREVIATIONS

BPA:	Business Process Analysis
CITES:	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CPM:	Commission on Phytosanitary Measures
ePhyto:	Electronic Phytosanitary Certificate
ESG:	ePhyto Steering Group
GeNS:	Generic ePhyto National System
HTTPS	Hypertext transfer protocol secure
IAG:	ePhyto Industry Advisory Group
IATA:	International Air Transport Association
IPPC:	International Plant Protection Convention
ISPM:	International Standard for Phytosanitary Measures
LTU:	Lead Technical Unit
MoU:	Memorandum of Understanding
NPPO:	National Plant Protection Organization
OIE:	World Organisation for Animal Health
P-IMA:	Prioritizing SPS Investments for Market Access
PAC:	Project Advisory Committee
PC:	Phytosanitary Certificate
PTC:	Project Technical Committee
SOAP:	Simple Object Access Protocol
SSL:	Secure Socket Layer
STDF:	Standards and Trade Development Facility
SWIFT:	Society for Worldwide Interbank Financial Telecommunication
TIR:	Transit International Routier (International Transport of Goods)
TLS	Transport layer security
UN/CEFACT:	United Nations Centre for Trade Facilitation and Electronic Business
UNCTAD:	United Nations Conference on Trade and Development
UNESCAP:	United Nations Economic and Social Commission for Asia and the Pacific
UNICC:	United Nations International Computing Centre
UNNEtT:	United Nations Network of Experts for Paperless Trade and Transport in Asia and the Pacific
UNOPS:	United Nations Office for Project Services
WCO:	World Customs Organization
WTO:	World Trade Organization

1. EXECUTIVE SUMMARY

The project established a central server (referred to as a “Hub”) to facilitate the exchange of electronic phytosanitary certificates (ePhytos) between “contracting parties” or National Plant Protection Organizations (NPPOs), as well as a simple web application for the production, sending and receiving of ePhytos referred to as a Generic ePhyto National System (GeNS). The Hub is a means to simplify and standardize the exchange of certificates by eliminating the need for bilateral agreement on the factors for the exchange. The GeNS provides countries that do not have their own national system with a simple method of implementing the use of electronic certificates for trade in plants and plant products. Together, these two main components are referred to as the ePhyto Solution, which represents an alternative to the current practice of exchanging paper certificates or achieving electronic certificate exchange through costly and time-consuming bilateral agreements. The third component is the establishment of a harmonized method for the exchange, which is embodied in the XML mapping document. The establishment of the ePhyto Solution improves the security of official communications between countries, improves trade flows by facilitating improved border access for plants and plant products, reduces cost and complexity for countries developing individual systems for electronic data exchange, decreases the use of fraudulent certificates and removes the need for countries to engage in costly negotiations to establish the necessary exchange protocols on a country-by-country basis.

2. BACKGROUND

The **International Plant Protection Convention (IPPC)** is a multilateral treaty dating back to 1952 that is overseen by FAO. It aims to secure coordinated and effective action to prevent and control the introduction and spread of plant pests and plant products. The Convention extends beyond the protection of cultivated plants to the protection of natural flora and plant products. It also takes into consideration both direct and indirect damage by pests, and therefore includes weeds.

The Convention created a governing body comprising each party, known as the **Commission on Phytosanitary Measures (CPM)**, which oversees the implementation of the Convention. As of August 2017, the Convention has 183 contracting parties. The Convention is recognized by the World Trade Organization (WTO)’s [Agreement on the Application of Sanitary and Phytosanitary Measures](#) (the SPS Agreement) as the only international standard-setting body for plant health.

While the IPPC’s primary focus is on international trade involving plants and plant products, the Convention also covers research materials, biological control organisms, germplasm banks, containment facilities, food aid, emergency aid and anything else that can act as a vector for the spread of plant pests, for instance containers, packaging materials, soil, vehicles, vessels and machinery.

Since the late 1970s, exporting countries have relied on paper phytosanitary certificates to provide assurances that the plant or plant product being exported to another country meets the phytosanitary requirements of the importing country. Phytosanitary certificates are issued by a country’s NPPO based on an International Standard for Phytosanitary Measures (ISPM) adopted by the CPM. Although this system has been employed relatively efficiently through the years, the smooth and efficient facilitation of trade has often suffered due to a number of issues related to the use of paper phytosanitary certificates.

There are a number of inefficient processes in place, such as the fact that the use of paper is labour-intensive and highly manual, with physical paperwork being couriered around and often re-entered. One study recently carried out by Union Fleur showed that in the cut flower industry, non-compliant documents triggered a higher number of import rejections than actual plant health issues (such as harmful organisms). In addition, vast numbers of emails are sent – in the grains industry alone, more than 275 million emails are sent annually to process the estimated 11 000 shipments of grain transported on the ocean worldwide. Any re-issuing of paper phytosanitary certificates has a significant cost for business in terms of both time and money. While clearance is awaited, in the form of paper certificates, commodities deteriorate, while customer make claims for late deliveries or low quality as a result. Mountains of paper, much of it expensive, are produced, printed, stored and destroyed on an annual basis. In addition, paper certificates can be lost, stolen or damaged, as well as forged or faked.

To take advantage of technological developments, and in recognition of the fact that a number of countries were beginning to develop unique systems of their own, the CPM adopted an annex to ISPM 12 (*Phytosanitary Certificates*), which describes the use of ePhytos at CPM-9 (2014). With the development of the WTO's Trade Facilitation Agreement, even more emphasis was placed on using technology to facilitate trade in plants and plant products.

As noted above, a number of developed countries were already embarking on the development of electronic phytosanitary certification systems of their own. While none of these had reached the point at which actual sending and receiving was taking place, a couple of countries recognized that the continued development and implementation of "point-to-point" systems would be costly (as much as USD 120 000 to establish and between USD 20 000 and 100 000 annually to maintain) and began to advocate with the IPPC Secretariat for a harmonized approach to electronic certification. In many respects, this approach is much easier for the IPPC Community than for the other three so-called "SPS Sisters", as the IPPC in effect relies only upon two certificates – the phytosanitary certificate (PC) and the re-export certificate. Codex Alimentarius and the World Organisation for Animal Health (OIE) continue to grapple with a number of different certificate formats. In addition, no developing countries were engaged in putting together an electronic certification system, for obvious reasons, although the United Nations Conference on Trade and Development (UNCTAD) had unsuccessfully attempted to develop a system for sending certificates from Eritrea to the Netherlands.

After reviewing the status of electronic phytosanitary certification, The IPPC Secretariat determined that: 1) harmonization of the technology would be the most cost-effective and technologically efficient way forward for all members; 2) any system to be developed should be completely accessible for any country choosing to use it; and 3) access and use of the system for both sending and receiving ePhytos should be free to developing countries. There was overwhelming agreement among the members of the IPPC Community that facilitating access to and use of an ePhyto system would greatly benefit developing countries, helping them to gain access to the markets that might have the greatest economic impact upon their domestic economies.

It is worth noting that although considerable harmonization work took place in the IPPC Community before the STDF grant for the IPPC ePhyto Solution was awarded, STDF funding was clearly needed to develop the systems (Hub and GeNS). The STDF project built on the platform of harmonization.

The IPPC Secretariat applied for and received a project grant from the STDF in December 2016. Work began immediately on the project, while in January 2017 the IPPC Secretariat undertook a global survey to assess the readiness of a number of countries to participate in ePhyto development, either as a pilot country in the pilot phase or for implementation over the next few years.

By March 2017, technical developments were completed, allowing for the preparation of the Hub piloting effort. Nine countries joined the pilot in early October 2017 by connecting their existing national systems to the Hub. These pilot countries were at different stages of testing exchanges of certificates, with some commencing the exchange of certificates for consignments in the full production environment in early January 2018. On 15 June 2018, the IPPC ePhyto Hub component of the ePhyto Solution was launched in full production.

The IPPC Secretariat and the United Nations International Computing Centre (UNICC) finalized contracting for the development of the GeNS in late January 2018. Prior to its selection as the developer of both the ePhyto Hub and the GeNS, UNICC first attempted to work with UNCTAD to review the feasibility of using ASYCER as a GeNS. Unfortunately, ASYCER failed to provide a proposal for consideration, despite numerous requests, causing a lengthy delay to the beginning of work on the GeNS. As a result, the piloting of the GeNS in Sri Lanka, Samoa and Ghana suffered a slight delay in launching. However, the GeNS component of the ePhyto Solution was opened to all interested IPPC contracting parties as of 15 July 2019.

3. PROJECT GOAL

The overall goal of the project was to provide any interested country with the opportunity to exchange ePhytos in order to facilitate safe and efficient trade in plant products. Electronic data exchange has become the norm in business in the past several years for a number of reasons, most importantly the higher rates of speed and efficiency associated with digital technology. It is clear, therefore,

that not only industry but also NPPOs should begin to focus on ways to expedite trade in plants and plant products, while maintaining the standards for safety that have been developed over the years.

The project's goals were accomplished through a logical process. Even before the STDF-funded project began, the IPPC Secretariat and the ePhyto Steering Group (ESG) concentrated on digitally harmonizing the ePhyto Certificate. Once this was accomplished, concurrent to the beginning of the project, the next step was to demonstrate the proof of concept, i.e. that digitally harmonized phytosanitary certificates could be exchanged electronically, and, subsequently, to show that the exchange could take place not only by slightly adjusting the technical characteristics of unique national systems but also through the use of a web-based platform (the GeNS). The final result is, until now, a wholly unique system through which both developed and developing country NPPOs can efficiently exchange phytosanitary certificates electronically through a centralized Hub.

The significance of this development is that while the leading *developed* countries that were previously producing electronic exchange processes and were able to afford the investment in building systems (which, did not allow mutual exchange for both sending and receiving phytosanitary certificates), developing countries keen to expand their export opportunities in plants and plant products, as a result of the opening of world markets following the implementation of the SPS Agreement, were nevertheless forced to continue to use paper certificates, with all of the inefficiencies and problems noted in Section 2 above.

As a result of the development of the web-based GeNS, developing countries are now coming onboard the ePhyto Solution at an increasing rate, meaning that they are able to issue and receive ePhytos on a basis equal to any developed country. This, in turn, eliminates a number of the problems associated with the issuance of paper certificates in developing countries, a number of which have been described in STDF reports on facilitating safe trade in Southeast Asia and southern Africa. For a producer in a developing country, the capacity to ensure that a product reaches a market, in particular a foreign market, is an achievement in itself. Ensuring that the product reaches the market even more quickly, as the PC arrives before the shipment, means that there is a reduced likelihood of product delay and/or damage, given that the speed of the transaction has increased. In addition, for an importing NPPO, in either a developing or a developed country, the receipt of an ePhyto prior to the arrival of the shipment means that the often understaffed NPPO and customs officials can arrange, within a sufficient time frame, the work schedules that will, in turn, result in cost savings.

4. PROJECT IMPLEMENTATION AND MANAGEMENT

Primary responsibility for the implementation of the project rests with the IPPC Secretariat. The technical work to build the ePhyto Hub and develop the web-based GeNS was contracted to UNICC, which is located in Geneva, Switzerland.

The development and implementation of the project was attributed to the Bureau of the Commission on Phytosanitary Measures, which in turn gave the detailed management responsibility to the IPPC ESG, which also acted as the Project Technical Committee (PTC). The ESG/PTC comprised members from the seven FAO regions, UNICC and the IPPC Secretariat, with the occasional participation of a member of the CPM Bureau. The ESG conducted monthly teleconferences and held face-to-face meetings twice a year. The monthly teleconferences allowed for an ongoing monitoring of the project's development and a full evaluation of the actions taken within it. An independent Industry Advisory Group (IAG) was established to provide practical guidance and advice to the IPPC Secretariat on the design, development and deployment of an ePhyto Solution that would work for industry groups in the trade of their plants and plant products.

An additional Project Advisory Committee (PAC), made up of other international organizations, a member of the ePhyto IAG, representatives of the STDF and an STDF donor member, provided a platform through which the IPPC could provide updates to those organizations on the project's progress, as well as sharing information on developments. All technical decisions regarding ePhytos were made through consensus of the IPPC ePhyto Steering Group, and subsequently reported to the CPM Bureau, as well as in annual reports to the CPM.

5. PROJECT OBJECTIVE, OUTPUTS AND ACTIVITIES

a. Project objective

This project sought to improve the capacity of countries to facilitate safe, secure and efficient trade in plants and plant products through the establishment of a global framework for electronic phytosanitary certification. The system, the ePhyto Solution, was established and is now fully operational and accessible to all contracting parties wishing to join. The ePhyto Solution can be considered an unqualified success. Approximately 45 countries are exchanging ePhytos in real-time production, with a further 50 in the process of becoming active. No technical breakdowns have so far been experienced in the system, which in its current configuration is processing approximately 11 000 certificates per month and has the capability to handle 100 000 certificates per day. This number represents approximately twice the estimated number of phytosanitary certificates issued per year. In addition, Argentina and Chile have gone fully paperless in their PC exchanges thanks to the ePhyto Solution.

The onset of the Coronavirus pandemic in early 2020 added a new dimension to the development of the ePhyto Solution, in the sense that it provides additional validation to the necessity of transitioning PC exchanges from a paper-based to a digital system. A number of countries have been willing to accept alternative certificates such as PDFs, faxes or emailed copies, however these arrive with no certainty as to their validity. The ePhyto Solution offers a secure and robust means for certificate exchange that provides the user with much greater certainty and accuracy than any of the hastily adapted alternative methods.

Accomplishments:

1. Finalization of project and service agreements with UNICC regarding the design, construction and operation of the Hub and GeNS.
2. The design and operating rules (schema, codes and lists for the certificate, web services to facilitate the exchange, etc.) of the ePhyto Solution were completed by the PTC.
3. The Hub was brought into operation after being successfully tested. A pilot was conducted between October 2017 and March 2018, which included nine participating countries. During the pilot, around 10 000 certificates were exchanged. Two technical evaluations were conducted during and at the close of the pilot. Based upon the recommendations of the pilot participants and the PTC, a number of adjustments were made to the operation of the system and the pilot was closed. The ePhyto Hub became fully operational on 15 June 2018. Additional countries with national systems capable of producing ePhytos have been and continue to be onboarded, with a total of 90 countries registered as of May 2020, and a number of additional countries expressing their interest in joining on a frequent basis. In view of the crisis in trade facilitation stemming from the global COVID-19 pandemic, it is expected that a significant number of countries will be focused on joining the system.
4. The GeNS is fully operational. Piloting of the system took place from the third quarter of 2018, with full operations beginning on 15 July 2019. It was subsequently rolled out to pilot countries in a number of phases. A schematic of the roll-out is presented below.
5. The IPPC Secretariat, together with PTC members, also worked with GeNS pilot countries and UNICC in the development of technical tools to assist in the implementation of ePhyto in supporting improved trade facilitation and border management. Examples of these efforts include developing electronic data-sharing options between border agencies to improve trade procedures, increased data analysis and advanced information to support improved risk management based upon the electronic data delivered by ePhytos.
6. A consultant completed an analysis of potential business models in order to support the sustainable long-term operation of the ePhyto Solution. These are discussed in greater detail in Section 7. The consultant reviewed a number of potential options for cost recovery and led a meeting of business experts, as well as representatives of other international organizations and members of the CPM Bureau, to review the different options. The meeting was followed by further consultation with the PTC. The consultant suggested that the ePhyto Solution may be best supported by donor funding for at least the first five years of operation until the costs of operation, the full impact of implementation of the Solution and a thorough analysis of the costs and benefits to both governments and the trading community can be fully developed.

Financial projections from March 2020 indicate that the ePhyto Solution has sufficient funds to remain fully operational for a further period of two years after the completion of the STDF project, based on current donor contributions alone. Additional expected contributions, decreased operating costs passed on by UNICC, as well as potential partnerships with the other two SPS "Sisters" and/or other international certification bodies provide a strong basis and foundation for sustained operations into the future.

7. A five-year strategic implementation and operating plan based upon the recommendations in the business model was developed by the IPPC Secretariat and the PTC and was presented to the CPM Bureau in October 2018. The plan was endorsed by both the CPM Bureau and the IPPC Strategic Planning Group in October 2018, and was presented and approved by the entire CPM in April 2019.
8. As part of the overall effort to provide training and guidance, a number of regional workshops were held (Pacific Islands, Latin America, Caribbean, sub-Saharan Africa, Asia-Pacific), as well as a Global Symposium hosted by Malaysia. An additional regional workshop for the Middle East and North Africa region was expected to be held virtually in May 2020, however, owing to a number of factors, this did not take place.
9. Online training materials for the GeNS, developed by the ESG/PTC and UNICC with funds provided through the present project, became available by the end of April 2020.

b. Output 1: Establishment of the contract for the ePhyto Solution

After careful consideration of the CPM's recommendations and taking into account the concerns of contracting parties regarding inviolability of data, confidentiality, cyber-security and the neutrality of the server's location, the IPPC Secretariat selected UNICC as the lead technical unit for the IPPC ePhyto Solution, including the selection, hosting and long-term maintenance of the GeNS and Hub.

FAO, through its Chief Information Office and UNICC, have an existing open-ended memorandum of understanding (MoU) for computer services. The MoU represents the general basis for services provided by UNICC to FAO and includes provisions for assumption of liabilities, etc. The MoU also provides a framework for the establishment of agreements, as needed, that outline the details of the specific IT services provided by UNICC to FAO.

Key development tasks of the component include:

Establishment of a project agreement

A specific time-limited project agreement was established between FAO and UNICC for the design, selection and development of the GeNS and the Hub, as described in Components 2 and 3.

Establishment of a service agreement

Following the development of the GeNS and Hub, a separate service agreement was established, providing for the piloting, hosting and long-term operation of the ePhyto Solution, as described in Components 2 to 4. Elements of the agreement include the service description, requirements for network infrastructure, redundancy and backups, disaster recovery, security and data confidentiality, event management, incident management, operating system changes, maintenance windows and processes for communication.

Expected deliverables under Component 1 include:

- Project Agreement FAO/UNICC
- Service Agreement FAO/UNICC

c. Output 2: Establishment of a GeNS for the production, sending and receipt of electronic certificates.

A web-based GeNS was developed, allowing countries without existing systems to produce, send and receive ePhytos.

The web-based system is a practical solution for developing countries or countries with limited trade that do not have the resources or capacity to establish and maintain their own server-based electronic system. As well as providing them with an easily accessible off-the-shelf solution, the GeNS has the advantage of being centrally maintained and upgraded. **No costs are incurred by the users for upgrades and maintenance.**

Some countries, however, have legislative requirements that require that data be maintained within the country. A web-based system would maintain data records at a central server outside of the country. To facilitate the adoption of the GeNS by countries with such legislative requirements, the feasibility of deploying the GeNS as a stand-alone system in a country was also examined and found to be feasible. Both web-based and in-country systems were deployed in order to facilitate the requirements and needs of individual countries.

Key development tasks of the component included:

Finalization of the specification

General features and operating conditions for the GeNS:

Compatibility with ISPM 12 (Appendix 1);

Ability to communicate with the international Hub and exchange phytosanitary certificates with participating countries;

Capability to produce both electronic and paper certificates;

Ability to authorize different parties that may have differing access requirements;

Capability to guarantee the identity of the sender;

Capability to send, receive and store certificates;

Security features;

Ability for business to input data;

Flexibility allowing system expansion such as ad hoc reporting, interoperability with and data transmission across other government or business systems.

These features were refined to define the specific scope of operating conditions that are achievable within the limits of the budget available in the project, over and above basic functions, such as the extent of storage or the extent of reporting.

Review of ASYCER for use as a GeNS

Prior to the selection of UNICC as the developer of both the ePhyto Hub and the GeNS, UNICC first attempted to work with UNCTAD to review the feasibility of using ASYCER as a GeNS. UNICC intended to draft a recommendation outlining the technical and financial feasibility of using ASYCER. The IPPC Secretariat also intended to assess the non-technical/business support requirements of such a venture. The requirements and the related assessment grid/template were to be prepared by the project manager, in consultation with the relevant PAC members and the STDF Secretariat. This included aspects such as the ease with which the system may be used by developing countries, the track record or experience in working with developing countries, the capacity to undertake advocacy and support business changes in developing

countries, the compatibility with other e-certificate systems and other industrial or business benefits. Unfortunately, ASYCER failed to provide a proposal for consideration, despite numerous requests, causing a lengthy delay to the beginning of work on the GeNS.

Evaluation of other options for use as a GeNS

Given that the development of a reconfiguration of ASYCER for use as the GeNS proved a time-consuming and unworkable option, a speedy consideration and assessment of other existing software that could be reconfigured for use as a GeNS was carried out. In the interests of time, the ESG and the IPPC Secretariat determined that UNICC was best placed to construct the GeNS, in addition to the Hub, based on criteria such as the alignment with Appendix 1 of ISPM 12, security features, the cost-effectiveness of the system, the ease with which it might be reconfigured to achieve project specifications, the long-term adjustment and upgrading costs, support costs (including training elements) and usability.

Reconfiguration of an existing system

Following this decision, UNICC immediately began reconfiguring the selected system for operation.

Expected deliverables under Component 2 include:

- Specifications for GeNS
- Non-technical/business support requirements list and assessment template
- Assessment report for ASYCER
- Evaluation report of additional providers, if necessary

As stated in Section 5A above, a number of regional workshops were held (in the Pacific Islands, Latin America, Caribbean, sub-Saharan Africa and Asia-Pacific). These workshops not only provided an introduction to the IPPC ePhyto Solution, but also served as hands-on training for participating countries to become familiar with the system and initiate their participation. A number of countries registered for the ePhyto Solution as a result of these workshops, with some, such as Fiji and Jamaica, quickly became users of the GeNS system in production. These countries have, in turn, provided support and guidance to other countries in their respective regions on how to access and use the GeNS.

d. Output 3: Establishment of an internationally accessible hub for ePhyto exchange

The component established and made operational an internationally harmonized system for the exchange of ePhytos – the ePhyto Hub. This eliminates the need for countries to set-up costly individual bilateral agreements for transmission of data, reduces development costs and allows for ease of transmission and receipt of certification information for any country that has accessed the system.

Initial development focused on a simple exchange process. Additional features and complexity are being added over time. However, the design for the exchange of ePhytos only focuses on exchanging the data prescribed in Appendix 1 of ISPM 12, without adding obligations beyond those currently required for paper phytosanitary certificates.

1. Key development tasks for this component include:

(i) Finalization of the specification

2. General design specifications included:

(ii) Use of UN/CEFACT provides a consistent XML schema to ensure standardization of the elements of a phytosanitary certificate. It also includes considerations for the re-export of phytosanitary certificates. In this way, the use of the schema ensures that certificates are exchanged in a manner readable to all NPPOs.

- (iii) Communication by way of a Simple Object Access Protocol (SOAP), a messaging protocol that allows programmes that run on disparate operating systems.
- (iv) Authentication and security of the system occurs through Secure Socket Layer (SSL) client certificates, a digital certificate that authenticates the identity of a web site and encrypts information sent to the server.
- (v) The certificate should be transferred inside an envelope containing only basic information that is readable to the Hub (the identity of the sender, the identity of the recipient, etc.)
- (vi) Receiving NPPOs should have the possibility of ensuring that the envelope is delivered to a secure receiving system or, alternatively, may choose to pull a group of envelopes from the Hub.
- (vii) Messages are only stored on the Hub until they are received by the recipient.
- (viii) A draft work specification was prepared, with codes and details were finalized with UNICC.

3. *Establishment of the Hub*

- (ix) UNICC established the Hub based on the design specifications proposed and agreed upon by the PTC and discussed with the PAC.
- (x) Internal testing of the service, using dummy data transferred from a mock GeNS, was also undertaken to ensure consistent operation of the Hub. UNICC validated transfers using fictional data transferred between two volunteer countries.

4. *Development of a user policy framework*

- (xi) To support responsible connection and use of the Hub, a user policy framework was developed which outlines the responsibility of parties, delimits the scope of liability of parties, provides data access rights, processes for authentication, archiving, etc. The framework includes a legal user compliance acknowledgement that countries will be required to accept before accessing the Hub. Existing good practices and policy frameworks for the use of relevant electronic data transmission systems (such as those developed by UN/CEFACT, the International Air Transport Association (IATA), UNCTAD, etc.) were reviewed to inform the development of the framework.

Expected deliverables under Component 3 include

- Specifications for ePhyto Hub
- User Policy Framework

e. Output 4: Establishment of a fully operational ePhyto Solution

A pilot consisting of approximately ten countries was carried out, which included participants from developing countries. The pilot tested the operation and usability of the GeNS and the efficiency of the Hub in communicating between the GeNS and the systems built by national governments that were connected to the Hub. In addition, the pilot collected data on the operating costs of the ePhyto Solution. This data has been taken into consideration in the process of determining a cost recovery mechanism, as it allowed a more accurate estimate of the cost and efficiency of operation of the ePhyto Solution. A detailed evaluation plan was developed by the PTC to assess the efficiency, usability and performance of the Solution.

1. Key implementation tasks of this component include:

- (i) *Selection of pilot countries*

A survey was initiated by the IPPC Secretariat to determine the preparedness of countries for participation in the ePhyto Solution. The survey was conducted between mid-December 2015 and mid-January 2016. Countries were evaluated on trade volumes, resource availability, legislative readiness and available

infrastructure. Some non-quantitative factors were also considered, such as the willingness to participate and volumes of trade with other pilot countries, among others.

Candidate countries were grouped in two categories: (i) countries with existing systems for piloting of the Hub, and (ii) countries without an existing system for piloting of the GeNS with its subsequent connection to the Hub.

While the selection of countries for the Hub pilot was mostly based on data collected from the survey and did not require an in-depth, in-country assessment, there was a need to consider aspects such as the balance between countries with existing systems and those planning to use the GeNS. Regional representation and a good working level of English were also key criteria in the selection process, as configuration of the Solution during initial piloting was to be limited to English.

A short list of countries for both the Hub and GeNS pilot was drawn up, identifying the "best fit" countries for implementation of the ePhyto Solution immediately following development. The "best fit" countries were those requiring minimum capacity development to implement the ePhyto Solution. Specifically, the countries corresponded to the following criteria:

- i. required no/minimal assistance to adapt their existing national systems to connect to the Hub;
- ii. required minimal business process re-engineering for deployment of the GeNS on a pilot scale;
- iii. had sufficient resources to support testing;
- iv. had sufficient trade to demonstrate that the Solution is operating effectively.

The decision to use the "best fit" approach in the selection of pilot countries aimed to allow for focused assessment of the technical functionalities and usability of the Solution, thereby allowing a rapid release of the ePhyto Solution for uptake following the pilot phase.

The final selection of countries to participate in use of the GeNS was based upon assessments of a candidate country's readiness to participate relatively quickly in the implementation of a system. PTC members performed these assessments based upon preliminary assessment questionnaires developed by the PTC. The questionnaires aimed to enable a rapid situation analysis and a limited Business Process Analysis (BPA) that would allow the PTC to rank the shortlisted countries based on their readiness. Assessments during this phase also served to evaluate the need for trained facilitators to facilitate an in-country assessment or BPA and the usefulness/appropriateness of the assessment questionnaires. It also helped to identify the need and scope of additional resources that might be required for effective capacity-building in the area of readiness assessment. Lessons learned from the in-country assessments will be documented by the project manager and the PTC. These findings will inform the gap analysis and setting of priorities under Component 5.

A report summarizing the outcomes of the survey and proposing the final list of countries for the pilot was prepared and presented to the CPM for review. Input from the IAG was also requested and provided.

Once the final selection of pilot countries was made, the countries in question were notified and committed themselves to participation. The target of approximately eight countries using existing national systems to pilot the hub and one to three countries to pilot the GeNS and the Hub was achieved.

(ii) Pilot testing of the GeNS

Account configurations, authorizations, etc. were managed by UNICC as part of the service agreement. A comprehensive user guide was prepared by UNICC, in consultation with the PTC. The pilot testing of the GeNS in selected countries focused mainly on usability and technical testing. The pilot initially targeted a limited set of the phytosanitary certification activities in the pilot country. Subsequently, the pilot countries, as well as new GeNS users, have provided an almost constant stream of proposed enhancements and

improvements for the GeNS, underscoring the success of the effort as well as the potential for technical growth in the system.

PTC members and the GeNS pilot NPPOs worked with stakeholders to implement exchanges on one or more commodities. This allowed a first assessment of the usability of the system and its technical robustness, while preparing for expansion to the full scope of country use. During this phase, a core group was coached to use the GeNS and an assessment made to gauge the extent to which additional guidance and training materials were required for use of the system. This assessment included a determination as to the need for tailor-made training resources, according to a number of audience groups (a “training of trainers” package to be used by NPPOs, private sector-targeted training, etc.). The assessment drew on feedback collected in the country, but also on monitoring of helpdesk requests following the in-country kick-off visit.

After the pilot testing of the ePhyto Solution was completed and the required changes introduced to the system, the GeNS became fully operational. Pilot countries have continued to build upon the competencies acquired during the pilot phase to fully implement the use of the system more broadly (NPPO staff and operators). Further details on capacity-building resources can be found in Component 5.

(iii) Connection to the Hub

Countries that have developed national systems to exchange ePhytos have completed most aspects of business assessment, have adjusted business operations to accommodate the electronic exchanges and have experience with the ePhyto exchange process. These countries only required the technical understanding to connect to the Hub. In most cases, this was achieved with relative ease. A general specification for connecting to the Hub was developed by the PTC and provided to pilot countries.

(iv) Operation and evaluation of the pilot

The pilot, which began later than anticipated for reasons noted above in Section 5c, operated for around eight months, becoming live in July 2019. Pilot countries issued both ePhytos and paper documents during the course of the pilot. This was required in order to verify that the information transmitted was consistent between the two methods. Sufficient transfers of data using the GeNS and the Hub were also required in order to fully evaluate the effectiveness and efficiency of the systems. The project implementation team consulted with pilot countries to determine whether they felt that sufficient testing was undertaken. UNICC provided basic statistics on certificate exchanges and worked closely with the pilot countries and the PTC to identify and rapidly resolve any issues that arose during the pilot.

(v) Deployment of the ePhyto Solution and uptake

With the completion of the pilot, the ePhyto Solution was made available for any country to participate. Operational documents (design specifications and other support documents identified during the pilot phase) are available at www.ephytoexchange.org and countries with national systems may use these to connect to the Hub.

Use of the GeNS is encouraged. Countries requiring assistance with technical issues or with business process re-engineering to implement the GeNS may be provided with assistance using the resources developed under Component 6, with the IPPC Secretariat developing cooperative efforts with other organizations to facilitate implementation. Originally, it was expected that until a bridge fund could be established and replenished to assist countries requiring major support; and until capacity-building tools were fully developed and disseminated, deployment might be limited to those countries with the capacity to implement the system independently based upon user guides alone.

Surprisingly, a number of countries were more prepared than had been anticipated. This was, in part, due to the inherent simplicity of the GeNS developed by UNICC. In essence, given that all of the countries deciding to come onboard the ePhyto Solution were already issuing and receiving phytosanitary certificates, the transition from their normal work process to the GeNS was not as substantial a change as had been anticipated at the outset of the project.

Expected deliverables under Component 4 include:

- In-country assessment questionnaires
- In-country assessment reports
- Summary report for country selection (including survey results, selection criteria for Hub and GeNS, country assessment results)
- Pilot evaluation plan
- Templates (Hub, GeNS) for data collection by pilot countries (costs, statistics and operations)
- Ease of implementation feedback templates (Hub and GeNS) for pilot countries (including need for further guidance document)
- Pilot satisfaction survey questionnaires
- GeNS user guide
- Specification for connection to the Hub
- GeNS kick-off mission assessment report (including additional guidance required and follow-up actions)
- Helpdesk requests monitoring report
- Pilot evaluation report
- Other operational documents for deployment of Hub and GeNS as recommended by pilot report

f. Output 5: Development and dissemination of training, advocacy and business process re-engineering tools

A preliminary assessment of the capacity-building resources required to ensure a smooth transition of ePhyto was conducted by the PTC. This was based on extensive consultations with IPPC contracting parties and other regional and international organizations with experience in the implementation of relevant paperless trade systems in developing countries. Different types of resources were identified and grouped as follows:

- Advocacy materials: Previous experiences in paperless trade initiatives indicated that strong political will and buy-in is key to success. This project therefore produced advocacy materials to explain to policy-makers the concept of electronic phytosanitary certification and its benefits for countries.
- Readiness assessment questionnaires and situation analysis: This group of resources includes different types of materials, such as questionnaires aimed at providing a quick assessment of the level of readiness of countries to adopt ePhyto, more in-depth tools e.g. BPA guides, or more specific systemic tools such as the Phytosanitary Capacity Evaluation tool, which allows the identification of cross-cutting adjustments required in the phytosanitary system to address business failures.
- Technical user guides and manuals for the ePhyto Solution: This group of resources addresses technical needs to implement the ePhyto Solution. It includes specifications on how to connect to the Hub, a user guide for the use of the GeNS, etc. However, more detailed manuals to explain the functionalities of the ePhyto Solution may also be required.
- Decision support tools: These are the tools that enable countries to take an informed decision regarding the implementation of ePhyto. They include guidance on how to conduct cost/benefit analysis, how to undertake a feasibility study and how to elaborate a business model (clients, communication plan, services, cost recovery, etc.) Other tools, such as the STDF's Prioritizing SPS Investments for Market Access (P-IMA) tool to evaluate the priority of ePhyto

implementation as compared to other investment options, can be considered among these tools.

- Business process re-engineering: These tools allow countries to prepare a workflow of the current situation and to define revised workflows that correspond to the selected business model. They also provide guidance on how to implement the changes required and to evaluate the success of the change. These tools may include an ePhyto project road map and cost recovery models.

Key development tasks of this component include:

(i) Needs assessment

The IPPC Secretariat surveyed NPPOs to gather a list of needs for basic operational and business process re-engineering training. In addition, needs for capacity-building and resources identified during the pilot phase by PTC members, pilot countries and helpdesk FAQs were considered.

(ii) Evaluation of existing resources

The IPPC Secretariat, through the PTC, sought and received resources from countries that had implemented phytosanitary electronic exchange to collect technical documents, policy briefings, legislative and business assessment and change resources, cost recovery options and business models, as well as other related documents used by those countries to implement the change.

Consultations were carried out with other international organizations, including UNCTAD and the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) – mainly with regard to the resources developed under the United Nations Network of Experts for Paperless Trade and Transport in Asia and the Pacific (UNNEXT) – as well as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Secretariat (mainly with regard to the e-permitting toolkit) and others to compile an inventory of existing resources.

(iii) Gap analysis and priority-setting

The list of topics requiring training resources (as well as the type of materials required) gathered from the needs assessment was analysed against the inventory of existing resources. Project resources were allocated to adapt/develop resources by order of priority. Any tools not developed within the scope of the project will be considered in future capacity-building activities, with project governance committees requested to identify sources of additional funding to cover these needs.

(iv) Identification of training media

The PTC also assessed the types of training media that should be employed to support implementation, including face-to-face training of NPPOs, training of trainers, web-based applications (such as videos and e-learning modules), written specifications and user guides.

(v) Development of priority tools

Technical user guides and manuals for participation in the ePhyto Solution were developed by the PTC and UNICC in advance of the pilot phase, and were subsequently amended as necessary, based on the results of the pilot. Readiness assessment questionnaires and situational analysis tools were developed by the PTC in advance of the pilot and assessed with the pilot countries prior to its initiation. These tools were subsequently refined following in-country assessments, while advocacy materials were developed both during and after the pilot.

The IPPC Secretariat also attempted to discuss with other international organizations (e.g. UNESCAP, UNCTAD, etc.) potential collaboration to develop resources and deliver capacity building. Regrettably, not all of the organizations were able or willing to engage on this topic. In most cases, this was because they did not have the required technical expertise, while in others, it was because other demands on their

resources would not allow them to participate. As a result, the PTC and UNICC developed and delivered (and continue to deliver) as much assistance as can be accommodated, when requested. The PTC/ESG worked and continues to work with international industry associations to improve advocacy for ePhyto within national industry sectors.

Tools were initially be developed in English, before being translated into French and Spanish and, ultimately, into all FAO languages.

(vi) Validation of the resources

Due to the late start to the pilot for the GeNS for reasons noted previously, validation of the effectiveness of technical and business process re-engineering tools will be undertaken by the ESG in at least two countries, with minimal infrastructure for the adoption of the ePhyto Solution, following the completion of the project. The IPPC anticipates that this validation will occur prior to the adoption of a sustainable funding mechanism by the Commission on Phytosanitary Measures, currently expected in Spring 2023. The countries selected for validation of the tools will operate in languages other than English (mainly in French) in order to ensure that the tools are effective across languages and country set-ups. The ESG/UNICC will provide the training and assist countries with undertaking the business changes required to implement the ePhyto Solution. The tools will also be posted on www.ephytoexchange.org for use by NPPOs.

Expected deliverables under Component 5 include:

- Needs assessment results (NPPO survey results, needs identified during pilot etc.)
- Inventory of existing resources
- Lists of resources to be developed/adapted
- A set of priority resources developed and/or adapted in English, French and Spanish
- Report of field-testing of training resources.

g. Output 6: Establishment of a business model for the long-term operation of the ePhyto Solution

(i) Establishment of a bridge fund

Funding provided under the project covered the development of the ePhyto Solution and its operation until the end of the pilot phase. It has also covered the production and validation (field-testing) of the training resources. Additional working capital has been provided by IPPC contracting party donations to cover running expenses related to the operation of the ePhyto Solution (hosting, maintenance, helpdesk functions for new and existing users, etc.) and to provide support to developing countries requiring major capacity-building to implement the GeNS until a cost recovery mechanism is established (see below). In order to bridge this gap, the IPPC Secretariat examined the options for creating an "ePhyto Bridge Trust Fund". Following a thorough review of what this would require within the FAO financial system, it was determined that a better and less costly approach would be to earmark funds provided by donor countries for ePhyto within the context of the existing IPPC Multidonor Trust Fund, which also has a much lower overhead than a new fund, should the latter be created (6 percent compared to 12 percent). As noted above, continuing contributions have been provided by IPPC contracting party donors and consideration is also being given to identifying non-traditional sources, such as private sector and equity investors. A number of countries and regional organizations have based their willingness to provide sustained funding for the system's operation on the fact that costs of establishment of point-to-point systems will be eliminated by implementing the Solution.

Currently, countries using the ePhyto Solution are not charged for the use of the service, as donor funding and lower than anticipated costs for the operation of the ePhyto Solution provide sufficient operating and development support. Nevertheless, the search for a suitable means of covering costs has resulted in a proposal (discussed in Section 7, below) for consideration and potential approval by the CPM.

(ii) *Development of a cost recovery mechanism*

To ensure the long-term sustainability of the ePhyto Solution, a cost recovery mechanism can only be developed using more accurate data collected after the establishment of the Solution and its pilot testing. From the outset of the project, there has never been any intention for the least developed countries to pay for use of the system. Indeed, the GeNS has been developed specifically for use by those countries without the resources and/or capacities to develop a national electronic certification system of their own. Key tasks included:

Engagement of a consultant to identify a suite of possible cost recovery mechanisms: A consultant was contracted to undertake scoping work on the cost recovery approaches used in national and international systems. This was not necessarily limited to electronic certification but encompassed other data exchange systems, peer-to-peer and electronic commerce platforms, etc. This was achieved through consultation with countries and organizations (such as the Society for Worldwide Interbank Financial Telecommunication (SWIFT)) with experience in establishing cost recovery models for similar systems. The consultant selected was highly familiar with business modelling and financing of international "shared ownership" systems. The terms of reference for the consultant were prepared by the project manager. This assignment led to the preparation of a scoping study that, in turn, served as a background document for the preparation of the expert consultation meeting (described below) and as a reference document during the meeting. The consultant also prepared a concept note for the expert consultation meeting, including a draft agenda and a list of potential experts to be invited.

Expert consultation on possible cost recovery mechanisms: Based on the outcomes of the scoping study and the meeting concept note prepared by the consultant, the project manager organized an expert consultation meeting to discuss possible options of cost recovery for the ePhyto Solution. Participants included selected countries and international organizations with experience in electronic certification and experts in finance, business models and strategy, as well as econometricians who could advise on aspects related to statistical modelling aimed at projecting trade flows, ePhyto Solution's uptake forecast, etc. The meeting was held in December 2017 in Geneva, Switzerland and focused, *inter alia*, upon:

- Data collection needs for cost estimation, including baseline (pre-implementation) data needs and post-implementation data needs. This provided the necessary input for data collection for monitoring and evaluation purposes as well as for the elaboration by the PTC of the templates for data collection to be provided to pilot countries prior the start of the pilot.
- Clarity of the benefactors and the principles of "who should pay".
- Frequency and processes for fee collection and financial management.
- Potential options for cost recovery mechanisms.
- Additional expertise required to prepare the cost recovery mechanism.

Elaboration of the cost recovery mechanisms: Once operating costs have been fully determined, benchmarked options for cost recovery were further refined and documented by the consultant. While refining cost recovery options, consideration was given to all possible pricing models (and their respective advantages and disadvantages). These include:

- (i) Establishment of a consumption-based price. In this case, a decision would be made on value-based consumption or consumption based on the number of transactions; or
- (ii) Establishment of a subscription-based price, in which case consideration would be given to a prorated charging system based upon a country's economic status.

The report documenting the proposed cost recovery mechanism (more than one option may be retained) includes the analysis of the cost structure (for operation of the system and any ongoing outreach and

capacity-building required for new participants) and the proposed pricing with possible scenarios (projections with future uptake). The report also provides fund management details, including whether or not fund management should be contracted out or carried out within FAO. The final proposed approach will be presented to contracting parties at CPM-17 (2023) for a final decision, and is covered in detail in Section 7 below.

Fund governance structure: Regardless of the option retained – i.e. fund management by FAO or by a third party financial service provider – a fund governance charter will be elaborated during the same CPM-17 (2023) session. This would include the description of the fund management structure, including administration (board of directors vs Secretariat centralized administration), legal terms, reporting and oversight by the CPM, liability and litigation procedures, investment policy, payment terms, procedures for non-payment and the collection of debt. Initially, there was a sense that a dedicated fund would be created and that each NPPO would deposit resources into this IPPC account under an appropriately and independently audited structure, as per FAO business operation rules. This was eventually rejected as the overhead costs associated with the creation of such a dedicated fund would be twice those of the current Multidonor Trust Fund (12 percent compared to 6 percent). In addition, the IPPC Secretariat has been fully capable of providing detailed financial reporting on resources contributed specifically for the purpose of supporting the ePhyto Solution.

Expected deliverables under Component 6 include:

- Report outlining options and fundraising strategy for the ePhyto Bridge Fund
- Scoping study on cost recovery schemes and a concept note for the expert meeting
- Expert meeting report
- Benchmarking report of cost recovery options and costing structure of the ePhyto Solution
- Final cost recovery options description report
- Fund governance charter

h. Output 7: Establishment of a monitoring and evaluation process

Establishment of a project governance structure

A project governance structure was established to ensure that:

- the project considers the experience and lessons learned from other developments at international level in relevant areas;
- the project's capacity development components consider the tools developed by other international initiatives and factor in any lessons learned;
- the project considers the long-term potential for alignment between international e-document initiatives, such as the World Customs Organization (WCO) Data Model, CITES e-permitting and any possible future OIE and CODEX e-initiatives.

The Project Implementation Team included:

- The Project Implementing Agency: Implementation of all activities funded under the project was under the leadership of the IPPC Secretariat. The Secretary of the IPPC, on behalf of the IPPC, held the budget designated for management of the project resources. The IPPC Secretariat provided the general administrative and financial services and project monitoring following established procedures in the FAO-ORACLE system.
- ePhyto Project Manager: Attached to the IPPC Secretariat, the ePhyto Project Manager utilized established monitoring and evaluation methods to ensure that project progress was made against agreed baselines and targets, as set in the components of the work plan. The Project Manager was assisted by a temporary staff/consultant for day-to-day implementation of the project (to address operational, administrative and other related matters).
- The Lead Technical Unit (LTU): UNICC was the LTU of the project and had full responsibility and liability for the operation of the ePhyto Hub and GeNS. This relationship was established as a result of a specific MoU between FAO (the IPPC's parent organization) and UNICC.

- ePhyto Project Advisory Committee (PAC): The PAC provided advice to the ePhyto PTC on the development and design of the ePhyto Solution, in particular with regard to linkages and synergies to developments in other areas related to electronic certificate exchange (including trade facilitation, paperless trade initiatives, customs automation, Single Window and SPS-e-Cert).

At the outset of the project, the PAC reviewed and recommended to the PTC changes to the proposed work plan. The PAC also confirmed targets and identified progress indicators. Meetings of the PAC were organized face-to-face or electronically, based on the needs of the project. Milestones requiring PAC review and recommendation include, *inter alia*:

(i) after the assessments of the service provider for the GeNS and finalization of the specifications for the Hub, as well as the pilot plan (first semester);

(ii) after the pilot phase;

(iii) during the cost recovery development, PAC members were regularly updated on progress and consulted on a number of issues in between PAC meetings.

- ePhyto Project Technical Committee (PTC): The PTC oversaw and provided technical guidance and advice to the IPPC Secretariat on the implementation of the project. The Committee was the main monitoring mechanism of the project in terms of the delivery of outputs. The PTC consisted of the IPPC ESG, which was established by CPM-8 to provide guidance in the implementation of ePhyto, as well as an expert from UN/CEFACT and other ad hoc technical advisors as required.

Note: The ESG reports to the CPM Bureau and is responsible for ePhyto activities beyond those of this project. The ESG is tasked with identifying the implementation requirements of Appendix 1 to ISPM 12; establishing processes and functions to maintain the ePhyto Solutions and a common repository of harmonized terms and codes; contributing to raising awareness, understanding and building capacity among contracting parties for ePhyto; as well as other related functions, as required.

- Industry Advisory Group (IAG): The IAG advised the project on practical aspects of project implementation from an industry viewpoint and on measuring the benefits of ePhyto for the industry.

6. CROSS-CUTTING ISSUES

a. Gender

The implementation of the ePhyto generic national system in developing countries will provide a sharper geographic focus with regard to future trade activities and promote opportunities for effective gender equality by supporting initiatives for equal employment of men and women. The investments in infrastructure, trade facilitation and competitiveness achieved as a result of the implementation of this project will reduce the cost of doing business in developing economies, while trade facilitation ensures that businesses in a number of developing countries could take advantage of international trade opportunities. The investments in "effective governance" of ePhyto will improve the operations of the public sector, which may provide a sound regulatory environment for stronger growth in the private sector. As such, men and women will have extended opportunities to be employed in agricultural and ePhyto (IT systems) activities.

b. Environmental aspects

The most significant environmental aspect directly associated with the global implementation of the IPPC ePhyto Solution will be the reduction in the use of paper to facilitate the trade of plants and plant products globally. Other lesser impacts will include eliminating the need, in some cases, for system stakeholders to travel to a specific office or offices to handle the paperwork associated with phytosanitary trade. Indirect contributions include minimizing the spread of pests and diseases through the use of electronic phytosanitary certification. Indeed, the ease of use of the GeNS system and the current COVID-19 crisis should increase, encouraging even greater interest from other countries in participating in the system. For example, the development of the system has been carried out in such a way that any paper certificate, once formatted digitally in a way acceptable to the parties choosing to join the system, will encourage other international organizations seeking to exchange paper certificates electronically to do so if they wish, thereby further decreasing the use of paper.

7. SUSTAINABILITY

A large number of options were considered for the sustainability of the ePhyto Solution. Following lengthy discussions within the ESG, as well as with the assistance of an outside consultant, the following funding options were fully considered:

- 1) Full funding by FAO
- 2) Funding by lead NPPOs and/or PC users
- 3) Funding by donors
- 4) Transaction-based funding
- 5) Combination approach

Each of these options is discussed below in detail. Preliminary comments on the advantages and disadvantages of each approach are also provided. These may be expanded at a later stage, based on feedback from experts and further research.

7.1 Funding by FAO

FAO could consider funding the delivery of the ePhyto Solution, either in its entirety or partially, as suggested by a number of NPPOs and PC users. Under this option, the IPPC Secretariat, through FAO, would have to prepare a budget for approval by FAO Members. Although this is a lengthy process, it is possible that Members could approve it. Depending on the extent of coverage, the budget would need to cover the following areas:

- Operation of the ePhyto (fees to cover UNICC costs) – USD 400 000 per year.
- ePhyto programme management and delivery (P3 plus 30 percent G4 staff, plus external meetings) – USD 139 000 per year.
- Supplemental operational costs (operational helpdesk, further development and enhancement of ePhyto software, contingency for additional volume charges) – USD 190 000 per year.
- Basic training and capacity-building (use of the eLearning tools available on the www.ephytoexchange.org website as well as video training sessions mostly focused on GeNS countries)– USD 153 000 per year.

- Enhanced training and capacity building (this would include more technically complex training, as well as possibly in-person support, and would most likely be centred around countries working to connect to the ePhyto Hub through their own national system) – USD 185 000 per year (in addition to the figure of USD 153 000 above).

FAO Members could be asked to fund the entire programme above (for a total of USD 1.1 million) or selected components.

7.1.1 Advantages and disadvantages

The main advantage of this approach is the certainty that it provides to the ePhyto programme and the strong message of support that it sends to IPPC members, in particular in terms of the economic development aspect of the programme. It is also relatively simple and consistent from an operational and managerial perspective, and would likely ensure more rapid and sustainable implementation of the programme.

Another key advantage of this approach is that the ePhyto would be provided to users without additional charge. This can be a very important factor in the early stages of a new initiative, such as ePhyto, where there is an attempt to lure users away from a system and approach that they have used for decades. It is an approach often used in eService provision, such as eNewspapers or eSupport tools. The approach often used is to provide the entire service for free initially and charge users for enhanced services at a later stage, often restricting the level of free content as time progresses.

The disadvantage of this approach, however, is that securing the necessary funding can take considerable time and could delay the implementation of the programme. There is also a preference among Members to see greater emphasis on “user-pay” approaches to UN services that relate to commercial activities.

7.2 Funding by lead NPPOs, PC users and/or donors

This option is conceptually similar to the FAO funding option described in Section 7.1 above, with the exception that the source of funding would now be the lead NPPOs, lead companies or industry associations that are big users of PCs, and/or specific donors. Indeed, the IPPC Secretariat has received well in excess of USD 1 million from lead NPPOs to sustain operations of the ePhyto Solution, ensuring continuity until 2022.

The areas in which funding is required remain unchanged. These include:

- Operation of the ePhyto (fees to cover UNICC costs) – USD 400 000 per year.
- ePhyto programme management and delivery (P3 plus 30 percent G4 Staff, plus external meetings) – USD 139 000 per year
- Supplemental operational costs (operational helpdesk, further development and enhancement of ePhyto software, contingency for additional volume charges) – USD 190 000 per year.
- Basic training and capacity-building – USD 153 000 per year.
- Enhanced training and capacity building – USD 185 000 per year (in addition to the figure of USD 153 000 above).

While it is possible that some lead NPPOs, lead companies or industry associations that are major users of PCs, and/or that specific donors could consider funding the entire package, it is more likely that they would cover specific areas. For this option, therefore, it would be best to keep the operational costs as low as possible and to split off the areas of capacity-building and technical assistance for separate funding.

The total contribution required per entity will obviously depend on the number of contributors. For example, on the untested assumption that it would be possible to attract ten such entities, the total required to cover basic operational requirements would be USD 60 000 per entity per year and USD 100 000 per entity to cover the entire package detailed above.

Some of the potential NPPOs that could be targeted include:

- Australia (financial resources donated on a one-off basis)

- Canada
- China
- New Zealand (financial resources donated on a one-off basis)
- The Netherlands (financial resources donated on a one-off basis)
- United States of America (ongoing financial resources donated – USD 150 000 per year).

Possible lead companies or industry associations include:

- Members of the ePhyto IAG¹

Possible donors include:

- World Bank
- Regional Development Banks
- Specific donors such as the German Corporation for International Cooperation, the UK Department for International Development and the United States Agency for International Development.

It is noted that funding from the above entities would likely be for a limited period only and would need to be renewed on a regular basis. It is for this reason that a phased approach to fee-based funding for the ePhyto is proposed, with an initial focus (for the first five years, for instance) on attracting contributions from leading players and/or FAO itself, before moving to some form of transaction or fee-based approach, as described in Section 7.3 below.

7.2.1 Advantages and disadvantages

The main advantages of this approach are similar to the FAO funding approach, i.e. simplicity and the ability to offer the service for free and attract users in the early stages of the programme.

Another advantage is that it engages major users (i.e. major NPPOs and industry) in the ongoing operation and development of the Solution. This can also have a positive impact on securing related capacity-building and technical assistance support for the programme, as donors would already have a stake in ensuring the success of the programme.

As with the FAO funding model described above, the main disadvantage of this approach is that securing such funding can take considerable time and could delay the implementation of the programme. In addition, coordinating support from a range of donor sources would require considerable administrative, managerial and promotional effort from the IPPC, which would be an ongoing exercise, given that most donor funding is of a limited duration (with a maximum of around two years).

7.3 Transaction-based funding

Options for a transaction-based revenue model were also considered. This is recognized as being the least preferred option of the NPPOs and is not favoured by the ESG. The reasoning behind these objections, which are quite legitimate and well founded, are summarized in Section 7.3.2 below. However, the consultants felt it that it would be useful to at least review this option at a summary level for future consideration as the project matures. Indeed, it is the view of the consultants that, while securing development and initial implementation support from donors is generally feasible for attractive projects such as the ePhyto, maintaining this funding in the longer term (i.e. for more than five years) can be quite challenging.

It is also important to note here that the concept of transaction-based funding can have a number of different manifestations and can be tailored to the unique needs and requirements of a particular application, industry or situation. Some examples of these options are described in Section 7.3.1 below.

¹ <https://www.ippc.int/en/ephyto/ephyto-industry-advisory-group/>

7.3.1 Possible options for transaction-based funding

Based on experience in other projects such as eTIR², Single Windows and Port Community Systems, the consultants considered the following transaction-based framework. Firstly, all NPPOs joining the system should pay a membership fee to cover the initial set-up and linkages, as well as to cover a minimal amount of ePhytos “for free”. This is to ensure commitment and to encourage low-volume users to join the system. It is suggested that this fee be set at USD 1 000 per annum and that it include coverage of up to 5 000 ePhytos per year. Additional charges would then be levied on a consumption basis. Three options for this are described below.

7.3.1.1 Additional charge included in the regular PC fee

The vast majority of NPPOs charge a fee for issuing existing paper-based PCs, and mechanisms are already in place for collecting these fees. The option of adding a small incremental fee (ranging from USD 0.05 to USD 1.0 per ePhyto) to cover the incremental cost of the ePhyto should be seriously considered. This would be administratively simple, while arrangements could be made for NPPOs to transfer the related funds collected to the IPPC on a regular basis, calculated in advance on the anticipated number of ePhytos to be issued over a given period (any corrections up or down could be reconciled for the following period). It is noted that PC users indicated this to be one of their preferred approaches.

Two alternatives to this approach, that consider a totally separate fee structure for the ePhyto, are presented below and represent more classical transaction fee approaches.

7.3.1.2 Volume discount tiered fee structure

This model considers a totally separate fee structure for the ePhyto. Under a volume discount tiered fee structure scenario, NPPOs with higher volumes receive a discount on the fee per ePhyto transmitted. The following simulation was prepared as an example of this approach. It assumes the following:

- 1) No charge for PCs under 5 000.
- 2) A discount rate of between 20 and 50 percent, depending on the volume of PCs transmitted above 5 000.
- 3) A basic membership fee of USD 1 000 for each participating NPPO.

Under this scenario, and assuming a total market of 12 million PCs, a market penetration rate of 28 percent by 2024 and a fee rate of USD 0.2 per ePhyto, the ePhyto could generate approximately USD 539 000 per annum in income (Table 2).

² The eTIR international system aims to ensure the secure exchange of data between national customs systems related to the international transit of goods, vehicles or containers according to the provisions of the TIR Convention and to allow customs to manage the data on guarantees, issued by guarantee chains to holders authorized to use the TIR system.

TABLE 1 DISCOUNTED FEE SCHEME							
TOTAL ePhytos	12 000 000						
Range		1 to 5 000	5 000 to 50 000	50 000 to 250 000	250 000 to 500 000	Over 500 000	Totals
Percentage PCs in band*		4%	23%	32%	18%	23%	100%
Estimated number of PCs in band		500 991	2 729 393	3 837 792	2 190 356	2 741 469	12 000 000
Number of PCs at 28% market penetration	0.28	140 277	764 230	1 074 582	613 300	767 611	3 360 000
Operational costs (in USD)		539 000	539 000	539 000	539 000	539 000	USD 539 000
Fee per ePhyto	0.2						
Total revenue		USD 28 055	USD 152 846	USD 214 916	USD 122 660	USD 153 522	USD 672 000
Pay (discount) rate		0	1	0.8	0.7	0.5	
Discounted revenue		0	USD 152 846	USD 171 933	USD 85 862	USD 76 761	USD 487 402
Membership fees (28% of 183 NPPOs = 51)	1 000						USD 51 000
Discounted revenue plus membership fees							USD 538 402

* This number is estimated based on the distribution of PCs submitted by the NPPOs, as indicated in the 2015 survey.

7.3.1.3 Variable Fixed Fee Approach

Another totally separate fee structure option for the ePhyto would be to set a fixed annual fee for NPPOs that would vary based on the volume of PCs submitted. The following simulation was prepared as an example of this approach. This assumes a fixed fee ranging from USD 200 to USD 100 000 per annum, depending on the volume ranges listed below.

As shown in Table 2, based on these figures, a total income of approximately USD 600 000 could be generated in 2024, assuming a market penetration rate of 28 percent of all NPPOs.

TABLE 2						
Annual number of PCs issued	1 to 5 000	5 000 to 50 000	50 000 to 250 000	250 000 to 500 000	Over 500 000	Total
Estimated number of NPPOs in this range*	55	57	55	11	2	180
Fixed fee (USD)	200	5 000	20 000	50 000	100 000	
Total income if all 183 NPPOs participating	11 000	285 000	1 100 000	550 000	200 000	2 146 000
Estimated total income for market penetration of 28% of NPPOs participating	3 080	79 800	308 000	154 000	56 000	600 880

* This number is estimated based on the distribution of PCs submitted by the NPPOs, as indicated in the 2015 survey.

7.3.2 Advantages and disadvantages of transaction-based funding

The primary advantage of an efficient and functional transaction-based approach is that it can provide secure funding for the operation of the ePhyto over the longer term. It also links the end user directly with the quality and benefits of the product and ensures that both are maintained. The option of including the fee within the existing PC charge would be worthy of serious consideration, provided that any related legal issues could be addressed.

Transaction-based funding is used successfully in many eServices in the international trade area and models can be devised to make this administratively simple and efficient. It would also be worth investigating the option of contracting out the entire fee collection to a specialist agency in this area, such as the United Nations Office for Project Services (UNOPS).

It is clear that any transaction model should not be based on an immediate payment per transaction but rather on a scheme whereby an accumulation of the transaction would be billed over a period of time. As discussed in Section 8.4, this could be paid in advance and could be based on a tiered membership approach based on the number of transactions

The main disadvantages of a transaction-based funding approach are as follows:

- Transaction fees could deter developing countries from participating in the project.
- The administrative costs of fee collection would be too high.
- Collection of the fees could be cumbersome.
- Difficulties in addressing countries that could not or would not pay.
- Difficulties in countries having to amend fee legislation/regulation to collect fees on behalf of international organizations.

It is clear that these are formidable challenges to implementing a fee-based approach. Of particular concern is the potential deterrent impact for developing countries in joining the ePhyto. In addition, the issue of the legal authority to collect such fees, as well as the amount of time it could take for NPPOs to achieve this, could be a major obstacle in the short term. In time, however, all of these issues could be overcome and there are a number of models of fee-based eServices that could be referenced in designing an appropriate approach for the IPPC ePhyto Solution. For all fee-based funding options, the regulatory limitations of NPPOs in charging any additional fee needs to be explored.

7.4 Payment in advance – based on the estimated number of ePhytos transmitted

A pre-payment approach could also be considered for adoption in the transaction model. This is a common approach in a number of Single Windows and in the TIR system. As part of this approach, an estimate is made of the likely number of ePhytos that a particular NPPO would submit to the ePhyto Solution over a given period, and a cost calculation is made. The actual cost would be reconciled at the end of the period, based on statistics provided by the ePhyto and recorded by UNICC. Over or underpayments can be addressed at this stage and estimates of charges for the coming period would be based on the previous period.

This approach minimizes the fee collection work and is administratively more simple to organize. This whole system could be automated by UNICC or contracted out to an administrative agency such as UNOPS, an operational arm of the United Nations, supporting the implementation of peacebuilding, humanitarian and development projects around the world³.

7.5 Framework for financial management of ePhyto funds

Managing the collection and disbursement of funds for the ePhyto Solution would constitute a major work and would be beyond the current limited resources allocated to the initiative by the IPPC. For example, fundraising from potential donors or other support entities is highly time-consuming, while management and reporting of funds utilization is a demanding task. In addition, a number of donor programmes require extensive reporting and full funds utilization and programme effectiveness evaluation reports.

In addition to the above, any fee or transaction-based approach would require considerable additional financial management resources. To minimize this aspect, the transaction model should be based on a scheme whereby an accumulation of transaction would be paid for in advance over a set period of time. This could be based on a tiered membership approach for a specific range of transactions. These options are further explored in Section 7.3.

The IPPC intends to explore options for an external entity to manage the financial aspects of the ePhyto programme. This could include, but should not be limited to, UNOPS.

7.6 How much should the PC users pay

As evidenced through numerous contacts, PC users clearly recognize the additional value that the ePhyto will create for their businesses and, as a result, are very keen to see it implemented. A key question is how much the PC users should pay, if anything, for an ePhyto versus a paper PC.

The major factors here will be the net added value to the end user and the net added cost to the NPPOs for delivering the service. It is possible, as in the case of eTIR, that the ePhyto may actually reduce NPPO costs, in which case there may be no need for additional charges to PC users. Indeed, this would present the highly positive scenario of offering an enhanced service at a lower cost. Mechanisms would, however, still need to be put in place to transfer funds from the NPPOs to the IPPC to cover the operation of the ePhyto.

In order to give further consideration to this matter, a cost-benefit analysis of the NPPO delivery and the end user use of ePhytos versus paper-based PCs is in progress. This includes the production of a number of PC user case studies.

In addition to the above, it is highly recommended that companies and/or industry organizations that are major users of the ePhyto, and hence major beneficiaries, contribute to the ongoing development and operation costs of the ePhyto as it is clearly in their best interests to do so. Discounted fee rates for ePhyto utilization could be considered for members of industry associations that are significant contributors to the funding of the system.

³ www.unops.org

7.7 Combination approach

As mentioned above, a combination of any and all of the above approaches is another viable option. For instance, the IPPC could decide to cover all administrative costs (i.e. the P3 and G4 staff), while leading NPPOs and or PC users could cover UNICC operations. Training and capacity-building could be covered by donations to a trust fund. An ePhyto membership fee could continue to be charged to all NPPOs and PC users to ensure their commitment to the project and cover the necessary administrative costs in maintaining user accounts and to access authorizations and storage allocations.

Although administratively challenging, this combination approach ensures the continued engagement and commitment of all key players. It also significantly reduces costs for ePhyto users.

A possible funding scenario reflecting the above discussion is presented below.

Item	Funded by	Annual cost (USD)
IPPC administrative support and meetings	IPPC	139 000
UNICC hosting and administrative support for Hub and GeNS operation	PC users (membership plus transaction fee)	400 000
Possible additional ePhyto operating costs	Lead NPPOs and industry	190 000
Costs related to capacity-building and technical assistance for onboarding countries	Donors	338 000
TOTAL		1 067 000

7.8 Recommendations regarding funding options

All of the above funding options have their advantages and disadvantages. The recommended approach is to focus initially (i.e. for the first 5 years) on a total support approach (Option 1 or 2 above) to ensure the successful implementation of the ePhyto and uptake by the broadest possible range of countries and end users, before moving to a sustainable approach that could include a form of transaction-based payment.

Any such approach would, of course, need to focus on the unique needs and aspirations of the programme, in terms of inclusiveness, ease of operation and management. Within this scenario, the recommended preference and sequence of the options listed is as follows:

- Phase 1 – Option 1: Full funding by donor contributions (the current situation).
- Phase 2 – Option 3: A transaction-based approach, with a preferred option of including the charge within the existing PC fee, combined with support funding from lead institutions for further development, capacity-building and technical assistance.

A combination of the above approaches should also be considered. For all of the above, it is recommended that discussions be held with UNOPS to consider whether the funding management could be handled directly by them.

In the most recent meeting of the Commission on Phytosanitary Measures (CPM) (CPM-15, 2021), the CPM: agreed to pursue a two-phase funding solution for the IPPC ePhyto Solution, with the first phase relying on funding from interested contracting parties and the second phase providing long-term financial sustainability; requested that the Secretariat take the lead in drafting Terms of Reference for a CPM focus group, including its composition, and agreed that the membership would include at least one representative from each region; agreed that the focus group be tasked with preparing a decision document on the funding solution for the second phase, for presentation at the CPM session in 2023.

8. FINANCIAL OVERVIEW



Food and Agriculture Organization of the United Nations

TF Project Status Report (Aggregate Values)

Up to Period: '2020-05'

AGD Office of Assistant Director-General (Division)

	Prior Years			Current Year: 2020 up to 2020-05			Cumulative up to 2020-05			Future Years			Project Total		
	Budget	Expenses	Balance	Budget	Expenses	Balance	Budget	Expenses	Balance	Budget	Expenses	Balance	Budget	Expenses	Balance
Funds Received															
3001 Contributions Received in Advance (Parent)	0	(1,120,000)	1,120,000	0	0	0	0	(1,120,000)	1,120,000	0	0	0	0	(1,120,000)	1,120,000
Expenditure															
5011 Salaries Professional (Parent)	0	0	0	0	0	0	0	0	0	20,000	0	20,000	20,000	0	20,000
5013 Consultants (Parent)	15,620	15,620	0	0	0	0	15,620	15,620	0	44,887	0	44,887	60,707	15,620	44,887
5014 Contracts (Parent)	744,417	744,417	0	0	61,437	(61,437)	744,417	805,854	(61,437)	(107,020)	0	(107,020)	637,397	805,854	(168,457)
5021 Travel (Parent)	135,511	135,511	0	0	2,976	(2,976)	135,511	138,488	(2,976)	60,835	0	60,835	196,346	138,488	57,858
5024 Expendable Procurement (Parent)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5027 Technical Support Services (Parent)	0	0	0	0	16,550	(16,550)	0	16,550	(16,550)	60,000	0	60,000	60,000	16,550	43,450
5028 General Operating Expenses (Parent)	1,104	1,104	0	0	0	0	1,104	1,104	0	24,446	0	24,446	25,550	1,104	24,446
5029 Support Costs (Parent)	107,633	107,633	0	0	9,716	(9,716)	107,633	117,349	(9,716)	12,367	0	12,367	120,000	117,349	2,651
5040 General Operating Expenses - external common services (Parent)	73	73	0	0	0	0	73	73	0	(73)	0	(73)	0	73	(73)
5050 Internal Common Services and Support (Parent)	19	19	0	0	0	0	19	19	0	(19)	0	(19)	0	19	(19)
Total Expenditure	1,004,577	1,004,577	0	0	90,679	(90,679)	1,004,577	1,095,257	(90,679)	115,423	0	115,423	1,120,000	1,095,257	24,743
Balance		(115,423)			90,679			(24,743)			0			(24,743)	

PART C: FINANCIAL OVERVIEW (SITUATION AS AT 30.04.2020)

	STDF	In-kind/Other	Total
Total project budget (USD)	1 120 000	608 000	1 728 000
Total amount received to date	1 120 000	608 000	1 728 000
Total expenditure during the reporting period*	1 095 257	608 000	1 703 257
Total expenditure to date	1 095 257	608 000	1 703 257
Unspent funds**	24 743	0	24 743

* Unspent funds that represent more than 25 percent of committed funds for a specific reporting period may only be carried forward into the following year with authorization from the STDF Secretary. Unspent funds amounting to less than 25 percent of committed expenditure may be carried forward automatically.

** Unspent balance excludes cumulative interest earned of USD 12 592.

9. LESSONS LEARNED

- 1) Some of the specific lessons learned as a result of the project are worth sharing. Most importantly, all participating countries need detailed prior project planning to ensure effective implementation and change management. A solid understanding of the necessary changes to the way of doing business is critical. The transition from NPPO to business in dealing with a phytosanitary certificate to an NPPO-to-NPPO process needs to be fully explained to all stakeholders and properly

implemented. To assist with this transition, the IPPC has developed a Business Process Analysis Framework for use by interested countries, and will soon be issuing an updated version of the framework in cooperation with UNESCAP and the Global Alliance for Trade Facilitation.

- 2) In keeping with the preceding discussion, there is an overall lack of awareness or information in general by both government and business, with regard to the costs of doing business using paper certification versus electronic certification. While there is overwhelming agreement that digital is faster, cheaper, safer and better, there are no readily available resources/studies that compare the costs of the paper process with the digital one. There are comments available regarding some specific cost savings, such as decreased use of courier services to send the paper phytosanitary certificates to the importing party, as well as some specific examples of decreased demurrage charges, but no substantial information exists on the costs of using paper versus the possible or existing costs of using ePhyto.
- 3) There is a large learning curve in managing to convey to senior decision-makers exactly what ePhyto is and what it can mean for their country. While the idea of electronic certification is absolutely supported, the ability to message the idea of ePhyto upwards sufficiently is lacking. The ePhyto effort still lacks the key communication tool to facilitate a means of quick but thorough comprehension of what exactly the ePhyto concept is at most senior levels. Although the response to ePhyto is generally positive, greater familiarity with the topic is required.
- 4) Multinational collaboration works extremely well, especially in cases related to training on the GeNS system. The latter lends itself to being easily adapted to persons familiar with online systems, while collaborative instruction is easier for training participants with similar languages and regions. For countries implementing their own national system, the uniqueness of those systems makes it difficult to engage in collaborative training; nevertheless, there has been considerable success in Latin America, with Argentina as a leader in helping several countries get onboard ePhyto using their own national systems. A significant number of countries are initiating their participation in the ePhyto Solution through the GeNS, which should facilitate a more expeditious implementation of ePhyto.
- 5) It has been considerably easier to access funding sources through emphasis on trade facilitation, as opposed to SPS issues, agriculture in general, or plant quarantine. Organizations such as the World Bank and the Global Alliance for Trade Facilitation have been very willing partners in assisting with the implementation of the ePhyto Solution, with specific emphasis on the Trade Facilitation Agreement aspects of using ePhyto (specifically Articles 7.9 and 10.1).
- 6) Building the system was significantly easier than originally thought, as much of the effort was modelled on existing forms of secure information exchange, such as transport layer security (TLS), authenticating systems that contact the hub through X.509 certificates, verifying senders also through X.509 certificates, and using Simple Object Access Protocol over hypertext transfer protocol secure (HTTPS), which protects the integrity of communication between the website and the user's browsers.
- 7) Interaction with industry groups proved useful, as it provided insights into industry practices, needs and requirements, which in turn have facilitated improvements and adjustments to the system. This specifically includes the development of what is known as the ePhyto "channel", which is being established to allow industry to receive copies of phytosanitary certificates and other pertinent information directly from NPPOs.
- 8) Industry relations have for the most part been very productive, one limitation is that, considering the types of industries represented, their efforts to communicate the success of the project as well as inform a larger audience on a broader scale have only been limited to their industry-specific communications tools. One thing that industry can do, and it may finally now be taking place, is to make use of more popular and widespread media, such as key newspapers and journals that are commonly reviewed by high-level decision-makers, which in turn will arouse interest in ePhyto and perhaps lead to additional resources to both sustain ePhyto as well as build it into a broader tool for all of the SPS organizations.
- 9) It was somewhat difficult to move as quickly as hoped in the establishment of the GeNS. UNCTAD/ASYCER representatives were approached to provide a proposal for developing the GeNS, but no proposal has been provided as yet. The IPPC Secretariat hopes to develop a collaborative relationship with the UNCTAD/ASYCUDA team, to develop connections between the ePhyto Solution and the ASYCUDA national single windows hub.

10. RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Having successfully demonstrated the concept of exchanging phytosanitary certification information digitally, the strongest recommendation that can be made is to expand the use of the system beyond the phytosanitary community to the broader sanitary and phytosanitary world. The challenge for the other two so-called “SPS sisters” is that, as opposed to the IPPC, which has only a single certificate with which to work and digitalize, both Codex and the OIE have multiple certificates. In this context, the lack of a harmonized certificate format will challenge these two organizations to move quickly to adapt to the system.

Nevertheless, the ePhyto Solution was established in such a way as to allow for any certificate to be transmitted once the harmonized XML coding has been developed. This means that certificate exchanges need not be limited to the SPS Sisters, but that any organization wishing to digitalize its certificates can theoretically make use of the system. Indeed, CITES and the Wine Institute have held discussions with the IPPC Secretariat and UNICC to investigate this possibility. A second recommendation would therefore be to expand the availability and use of the system to all interested global players with an interest in facilitating trade for all countries, regardless of development.

The conclusion of the above is that by adding additional partners to the system, costs are lowered across the board, as broader participation brings broader resources. UNICC has demonstrated this principle through the development of its UN Partner Portal.

While the IPPC Community is understandably proud of the leadership it has demonstrated in developing and implementing the ePhyto Solution, through its commitment to facilitating safe and expeditious trade, it views positively the possibility of an expanded system (with other organizations) being sustained and managed by an alternative organization or board.

11. ANNEXES

- Logical framework
- Financial report
- Contact list
- Other documents

APPENDIX 1: Logical framework

Objectives	Performance Indicators	Means of Verification	Assumptions / Risks
Goal: The capacity of countries to facilitate safe, secure and efficient trade in plants and plant products is improved.	At least 90 IPPC contracting parties using harmonized electronic phytosanitary certification in 10 years.	IPP reporting. CPM reports. Service provider reports.	A lack of political will to support the effort. A lack of resources at global and national levels.
Purpose: IPPC contracting parties are able to provide phytosanitary assurances in trade in an innovative, cost-effective and globally harmonized way.	20 IPPC contracting parties across at least 3 FAO regions are using harmonized electronic phytosanitary certification in 3 years. 20 more countries, across at least 4 FAO regions, have initiated the process to use the harmonized system by project closure. 80% of contracting parties using the system for more than 1 year have reported satisfaction in using the system.	Service provider reports. Export certification data at country level. Survey reports. RPPO reports.	The system is ready to be deployed. Countries are interested in the system. Resistance to harmonization of elements of the proposed system. Lack of confidence or security concerns in electronic/computerized systems.
Output: A global framework for electronic phytosanitary certification is established, accessible, used and maintained.	Harmonized databases and protocols available on the IPPC web site and a procedure to maintain them in place within 1 year. 50% of contracting parties report that they are confident that they can now access a system for electronic phytosanitary certification.	Service provider reports. Export certification data at country level. Survey reports. RPPO reports. Web site data.	A lack of minimal requirements to implement the system. Delays in the design, building and implementation of the system. Political will to adopt the system is lacking or not seen as a national priority. Legislation presents a barrier to adoption.
Activity 1: Provide a global harmonized exchange tool for electronic phytosanitary certificates.	1.1 A harmonized exchange protocol specified by month 6. 1.2 Global exchange tool developed by month 12. 1.3 Operational framework established by month 12.	Training reports. Budget/financial reports. Project progress reports. Steering Committee reports. IPPC web site data. ePhyto page.	Delays in the design, building and implementation of the system. Scarcity of trainers that understand both the IT and phytosanitary elements. National decision-makers do not understand the complexity of the issue.
Activity 2: Assist countries in setting up a generic system for national production, sending and receipt of electronic phytosanitary certificates.	2.1 Needs assessment, inventory and evaluation of systems for production and receipt of electronic phytosanitary certificates conducted by month 9. 2.2 An online tool for production and receipt of electronic phytosanitary certificates available by month 18.		
Activity 3: Assist countries in the implementation of electronic phytosanitary certification.	3.1 20 countries will have received advocacy materials for use by month 12. 3.2 Training materials and tools developed by month 24. 3.3 Training of trainers and training delivered to at least 9 contracting parties by month 30.		



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