Beyond Compliance

Report on workshop for STDF Project Preparation Grant 328

Developing trade opportunities: an integrated systems approach for pest risk management

August 16-19, 2010

Kuala Lumpur, Malaysia

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Executive Summary / Communique

Beyond Compliance: Integrated Systems Approach
for Pest Risk Management in SE Asia

Summary of a meeting funded by Project Preparation Grant (PPG) 328
from the WTO Standards and Trade Development Facility (STDF)

Introduction

In August 2010, the National Plant Protection Organisation (NPPO) of Malaysia, the Department of Agriculture, hosted a meeting in Kuala Lumpur to develop a project proposal concerning the use of Systems Approaches for managing risks in plant health. Under the auspices of the WTO-STDF funded PPG-328, the NPPOs of Thailand, Vietnam, Indonesia, The Philippines and Malaysia met with Imperial College London (ICL) and Queensland University of Technology (QUT) to consider the further development and implementation of a method to model and make decisions about managing pest risks in plant commodity trade.

Rationale

SE Asian countries together export over US$6 billion in fresh produce each year. Much of this trade is subject to pest risk management requirements imposed by the importing countries, usually based on the rigid application of single measures such as field applications of pesticides or a post-harvest commodity treatment. There is increasing dissatisfaction with single measures, which may be damaging to product quality, hampered by limited availability or capacity, or detrimental to the environment. Furthermore, when single measures fail, trade may be disrupted entirely. Another reason to seek improved pest risk management approaches is because imports to SE Asia pose significant threats of pest introduction into the region, particularly the contiguous countries where a pest entering one country can spread unimpeded to neighbouring countries.

A Systems Approach is the responsive application of two or more independent risk management measures in an integrated management system [International Standard for Phytosanitary Measures no. 14, FAO 2002]. This offers more flexible pest risk management, allows for more proportionate response to pest challenges, and shifts more responsibility to producers and traders. Systems Approach plans are developed jointly between exporting and importing countries, rather than being imposed by importers, creating a more symmetric relationship in trade negotiations.

In some regions, Systems Approaches have been used for decades. While there are examples of their use in SE Asia, there are significant conceptual, technical and institutional issues that must be resolved in order to take full advantage of opportunities from Systems Approaches to move beyond compliance with plans imposed by trade partners, to a position of strength for negotiation and

DEFINITION of SYSTEMS APPROACH

"The integration of different risk management measures, at least two of which act independently, and which cumulatively achieve the appropriate level of protection against regulated pests"

[ISPM No. 14, 2002; revised ICPM, 2005]

MEETING ORGANISERS

Imperial College London

Queensland University of Technology

Crop Protection and Plant Quarantine Division, Department of Agriculture, Malaysia

MEETING PARTICIPANTS

Agency for Agricultural Quarantine, Ministry of Agriculture, INDONESIA

Department of Agriculture, MALAYSIA

Department of Agriculture, THE PHILIPPINES

Ministry of Agriculture and Cooperatives, THAILAND

Ministry of Agriculture and Rural Development, VIETNAM evaluation.

One method for enhancing confidence is using Bayesian Network probabilistic modelling to clarify and negotiate a proposed trade system based on a Systems Approach. This tool is in development in Europe and Australia. If the approach proves effective in the proposed sub-regional SE Asia project, it will be of interest for global adoption.

Proposed Activities, Outputs and Outcomes

The project plans will be developed in partnership between NPPOs in SE Asia, the Asian Pacific Plant Protection Commission, QUT, ICL, and the SE Asian centre for CAB International (CABI), which has a strong track record in plant health support. The project will be discussed with appropriate agencies for potential funding. The initial project would last for three years and would produce:

- A review that describes pest risk management for imports and exports in the region, including design and evaluation of these measures
- A conceptual framework for Systems Approach decision-making, incorporating analysis and quantification using Control Points and Bayesian Networks
- Demonstrations of Control Points and Bayesian Networks
- Case studies of priority trade opportunities using Systems Approach for pest risk management (five export and two import cases have been identified for study)
- Establishment of a SE Asian competency base with the methodology
- A plan for a harmonised framework (possibly leading to a Regional Standard for Phytosanitary Measures) for Systems Approach.

Outcomes of the application of Systems Approach include more robust pest risk management in the region, greater inclusion of stakeholders in the process, more confidence in trade negotiations and new opportunities for trade in a phytosanitary context.

Proposed case studies for the project

Commodity	Exporting country	Importing country
Fresh produce (not rubber plants) that may carry South American leaf blight of rubber	Countries with SALB	Malaysia (for the region)
Oil palm seed	Countries outside the region	Thailand (for the region)
Dragon fruit	Vietnam	South Korea, Taiwan
Mangosteen, avocado	The Philippines	USA
Jackfruit	Malaysia	China, Australia
Orchid cut flowers	Thailand	Europe

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Abbreviations

ACIAR	Australian Centre for International Agricultural Research
APPPC	Asia and Pacific Plant Protection Commission
ARDN	ASEAN Regional Diagnostic Network
ASEAN	Association of Southeast Asian Nations
ASEANET	The Southeast Asian loop of BioNET International
BN	Bayesian Network – also known as Bayes Net or Bayesian belief network
CABI	Not an abbreviation
CEP	Centre for Environmental Policy, ICL
CP	Control point (from HACCP)
CRC NPB	Cooperative Research Centre for National Plant Biosecurity
DAMC	Centre for Data Analysis, Modelling and Computation, QUT
FAO	Food and Agriculture Organisation
HACCP	Hazard Analysis Critical Control Point
ICL	Imperial College London
IDRC	International Development Research Centre (of Canada)
IPPC	International Plant Protection Convention
ISPM	International Standard on Phytosanitary Management
JP	Jabatan Pertainian (Department of Agriculture) of Malaysia
NPPO	National plant protection organisation
PPG	Project Preparation Grant
PRA	Pest risk analysis
QUT	Queensland University of Technology
SA	Systems Approach (see ISPM No. 14)
SPS	Sanitary and Phytosanitary (Agreement)
STDF	Standards and Trade Development Facility (of the WTO)
WTO	World Trade Organisation

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- The workshop participants for their constructive support of the project.

1 Introduction

The meeting '*Developing trade opportunities: an integrated systems approach for pest risk management*' was held in Kuala Lumpur, Malaysia, from 16-19 August, 2010. Funds for the meeting were provided by the Standards and Trade Development Facility (STDF) as a Project Preparation Grant (PPG 328). The partners to the grant were Imperial College London (ICL), Queensland University of Technology (QUT) and the Jabatan Pertanian (JP, Department of Agriculture) of Malaysia.

The purpose of the meeting was to continue developing a new project, by consulting with potential participants and seeking their involvement with country and regional case studies. The project concerns pest risk management by Systems Approach (SA) under the International Standard on Phytosanitary Management (ISPM) No. 14 (FAO-IPPC 2002). A SA, according to the ISPM:

> *"… integrates pest risk management measures to meet the appropriate level of phytosanitary protection of the importing country. Systems approaches provide, where appropriate, an equivalent alternative to procedures such as disinfestation treatments or replace more restrictive measures like prohibition. This is achieved by considering the combined effect of different conditions and procedures … A systems approach requires two or more measures that are independent of each other, and may include any number of measures that are dependent on each other. An advantage of the systems approach is the ability to address variability and uncertainty by modifying the number and strength of measures to meet the appropriate level of phytosanitary protection and confidence."*

Many countries are employing or seeking to employ SA, but the development of SA can present difficulties with lack of data and uncertainty on the risk mitigation measures and their application. Independently, the use of Bayesian Networks (BN) in developing SA has been under investigation in Europe and Australia. ICL as part of the *Pratique* project of the European Community developed a BN template for SAs using a Control Point (CP) framework. Australia had begun developing a BN to explore options to prepare for the possible outcomes of a review of a key post-harvest pesticide.

ICL and QUT collaborated to develop a project to apply the *Pratique* CP-BN template in some real SA examples. This presents an opportunity to test the method and further develop it, so that it may be adopted for the development of trade opportunities using SA. Applying it in case studies in several countries in south-east Asia should deliver this outcome, while developing phytosanitary capacity in the region; specific trade opportunities may also be progressed. STDF awarded PPG 328 for ICL and QUT to run this workshop with the support of JP, in order to develop a project with these objectives.

The workshop brought together senior staff of the national plant protection organisations (NPPOs) of six countries (Malaysia, Thailand, The Philippines, Vietnam, Indonesia and Australia), CABI and FAO; New Zealand and ASEAN were invited but were unable to attend. They were addressed and consulted by project staff from ICL and QUT:

- Professor John Mumford, Director of the Centre for Environmental Policy (CEP), ICL
- Ms Megan Quinlan, Research Fellow, CEP, ICL
- Professor Kerrie Mengersen, Research Chair in Statistics, QUT
- Dr Peter Whittle, Principal Research Fellow, QUT and CRC National Plant Biosecurity

with the kind support of Ms Wan Normah Wan Ismail, Director, and Mr Hussain Tahir, Assistant Director, Crop Protection and Plant Quarantine Division, JP.

This document reports on the workshop and will underpin a project proposal to be developed.

1.1 Workshop agenda

Refer to Section 6, Appendix.

2 Meeting opening and objectives

The meeting opened with remarks by Prof Mumford, thanking the STDF-WTO for funding the meeting, the Malaysian hosts, QUT for their collaboration and all of the participants for attending.

Prof Mumford stated we have a tremendous opportunity to take a leading role in the development of Pest Risk Analysis (PRA), the purpose of which is to promote safety in trade. This is an opportunity to improve the link between analysis and management, with focus on relevance, effectiveness and efficiency. The purpose of this PPG is to prepare a proposal for a regionally based approach.

The whole process of PRA has been going for only 15 years (in the form of ISPM 2 (IPPC 2007)) so we are still pioneers. Commodity treatments and Export Certification schemes have been developed over the years as part of the phytosanitary risk management. Systems Approach, as defined in the International Standard for Phytosanitary Measures (ISPM) no. 14 (FAO-IPPC 2002), provided guidance on another option: combining measures in an integrated mitigation plan to reach the level of protection required by the importer.

Mrs Wan Normah Wan Ismail welcomed everyone to the meeting, on behalf of the Director General of the Department of Agriculture of Malaysia. She acknowledged that the Systems Approaches (SA) is not widely used in the region to date, although countries including Malaysia are developing systems using SA for import and export. Enthusiasm for SA stems from difficulties with conventional approaches such as single treatments. There are many questions that will be answered with experience, such as how effective each measure, or system is, what the control points are, and how to negotiate Systems Approach agreements with trading partners. The workshop is an opportunity to share experiences and to explore a new approach.

Prof Mengersen explained the objectives of this meeting and of the proposed resulting project.

The project objectives are (from the proposal):

- Trial emerging concepts from import countries/regions for estimating efficacy of measures in proportion to risk in the south-east Asian regional context.
- Refine the harmonised tool for pest risk management based on regional testing and share with all countries in the region.
- Extend to other countries and regions.

The project rationale is:

- Pest risk management imposed by importing country NPPOs will be more transparent, consistent and justified as proportional to the estimated risk.
- Measures combined in the new approach will be more widely applied without unnecessary redundancy.
- National goals to reduce use of chemical-based end point treatments will be advanced.

- Exporting countries with fewer resources will have the capacity to more confidently negotiate equivalence agreements to use measures better suited to their own conditions.

The proposed outputs are:

1. A description of the needs and priorities for pest risk management evaluation and design in the region, based on feedback from participating NPPOs and other relevant sources
2. A regionally developed plan for demonstration of an emerging pest risk management tool in representative south-east Asian countries, including activities to disseminate regionally and globally if successful
3. A project proposal featuring a description of objectives and activities and a budget for seeking support for the full project, including how results will be disseminated to others in the region and globally.

3 Existing situation

To further set the scene for the meeting, the five invited south-east Asian countries were requested to give an outline of their phytosanitary risk management arrangements. These are summarised in Table 2the workshop agenda (see Section 6) and in Table 2 and the presentations are included in the Appendix. At the end of this session, a list of the SA-based systems in the region was compiled (Table 1).

Table 1. Systems based on the Systems Approach in the southeast Asian region

Exporting country	**Commodity**	**Importing country**	**Status**
Malaysia, Thailand	cut flowers	Japan	
Malaysia	Carambola	USA	New
Malaysia	Pineapple	China	
Malaysia	Pineapple	Australia	projected
Malaysia	Jack fruit	various countries (China, US and Australia)	writing up, negotiating
India, Pakistan, Australia	Mangoes free of seed borer	Malaysia	
Vietnam	dragon fruit (using irradiation)	USA	
Vietnam	lychee, longan, mango		
	fresh potato	Vietnam	
Indonesia	mangosteen and salacca	China	
Indonesia	Also avocado and 9 others	China	In negotiation
Indonesia	Pineapple	Korea	

Mexican	table grapes	Indonesia	
Netherlands	Onion	Indonesia	in process
Indonesia would benefit from establishing Pest Free Areas			
Philippines	Banana	USA	in process
Philippines	rambutan, mangosteen and asparagus	USA	in process, maybe systems approach
Philippines	mango, papaya and coconut	Taiwan	PFA, pending
Philippines	Avocado	USA	in process

3.1 Regional capacity in PRA and phytosanitary risk management

(Dr KY Lum)

Regional development assistance in plant health is provided by a range of agencies including:

a. FAO/IPPC, ASEAN + 3 (Japan, China, South Korea), AusAID-funded SPS Capacity Building program and ASEAN-Australia Development Cooperation Program, and NZ AID

b. Others such as the ADB-funded BIMP-EAGA and GMS Programs, USAID, World Bank, STDF, etc.

Activities have focused on risk assessment in PRA. A key gap in the region has been in pest diagnostics capacity, required for pest list development for market access. One initiative is the ASEAN Regional Diagnostic Network (ARDN), in its pilot phase, currently funded by IDRC and managed by CABI-SEA and ASEANET. Remote microscopy technology is being explored for ARDN. There is a need for better understanding of the PRA process – through wider stakeholder involvement and better access to information to support PRA.

The risk management component of PRA is less developed. Countries in the region tend to lack the science base to do more than comply with the phytosanitary requirements of importing countries. Greater capacity would enable them to invoke the principle of equivalence and explore and negotiate other measures that would be acceptable to the importer, but less onerous on the exporter. General negotiations are accordingly low, and there is a need for better English language skills, and to be more conversant with ISPMs, SPS Principles, WTO rules, etc.

3.2 Experiences with measuring impacts and statistics

Mr Masahiro Sai reported on phytosanitary activities and issues in the ASEAN region under the capacity-building project. Risks in one country are often shared by other countries in the region. If a pest enters one country, it can readily move into the neighbouring countries. A key risk area is with importation into and within the region of seedlings for planting, in a wide variety of crops. He gave two examples of this occurring recently in sugarcane and cassava.

3.3 Current capacity and resources for regional approaches

(Mr Piao Yongfan)

Regional capacity has been reviewed in a comparative analysis of 10 countries and their capacities in PRA and SPS measures. Several workshops have been held recently on plant inspection, PRA and import regulation and ISPM No. 15 (wood packaging). These have been provided through a series of regional capacity-building projects. The Asia Development Bank (ADB) has an action plan for SPS capacity-building in countries of the Greater Mekong Subregion (GMS). The area of incursion management has been identified for attention and a workshop will be held shortly. A risk of particular regional concern is South American leaf blight of rubber (*Heavea*); a PRA has been conducted and a regional standard for phytosanitary management was adopted.

3.4 Barriers and challenges for decisions about phytosanitary risk management in the region

(Ms Wan Normah Wan Ismail)

Based on presentations by country representatives in the region, it is obvious the decisions about import risk and risk mitigation are made by the importing countries. Exporting countries must comply with phytosanitary conditions imposed by importing countries. Some of these measures include phytosanitary treatments such as irradiation and vapour heat which require large investments to make available.

Among the issues are lack of negotiation skills and capacity plus lack of knowledge and information on equivalent measures such as Systems Approach.

The roles of stakeholders are very important in implementing integrated measures under a Systems Approach. They place great importance on profit/benefit to be gained, before agreeing to take part in a systems approach involving pest management records and investments to comply with phytosanitary measures.

Table 2. Descriptions of phytosanitary risk management arrangements in five countries

	Malaysia	Thailand	The Philippines	Vietnam	Indonesia

What is the overall structure of your NPPO?	Ministry of Agriculture (MOA) provides policy on import and export.
	Dept of Agriculture (DOA) is the NPPO and provides management and regulation
	• Plant Quarantine Act 1976 and Plant Quarantine Regulation 1981.
	MAQIS undertakes border inspection.
	DOA Crop Protection & Plant Quarantine Division consists of:
	• Import & export control section
	• Plant quarantine enforcement section
	• Diagnostic and expertise section
	• Depository and repository section
	• Pest management section.
		Ministry of Agriculture & Cooperatives (MOAC)
		Dept of Agriculture (DOA)
		• Office of Agricultural Regulation (import / export plant quarantine service)
		• Plant Protection Research & Development Office (plant protection research)
		• Post-harvest & Products Processing Research & Development Office (certification body of GAP)
		National Bureau of Agricultural Commodity and Food Standards (ACFS)
		• Official contact point for SPS / CODEX / IPPC / OIE
		• Accreditation body of agricultural commodities
		Dept of Agricultural Extension (DOAE)
		• Plant Pest Management Center
		• GAP advisor
		• IPM training
			Presidential Decree 1433 (Plant Quarantine Law of 1978)
			Bureau of Plant Industry
			• Six divisions
			• Four component facilities including Plant Quarantine Service (NPPO)
			PQS is responsible for policy, regulation and operation of phytosanitary law.
				Ministry of Agriculture & Rural Development (MARD)
				Dept of Plant Protection (PPD) (NPPO)
				• Plant Protection Division
				• Plant Quarantine Division
				  ○ 9 regional PQ sub-depts
				  ○ 42 PQ stations
				  ○ 2 Post entry quarantine centres
				• Pesticide Management Division
				• Inspector & Regulatory Division
				• Pest Quarantine Diagnostic Centre (PQD)
				  ○ Conducts PRA
				• Administrative divisions
				
				Ordinance on Plant Protection and Quarantine (rev 2001)
				Decree on Plant Quarantine (rev 2007)
				Various Decisions of Minister of MARD and DDG of PPD
					Ministry of Agriculture
					Indonesian Agency for Agricultural Quarantine (IAAQ)
					• Centre for Plant Quarantine (CPQ)
					• Centre for Animal Quarantine
					• Centre for Quarantine Information and Bio-safety
					CPQ
					• Division of Plant Import
					• Division of Plant Export and Domestic
					• Division of Technique and Method
					IAAQ is the NPPO
					• Directorate of Protection for Horticultural Crops
					• Directorate of Protection for Food Crops
					• Directorate of Protection for Estate Crops.
					
					52 quarantine services/stations in 52 seaports and airports (Indonesia has 17,000 islands and many pests are restricted in distribution; very large task)
					
					• Law No. 16 of 1992 concerning Animal, Fish and Plant Quarantine.

					• Government Regulation No. 14 of 2002. • Minister of Agriculture Decrees ○ Pest list in MD No. 38 of 2006 • IPPC / APPPC standards (ISPM, RSPM)
Who proposes the risk management measures (e.g. PRA unit, policy unit)?	PRA is conducted on new imports or upon interception of quarantine or regulated non-quarantine pest. PRA prepared by committee from IECS and DES.	PRA is initiated after written request for access by exporting country to DOA. PRA is conducted by PPRDO PRA unit. Risk management measures are set under criteria of the Quarantine Act and as per ISPMs.	PRA is initiated after written request for access by exporting country. PQS forms a PRA team.	PRA on first importation, new origin of importation, scientific evidence of an outbreak of quarantine or regulated non-quarantine pest in the export country, detection of regulated pest in the import commodity. Based on IPPC and ISPMs.	PRA prior to importation. Conducted by Plant Quarantine Expert Committee appointed by the DG of IAAQ.
Is the risk management plan designed during the PRA process or separately?	Import protocol is prepared after the PRA		PR management team is formed after risk assessment stage.		
Who finalises the plan?					
Is it a bilateral negotiation?		Yes. Includes findings of visits to exporting country.			
Are stakeholders consulted (exporters, industry etc)?			Yes. Comments and recommendations are sought at each stage. Also review of the draft PRA by a panel of experts and public consultation on the final draft PRA.		
Is this published before becoming binding?		Notified to WTO for 60 days. Published in Thai Government Gazette	Yes		
If it is a Systems Approach, are any of the steps different than for a single measure?					

4 Emerging approaches to risk management decision challenges

4.1 Australian drivers for more reliance on Systems Approach

(Dr Greg Hood)

Australia uses Systems Approach (SA) for fruit fly risk management for domestic trade. Currently the SA involves areas of low pest prevalence and pest-free areas, in-field and post-harvest chemical treatments and area-wide IPM. Each of these has a number of elements including the Interstate Certification Assurance (ICA) system. The use of fenthion and dimethoate is currently under government review and there is real concern that the future of these key treatments is in doubt. There is also concern about potential incursions of new pests and the effects of climate change. A government/industry national fruit fly strategy has been developed and a number of projects are in train. A Bayesian Network (BN) was commenced to model the system, showing the Pathway, Controls and Activities, Risks, Costs or Utilities of the controls, and points of intervention. The approach provides for:

- Describing and understanding components of the system
- Incorporating models (subcomponents)
- Structured/targeted gathering of evidence
- Highlighting critical data and/or research needs
- Identifying certification steps
- Putting case to regulators
- Evaluating cost/benefit

How the BN approach is communicated is critical, as a complex system can be daunting to people such as regulators who are not used to such modelling. The BN can be presented as a simplified version, showing the key issues and dealing with the complexities at another level.

4.2 PRATIQUE – a European project

(Ms Megan Quinlan)

The European Community has been reviewing pest risk analysis in a major project called *PRATIQUE*, involving 15 partners from 9 countries, plus international observers. SA has been studied at Imperial College London in *Pratique Work Package 4.* Europe has traditionally used an end-point approach using global regulations. Due to increasing outbreaks, there is growing interest in pathway-initiated PRAs and the use of SA. Combined measures have been used in the past, but not in such a structured fashion as envisaged in SA.

The study on SA showed that schemes were based on species-originating PRAs that did not necessarily address how to control the pest most effectively and at what points in the pathway. It was concluded that a more critical approach using a different structure was required. SA offers advantages in enabling the use of *control points* in the production and marketing system, allowing the modification of the system by degrees rather than fundamental changes, and enabling non-compliance issues to be addressed at specific points rather than with the whole system.

4.3 Convergence of common interests – developing this initiative

(Dr Peter Whittle)

This presentation drew together the threads of previous talks, to reiterate the purpose and plan of the workshop and to focus the coming sessions.

Countries around the world, including in Europe, Australia and southeast Asia, experience problems with 'conventional' phytosanitary trade systems based on single, end-point systems. SAs present the opportunity to trade safely using combinations of risk management measures that may be more affordable and simpler to implement, more sustainable economically and environmentally, more robust (through redundancy of measures) to risk of trade suspension resulting from failures, etc.

SAs have been developed between many countries, but their development can be difficult, in elucidating and agreeing on the system; there is uncertainty about the system model itself and about its components, such as specific risk management measures and their efficacy. This uncertainty and lack of data often results in lack of progress, with requirements for further research that may not be feasible.

BNs present the opportunity to resolve these problems. BNs are probabilistic models, which identify the various components of a system (nodes) and the relationships between them. They are underpinned by the Bayesian statistical paradigm, which permits estimates to be used for the different states of a node and the values of the states. Preferably the estimate will be based on strong empirical data, but if data are lacking, it is permissible to use a "best estimate", which could be elicited from "experts" who are familiar with the system. Having developed the system and quantified the node states with estimates, the BN of the system is "compiled" and will show the final probability of the system, for example that the commodity is infested with the pest. Sensitivity analyses can then be conducted, to show the relative importance of nodes in the system. This could enable decisions to be much better informed than without the BN, for example a risk management measure that is considered to be critical and requiring more research may be shown to be of insufficient importance to require more research. Conversely, new intelligence may emerge about where more effort would be best spent. After the implementation of a BN, the estimates can be updated as new data are collected. Potentially a BN could be used dynamically to 'run' phytosanitary trade.

Developing BNs for SAs is complex – potentially overwhelmingly so – and it is important to develop and communicate them tactically. A BN for an SA can show the trade pathway, the opportunities for infestation to occur, where pest risk management measures can be best applied, and what the costs or utilities of the measures may be. Their development and communication needs to be focused on what will best accomplish these things. Greg Hood's presentation illustrated these points effectively, by breaking the BN into functional sections. The *PRATIQUE* BN template has dealt with these issues by one approach, focusing on "Control Points". We used the template to evaluate a hypothetical example of the importation of rubber budwood and the risk of transferring South American leaf blight (SALB). This cursory example showed that an SA could be robust by relying on several independent measures that complement each other, but it also showed that conventional PRAs may have insufficient focus on risk management to give the information required. Hence, the risk management component of PRA may often be *ad hoc*, consistent with common experience.

The shared interest of Europe and Australia in developing rational SAs that address these problems, and the simultaneous interest in using BNs for the purpose, led to communication over the past two years. The *PRATIQUE* template, which may be adopted into policy, provides a timely opportunity for a regional project in southeast Asia. Using some local case studies to test the template will support further development of the method, at the same time delivering outcomes in capacity building and possibly in developing trade opportunities with the case studies. The STDF Project Preparation Grant supporting this meeting is for the purpose of building such a project, to be run over three years from mid-2011. We are seeking 2-3 countries to participate in the project with their case studies. The studies will be undertaken by local people, who will have the opportunity to undertake plant biosecurity studies and higher degrees at QUT and/or ICL. A range of regional development activities will also be carried out.

4.4 Use of Bayesian Networks

(Prof Kerrie Mengersen)

This session was an exploration of the nature and potential of BNs, illustrated with examples of BNs for: *Lyngbya* (a blue-green alga affecting Moreton Bay in Australia); the successful relocation of Cheetahs in Africa; surveillance in Brisbane Airport; developing biosecurity surveillance for an island nature reserve; fruit fly incursions in Australia; prediction of armyworm outbreaks; and import risk assessment in EPPO. For *Lyngbya*, the process of developing the BN brought together a wide range of stakeholders to bring out all sources of data, published and unpublished. Jointly a conceptual map was built, then the model which was constructed and populated with estimates based on a consensus view of knowledge and uncertainty. The model allowed for exploration of the effects of change scenarios and the impacts of potential management and policy decisions. The outcome was a shared, rational, analytical approach to decision-making affecting many stakeholder groups.

BNs are developed using software to build a graphical model that can be populated with factor estimates of various types. There are numerous packages available and for this project, we have decided to use GeNIe, which is available free from Microsoft.

An interactive workshop was run, in which participants developed a simple, hypothetical BN of the probability of a carton of citrus being infested with fruit fly. This enabled participants to understand how to use BN software to build a model, make estimates using expert elicitation, enter the estimates into the BN and populate the conditional probability table (CPT), compile the model, evaluate the output and test system sensitivity to scenarios.

This workshop received positive feedback from participants who were able to see the potential for BNs in developing and negotiating SAs.

5 Developing trade opportunities: an integrated systems approach

This session was to discuss the current situation and its problems and the benefits offered by the proposed project.

Trade systems based on single, rigid measures may be technically sub-optimal:

- Single measures have a risk of failure that can result in total suspension of the trade, and an SA system may be more flexible, robust and responsive
- Some measures, such as a heat treatment, may affect product quality adversely
- Certain chemical treatments may pose environmental, occupational or food hazards
- Single measures may not be the most efficacious option for mitigation of the pest in question and multiple measures in an SA may work better
- Single measure approaches may ignore risk mitigation actions that are presently part of the system and could be readily brought into an SA.

Delegates were concerned about asymmetric relations in trade, which tend to arise with single-measure arrangements. These arrangements are often unilaterally imposed, without significant negotiation. There was a view that SAs, developed collaboratively using the CP-BN approach, as well as giving technical improvements, would be embraced better by both the importer and the exporter. The exporter would have a more constructive role and more control in negotiations, and greater opportunity to exercise local knowledge and decision-making in the operation of the agreed trade, with greater sharing of responsibility.

5.1 Project concept

5.1.1 Rationale

- Pest risk management imposed by importing country NPPOs will be more transparent, consistent and justified as proportional to the estimated risk.

- Measures combined in the new approach will be more widely applied without unnecessary redundancy.

- National goals to reduce use of chemical-based end-point treatments will be advanced.

- Exporting countries with fewer resources will have the capacity to more confidently negotiate equivalence agreements to use measures better suited to their own conditions.

5.1.2 Anticipated outputs:

1. A description of pest risk management evaluation and design in the region.

2. Case studies of priority trade opportunities using Systems Approach for pest risk management.

3. Demonstration and evaluation of quantification and analytical tools (specifically control points and Bayesian Nets) to support use of Systems Approach.

4. Establishment of a competency base with the methodology in the Southeast Asian sub-region.

5. A plan for a harmonised framework (possibly leading to an RSPM).

5.2 Case studies for inclusion in project

Participants proposed and discussed a range of options for case studies in the project. The final list is below. The first two examples pertain to the sub-region, while the others are for individual countries. The sub-regional cases will be undertaken by Malaysia and Thailand respectively, while the other cases will be undertaken by the exporting country.

Commodity	Exporting country	Importing country
Fresh produce (not rubber plants) that may carry South American leaf blight of rubber	Countries with SALB	Malaysia (for the region)
Oil palm seed	Countries outside the region	Thailand (for the region)
Dragon fruit	Vietnam	South Korea, Taiwan
Mangosteen, avocado	The Philippines	USA
Jackfruit	Malaysia	China, Australia
Orchid cut flowers	Thailand	Europe

5.3 Further details

This session involved discussion of further details of the project, that remain to be developed in the coming months as the proposal is written. Following are brief notes of the discussion.

5.3.1 Participation in the project

- Funding body representation in project oversight.
- Project manager – Dr Peter Whittle is expected to be available in mid-2011 to manage the project through QUT and this was proposed to the workshop and was accepted. Also it was proposed and accepted that CABI would provide local organisational support in the region.
- Supervising group – NPPOs and the RPPO/IPPC would have a role in oversight of the project
- Investigators – each country involved will provide a staff member to undertake the study. The time involved in this activity has not been determined. Funding, partial or whole, will be sought as part of the project grant. Countries will also need to provide expertise and support for occasional workshops for developing and reviewing CP-BNs. Countries will also need to be active in training opportunities. The investigators will have the opportunity to undertake postgraduate studies at QUT and/or ICL as part of the project.

5.3.2 Potential funding sources

This section is not intended to imply arrangements or obligations. The following notes were made about possible sources of project funds:

- STDF – US $600K over 2 years

    - Some funding, also an advocate for other agencies
- Trade Facilitation Fund (TFF) of World Bank
    - US $1M, fast turn-around
    - Mostly funded by Sweden and UK
    - Vietnam to make first contact? (LDC or DC?)
- IDRC – Canadian innovation program – office in Singapore
    - Up to $500K for 2-3 years
    - Reviewing programs now. Some components e.g. Innovation Policy & Science
    - Lum/CABI will inquire
- Crawford Fund
    - Workshops & training
    - Peter will inquire – workshops at inception and end, tied to training
- ACIAR – primary interest is research
- AusAID – possibly interested in sub-regional project like this
    - Inquire through country office? Each country to do this. PW to enquire at head office.
- ASEAN – Suwanda will ask
    - Funding from donor countries
- CRC NPB – depends on re-bid success to be known in late 2010. Peter continue to liaise.
    - Some chance of seed funding
- ABARE – BRS - minor specific funding - Greg
- QUT – linked funds for a PhD scholarship have already been promised
- USA – John will ask
    - APHIS for training costs
    - ARS/ERS for research aspects, e.g. economic impacts
    - USAID – is this regional or all bilateral?
- New Zealand
    - NZAid – program concluded for phytosanitary capacity building; not continuing, but putting funds into FTA (free trade area) jointly with Australia.
    - Discuss with ASEAN & Australian Govt.
- Qld government – Kerrie inquire
- FAO – funding from member countries and donors.
- European Aid sources – John & Megan
- Industries – potential to contribute to case studies?
    - Loreta will ask in Philippines
- DIFFID
- GTZ
- IAEA/FAO – might fund expert participation, country surveys
    - Megan will ask
- MB emission reduction
- CABI
    - May be an information portal at end

5.3.3 Technical aspects

- Each case study will require a PRA, focused on control points.
- Build the BN (conceptual model, then quantified)
- Evaluate the conventional and SA alternatives
- Communicate and refine the BN with stakeholders
- Report and recommend on SA trade proposal
- Common features report & technical recommendations on the total project. Harmonised SA framework and generic tool for dissemination.

5.3.4 Responsibility matrix

This remains to be completed

OUTPUTS (cFill in cells with who is responsible for each) Themes	1. Description of PRM design & evaluation now	2. Case studies of priority trade opportunities	3. Tools for evaluating and analysing	4. Competency base in countries / region	5. Harmonised framework towards standard
Technical					
Conceptual					
Institutional					

5.3.5 Investigator networking

- For budgeting purposes, 0.5 FTE per country for investigator – to be refined. This work will overlay some existing work (how does it interact with existing functions?)
    - $ in project for participants, plus $ as in-kind contributions
- Monthly Skype meetings
- Workshops every 3, 4 or 6 months (depends on budget)
- Quarterly written reports
- Annual and final reports

5.3.6 Communicating

- To investigator group
    - See Networking
- To Project group
    - Quarterly written reports
    - Presentations at periodic workshops
- To regional and other interest groups

- Presentations at their workshops
- Final report & Annual reports
- Who are the stakeholders and interest groups?
    - IPPC, APPC

5.3.7 Administration

- Appointments
- Payments
- Report dissemination
- Travel arrangements
- Workshop arrangements
- Grants & grant admin

5.3.8 Managing

- Possibly a fulltime job for Project Manager, plus local organisational support at a central point and in investigating countries
- Funding and project development
- Participant agreements
- Supervision of investigators, within their organisation, in the project and potentially as students.

5.3.9 Training

- MSc and PhDs (also Australian Plant Biosecurity course, but this is currently not available for international students)
- Workshop in first 6 months – training in quantitative analytical methods and SAs
- Final workshop on SAs and analytical tool
- Online training materials
- Online templates and tools
- APPC

5.4 Final plans

This workshop report will form the basis for discussions with potential funding bodies, and for proposed participants. Proposals will now be developed by QUT and ICL, in consultation with workshop participants, in particular with countries proposing to be involved as investigators. If possible, funds will be sought for commencement of the project in mid-2011.

6 References

FAO-IPPC (2002). "International Standard for Phytosanitary Measures No. 14, The Use of Integrated Measures in a Systems Approach for Pest Risk Management."

IPPC (2007) ISPM No. 2: Framework for Pest Risk Analysis.

APPENDICES

Workshop agenda

STDF PPG workshop presentations Kuala Lumpur, 16-19 August 2010			
Theme	Author	Presentation Title	Power point file name
17 August			
Introduction	Kerrie Mengersen, from PPG proposal	STDF proposed project Objectives. STDF Proposal Preparation Grant.	MENGERSEN stdf_objectives.ppt
Existing situation	Loreta Dulce	Country report – Philippines. Phytosanitary risk management procedures.	CountryReportPhilippines.ppt2
	Duong Minh Tu	Country report – Vietnam. Current status of pest risk analysis for import plants and plant products in Vietnam.	TU Current status of pest risk analysis in Vietnam.ppt
		Country report – Malaysia. Phytosanitary management procedures in Malaysia.	OTHMAN DOA Malaysia.pptx
	Tasanee Pradyabumrung	Country report - Thailand	Pradyabumrung present 16Aug10.ppt
	Suwanda	Country report – Indonesia. Plant quarantine profile of Indonesia.	SUWANDA STDF KL 2010.ppt
Regional perspective	Masahiro Sai	Comments on regional capacity.	SAI Outline of Sai's presentation.docx
	Yongfan Piao (APPPC)	An integrated systems approach for pest risk management.	Piao-System approach-Malaysia-2010.ppt
Emerging approaches to risk management decision challenges	Greg Hood	Australian drivers for Systems Approaches	HOOD Aust_drivers_KL_v02.ppt
	R Baker, J Holt, J Mumford, M Quinlan, AW Leach, J Knight. Presented by Megan Quinlan.	Emerging approaches to phytosanitary risk management decision challenges: PRATIQUE – a European project.	QUINLAN Pathways and systems presentation 20100127.pptx
	Peter Whittle	Convergence of common interests.	WHITTLE Convergence of common interests.pptx

		Developing trade opportunities: an integrated approach for pest risk management	
Use of BBNs	Kerrie Mengersen	Bayesian Belief Networks: an overview	MENGERSEN stdf_bn_overview.ppt
	Peter Whittle and Kerrie Mengersen	Case study BBN for South American Leaf Blight on rubber, based on APPPC's PRA.	
18 August			
Project plans	Quinlan with Group Mumford with Group etc	Project outputs Selected case studies Clarified problem/benefit statements	See notes in this report
19 August			
Project proposal plans	Whittle with Group	Project management structure and activities by outcome	See notes in this report
	Group	Possible funding sources and follow up.	See notes in this report

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PROJECT PREPARATION GRANT SSTDF/PPG/328
DEVELOPING TRADE OPPORTUNITY
&
INTERGRATED SYSTEM APPROACH FOR
PEST RISK MANAGEMENT
16 – 19 AUGUST 2010

Workshop evaluation

The workshop was evaluated at the end by way of an anonymous form, responses below. Predominantly responses were positive about the topics, materials, presentations and content. Nearly all want to participate in the proposed project, with some only partly committed and none in disagreement.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Did the workshop cover the topics that you expected?	Y	Y	Y	Y	Y	Y	y	Y	Y	Y	Y	M	Y	Y
Were the materials and presentations clear?	Y	Y	Not all	Y	Y	Y	y	M	Y	Y	Y	Y	Y	Y
Did you gain new information and ideas and information in the workshop?	Y	Y	Y	Y	Y	Y	y	Y	Y	Y a lot	Y	Y	Y	Y
Do you want to participate in the proposed project?	Y	M	Y	Y	Y	Y	y	Y	M	Y	Y	M	Y	Y
How do you rank the facilities at the hotel? (Corus, KL)														
Guest facilities (room, breakfast, reception etc)	Fine quality but room very noisy at night	Very good		Very good	Room good but lobby very noisy	Y	Reasonably good	Y	Good	Good	Great	Very good	Very good	Good
Meeting facilities	Excellent	Very good		Very good	Yes, good, thanks to secretariat	Y	Adquately good	Y	Good	Good	Great	Very good	Very good	Good
Any other comments?	Very glad meeting took place, good start				Should involve people who have really implemented this like Australian to get more experience	The workshop is very good.	Facilities in the 'Suran' could be further improved.	I think this workshop for 'consultation stage' not for 'commitment', so we get the idea or concept to our country and explain to ones concerned before commit. Because of it's a new concept.				The workshop should also involve the people who work on doing PRA. It will enrich the value of the workshop based on their experiences		

Y = yes; N = no; M = maybe