



**Cooperative Research Centre
for National Plant Biosecurity**

Final Report

CRC70138

Community-based Biosecurity (Phase 2)

Authors

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1. Executive Summary

The final report reviews the development, trialling, evaluation and implementation of the community biosecurity model and strategy developed in research over the five year period 2007-2011 in these sites:

1. implementation in Northern Australia
2. implementation by Maluku Province and its government in Indonesia
3. implementation in organic farming: Jatiluwih and Wongaya Betan Organic and Biosecurity Farming Program
4. implementation into education programs from primary to tertiary levels.

2. Aims and objectives

The final report amalgamates the work from both Phase 1 and Phase 2, as the latter built on the former incrementally using participatory research spanning five years 2007-2011. The research set out to investigate how to set up a community-based system for identifying and managing plant pests and diseases across sites in two countries, Northern Australia and Eastern Indonesia.

The last milestone was to implement the community biosecurity model developed and this has been achieved.

The original aims of Phase 2 as stated in CRC proposal in 2008 were:

- develop and implement a joint Indonesian/Australian coordinating framework for plant biosecurity risk mitigation (current running title: The Australia Indonesia Plant Biosecurity Response Framework)
- validate key components (leadership, governance, enterprise, policy, community knowledge) of the CRC NPB community management model
- integrate the key model components
- implement and evaluate the CRCNPB community management model in northern Australia and eastern Indonesia
- establish a joint Australia/Indonesia research award framework.

It was anticipated, and was subsequently borne out, that those who would benefit from the research would be:

- government, NGO's and international agencies such as ACIAR and AusAid
- Australian government agencies such as DAFF (AQIS)
- local communities and their leadership in Eastern Indonesia and Northern Australia
- Australian government involved in policy establishment (DAFF, DFAT)
- International aid/donor agencies such as World Bank.

3. Key findings

Implementation has been achieved at political system level, industry system level and education and training system level. National policy in Indonesia has adopted the term 'biosecurity' and most senior Ministries are aware of and working on its implementation in a number of ways. The Maluku Province is an excellent and advanced example (3.1), agricultural systems is exemplared through the Jatiluwih case (3.2), and a sample of education implementation examples are then provided (3.3). It should be noted that the research students and other team members working in this research have had additional high levels of impact from their publications and networks. These are reported in the book 'Managing Biosecurity' published by Springer, a proof copy of which is attached to this report.

In Australia, the engagement and knowledge dissemination model and associated resources have been adopted by the enterprises in the Indigenous communities involved in the study, as well as at least 10 Indigenous communities across Northern Australia other than those involved in the project. It is being used by the Northern Australian Indigenous Land and Sea Management Alliance to develop their strategy and materials to roll out the

i-tracker data collection program, and the Northern Territory Government Department of Natural Resources, Environment, The Arts and Sport to negotiate and improve community engagement in plant biosecurity and other related work. The calls for extension of the approach into new communities provide an opportunity to explore its effectiveness in dealing with other regional plant biosecurity issues.

The main findings are that effective plant biosecurity strategies:

- start by establishing and aligning with local community priorities
- explore and utilise best practice in biosecurity identification, impacts, surveillance and management
- understand and make strong connections between industry, government and community partners
- invest in first relationships and developing a commitment, then in skills and knowledge development
- identify socially, culturally and economically viable enterprise opportunities that can lead and undertake plant biosecurity management activities
- use evidence based decision making tools to support local decision making
- work through community's first language, local context and governance structures
- where appropriate explore the use of multimedia for communication across languages, power and knowledge structures.

3.1. *Implementation by Maluku Province and its government in Indonesia*

The Maluku Government has apportioned a significant budget amount to roll out biosecurity measures in partnership with the CRCNPB and CDU, starting in the Saram Island region, and incorporating an organic component. The slides below summarise the activities undertaken to date:

Ambon biosecurity research update

Acknowledgement:

- Charles Darwin University
- CRC National Plant Biosecurity

1

Ambon project

- 1. Pattimura university biosecurity team.
- 2. Maluku provincial pilot implementation.

2

Stages

- I: Organic farming research.
 - January to April 2011.
 - Presentation in the next workshop.
- II: School book writing.
 - April to October 2011.
 - Presentation in the next workshop.
- III: Reporting.
 - November 2011.

3



4

Biopesticide making.



5

Biopesticide making.



6



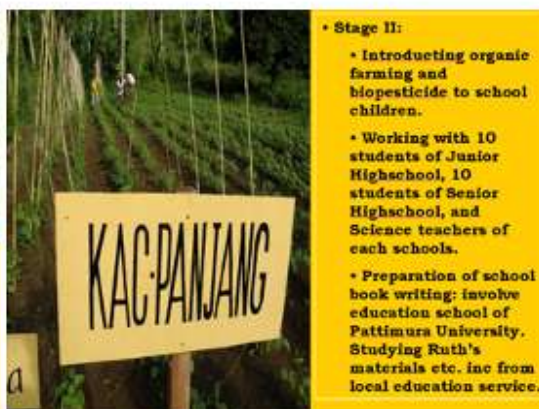
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8



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3.2. Technology for rural biosecurity development: implementation in organic farming



A rice paddy irrigated field, water from the Subak water management system, unique to Bali, and the subject of current World Heritage listing in which CDU and the CRC are partners

Jatiluwi and Wongaya Betan are sites in Tabanan regency, Bali, where 75 % of community are farmers. This area consists of 15 subaks (traditional organizations for water irrigation management for rice paddies and other farming activities) and since 2003 subak Jatiluwi and Wongaya Betan have planted organic produce. In those subaks, all of the members have 2-3 cattle each, and they process the manure individually. After about seven years, on December 2010, Subak Wongaya Betan won the National organic certification (SNI) for their rice organic farming.

The contribution of Unmas, one of AusIndoBIOCOM, the CRC and CDU's partners in Indonesia, was to conduct training on many aspects related to organic farming systems:

1. Training the members of Subak to manage cow manure for use in organic fertilization



2. Training to eradicate fruit fly on 'Sawo' and 'Manggis' (Mangostene) fruit



3. Cow Manure Management

5. Fertilisation Activities on Sawo tree



4. Sawo fruits



6. Management Activities on Manggis (Mangostene)



7. Women Group Training on Small Home Industry

8. Training in Organic Farming



9. Planted by Organic Farming System



10. Local Varieties preserved

3.3. Implementation into education programs from primary to tertiary levels

Specific instances are reported in Milestone and Quarterly reports and detail will not be re-reported here, so the points below summarise the key activities in this area:

- incorporation of biosecurity into Masters and PhD programs in at least three universities in Indonesia, more in the pipeline
- at Unmas, biosecurity is embedded throughout the teacher education programs as 'ecoliteracy' and other conceptual areas, so biosecurity is penetrating the system at all levels
- in Maluku Province, the University Pattimura team is developing school classroom resources for biosecurity education using the existing CRC education products as a basis
- partners in AusIndoBIOCOM have been successful each year in gaining national research grants, most of which have educational outcomes and products, all of which are related to biosecurity. This has ensured rapid uptake of the term and policy penetration
- project on water catchment-wide water management to UNESCO, partners are Unmas, Arizona University, Santa Fe Institute, CDU and AusIndoBIOCOM
- DIKTI (Indonesian national Ministry of Education, equates to ARC in Australia) proposal on International Collaboration with the same group of partners.

3.4. Findings

Finding 1

A sustainable model for the community management of biosecurity has two key components: *social structures* and *social processes*. It was found that these two components were each essential to effective implementation, and each variable depended on the analysis of the community and the community's identified purpose of the intervention. A model of community management of biosecurity occurs through:

- a) assessing community capacity in terms of its structure and process
- b) building capacity in identified gaps
- c) identifying common purpose of change process
- d) working with a balance between *structures* and *processes* in engaging with communities from grassroots to policy.

Finding 2

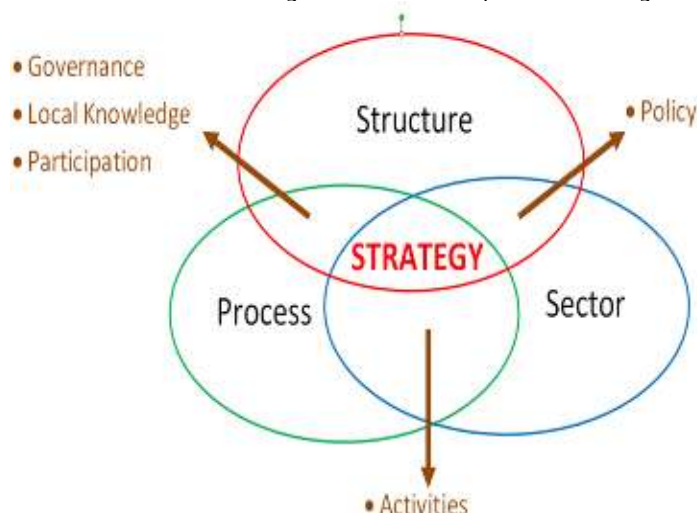
There is a need of a new and integrated strategy in biosecurity management. This strategy must explicitly target seven situational domains in a society and community if it is to be effective and sustainable:

1. governance
2. leadership

3. enterprise and entrepreneurship
4. knowledge transfer
5. local knowledge
6. organisations
7. ecological situation.

Finding 3

The model (See Finding 1 above) was developed into an integrated strategy based on the seven domains in Finding 2. The strategy is organised into the two dimensions of structure and process found to be vital in Finding 1 with sectoral specifics forming the third domain:



Finding 4

Finding 3 above portrays the way the strategy is formed at the convergence of structure, process and sector, and this is actioned through a matrix trialled and used in planning processes:

		STRUCTURES				
		Local Knowledge	Ecological Knowledge	Enterprise/ Institutional Knowledge	Government Agencies (Policy)	Networks/ Reciprocal Relations
P R O C E S S E S	Knowledge Recognition					
	Knowledge Transfer					
	Engagement					
	Leadership & Social Processes (Gender, Language, Culture)					

Additional detail on findings

The whole project was structured so as to ensure the final implementation of a community biosecurity model was systematic and encompassing. To ensure this was achieved, a matrix was used during the development, trialling, evaluation and implementation stages and modified in accordance with emerging research outcomes. Then these areas were categorised according to the sectors, disciplines and activities into two dimensions,

'structure' and 'process'. *Structure* and *process* were found to be the two categories of elements in a society that needed accounting for in a sound strategy for managing biosecurity. The five structures that arise as being most vital are:

1. government agencies/policy
2. ecological considerations and scientific knowledge
3. networks, especially reciprocal relations within network interactions
4. institutional knowledge especially the role of enterprise and markets
5. local and indigenous knowledge.

There are four sets of processes found to be vital:

1. leadership and social processes, including culture, language and gender
2. engagement (change) processes that produce knowledge and outcomes
3. knowledge recognition
4. knowledge transfer.

These have been presented in findings 1-4 above.

Through participatory processes and based on the previous information, a series of cross-cutting analytic steps were employed. The quantities and nature of each data response were then reviewed, coded according to origins and researcher, and re-categorized into possible new schemas to see which had the best 'fit' for the data and the consensus of the research team.

Of vital importance is the process element that relates to the engagement processes, since without these no effective and sustainable strategy is possible. Engagement processes have also been shown to be required within all levels of society, grassroots to national government so that knowledge and strategies are shared and become part of the way that group does business. However, this is insufficient as well, as we have learned that these interactions between people and knowledge at one level or another must be two way engagements, and paralleled by interactions linking the various levels of the hierarchy. In summary, all research points to an *integrated* strategy supported by policy as the way forward with planned engagements (formal and informal) at these levels (following Woolcock, 2001):

1. **bond:** plan activities and interactions within sectors/groups/organizations/communities, towns and so on
2. **bridge:** plan across sectors at same level
3. **link:** plan up and down sectors in the hierarchy.

In other words, 'top down' must meet 'bottom up' & 'sideways' in structured, trusting and non-threatening forums may provide. As a side issue, any such process benefits from a continuous evaluation program that parallels the strategic planning processes.

From model to planning a strategy

The aim of the project was to develop, trial, evaluate and implement a *model*. This was achieved quite early on in the research. In consultation with stakeholders, it was made clear that the implementation phase would need to occur through a *strategy*, and a strategy required some further development.

A strategy is made up of a number of activities. To plan a strategy using this model, the first step is to plan what activities should make up the whole strategy. That is, for the whole strategy and for each activity:


1. identify common purpose
2. consider each dimension of structure and process
3. develop action plans aimed at common purpose for each cell where structure and process intersect
4. incorporation of collective thinking about intersection of cells ensures participatory, inclusive and ethical activities that form a whole strategy.

Next of importance is to recognise and plan for the different kinds of engagement that are crucial for success in building a strategy that is integrated, comprehensive and sustainable, using the bonding, bridging and linking categories. Therefore, the implementation phase was planned according to these three categories, as now explained.

The implementation phase in action

1. *Bonding: local knowledge integrates with scientific knowledge in a social ecological approach*

Bonding interactions are those between people in the same close or homogenous groups, such as family and close friendship groups. In the example below, we see a group of women engaged in informal discussions which revolve around the quality and quantity of the food supplies which they deal with on a daily basis.

		STRUCTURES				
		Local Knowledge	Ecological Knowledge	Enterprise/ Institutional Knowledge	Government Agencies (Policy)	Networks/ Reciprocal Relations
P R O C E S S E S	Knowledge Recognition					
	Knowledge Transfer					
	Engagement					
	Leadership & Social Processes (Gender, Language, Culture)					

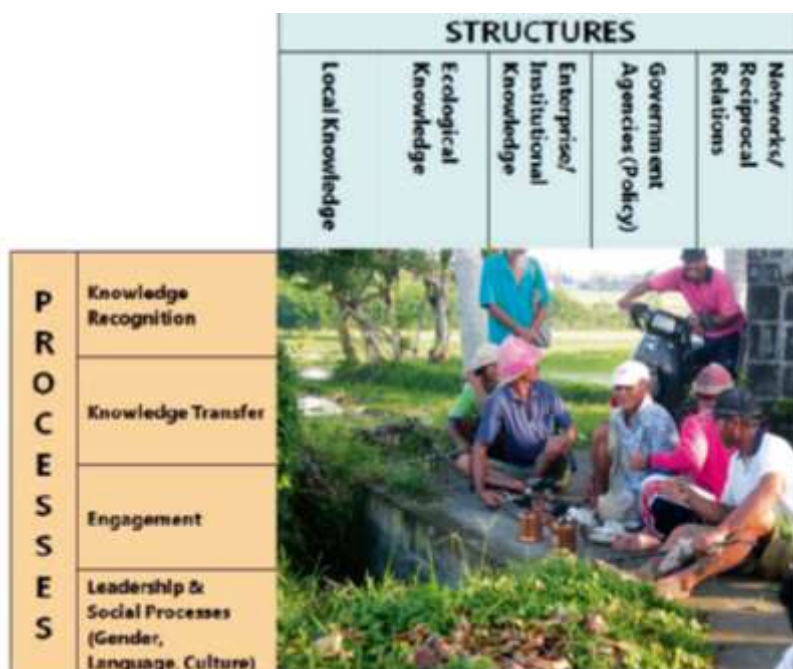
In the majority of the sites, women provide the most common connection of food product from field to market yet, as a source of local knowledge about biosecurity matters, their knowledge is not commonly shared so that biosecurity management can be improved. The axes of the matrix into which the photograph is pasted bring together the structural components (columns) with the process components (rows) and provides an integrated framework for considering planning options at various levels as well as cross-checking and evaluating that all major inputs into a rigorous planning process are accounted for. Hence, questions based on the matrix that can be raised with groups such as these, in an informal way, could involve 'local knowledge', 'enterprise' (Market activities), leadership processes, and perhaps ways in which their 'knowledge' could be 'transferred' so as to improve biosecurity management.

Questions such as knowledge transfer can provide the clues as to how the best benefit could be gained from bridging interactions, such as the example that follows, and representatives of the group pictured could be invited to attend or observe bridging or linking activities such as those below.

2. *Bridging: sharing local and regional knowledge in cross-sectoral planning forums for common purposes*

Bridging interactions are those that connect people in heterogeneous social networks at similar 'levels' in their respective communities and often between different communities.

In the example of a planning activity below, we see a photograph of a group of Balinese farmers gathered from around the district, learning about the technologies for the eradication of mice in rice paddies.

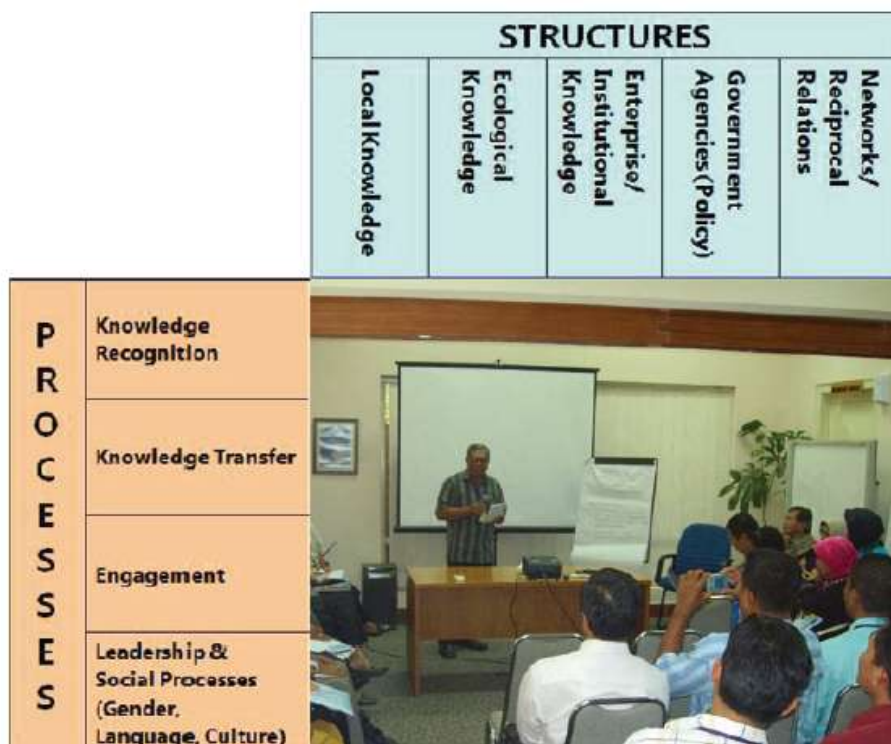


Again, for this example, the axes of the matrix into which the photograph is pasted bring together the structural components (columns) with the process components (rows) and provides an integrated framework for considering planning options at various levels as well as cross-checking that all major inputs into a rigorous planning process are accounted for. Hence, questions can be framed to inform planning interactions (conversations, meetings, forums and so on) around the components. For example, in a scenario such as the one shown, one could ask if the relevant local and scientific knowledge about rodent management has been discussed in groups such as this, and suitable participative processes taken place so that both sides see the relevance of the other's views. Has the local traditional leadership, as well as bureaucratic leadership, been engaged in discussions? Similarly, for follow-up work, organisers would ask how and who should be involved in the additional bridging and linking interactions that may flow from the planned activities? Planning these kinds of issues and following through will result in an interlocked set of knowledge. Structures and processes related to biosecurity management in that region.

It should be noted that local modifications to scientific practices are applied depending on the local circumstances. In this region, for example, a quite common 'strategy' is *not* to use these technologies since, based on knowledge passed down from generation to generation, the farmers believe the solution to the mouse problem will be more sustainable if 'nature plays its course'. The decision 'not to act' can be a valid local response and should be respected in the ultimate strategy.

3. Linking: connecting all levels of information through engaging partners

Linking interactions are those that connect people in social networks between different 'levels' in their society. Linking ties are sometimes referred to as networks of power, as they can be characterised as access people who have resources of some kind. For example, if a community member has a contact in government, this could be used to access information or other resources. In the example of the planning activity below, people from different groups come together for community planning activities related to biosecurity. The people come from different regions, and represent government (several levels) and farming sectors, community members and researchers.



What brings these people together is their common interest in establishing better management strategies and practices for biosecurity.

These linking interactions are where information and strategies can be discussed, decided and agreement reached on implementation and resourcing. This is facilitated when people in positions of power can be engaged in the process and commitment to outcomes engendered. A meeting such as this is therefore an excellent example of knowledge transfer processes, while gender and leadership issues need to be checked to ensure inclusivity and ownership of outcomes.

4. Implications for stakeholders

The research began from the naïve position that terms such as 'industry', 'community' and 'policy makers' were fairly unproblematic. A significant contribution of the research has been to unpack these terms, and show how an integrated strategy for managing biosecurity should be articulated as per the findings 1-4 above.

For industry: 'Industry' is a simple term but in reality is complex. For managing biosecurity, all 'industries' must meet at the planning table and agree to cooperate in implementing the strategy. In one implementation, the Maluku Province brings all sectors together at the planning table, and each meeting ends up with activities to carry out that aim at engaging across sectoral participants in implementing a sustainable strategy.

For community: 'Community' is an even more complex term in reality. The reality is that 'community' is 'everybody'. Industry is located in communities, and its leaders are community members. So are governance personnel at all levels. The division between such terms is misleading. The implication is that the term 'community' must be analysed to ensure its actual sectors and stakeholders *in that situation* are mapped and engaged.

For policy makers: 'Policy makers' are at all levels of governance, from local town management to the national level. Policy makers all live in communities somewhere and usually belong to an industry in addition to politics. The main implication for policy makers, however, concerns the need to ensure that policies have as part of their wording and legislative base the capacity to engage with the intended stakeholders in a cycle of development, implementation, evaluation and modification. The tendency in both the

countries which have been involved in the research is that the further away from the political centre (Canberra, Jakarta) a place is, the less influence policy has and the less true it is to its intended form when it is implemented there.

For universities and research centres: In both Australia and Indonesia, universities are an important group of stakeholders. They often incorporate research centres, but sometimes research centres are located outside of universities. In Indonesia, the research sector is, if anything, more important than in Australia to development issues. It is unusual for high level policy makes to lack Masters or PhD awards, and they look to universities for guidance on many development issues. In the Eastern Indonesian region, government has worked with NGOs and the university sector to develop an organization called *Jaringan Peneliti Kawasan Timur Indonesia* (JIKTI), which is a network of active researchers concerned with development and especially biosecurity across the whole extent of that vast region adjoining northern Australia. This provides an immediately accessible means of networking with Indonesia about biosecurity and related issues.

5. Recommendations

In a global economy increasingly connected by engagements and partnerships that occur independently of national governments, managing biosecurity effectively becomes an even more complex issue to deal with at legislative, regional government and community levels. The knowledge that science injects into the management of biosecurity processes always and irretrievably needs to be adjusted to account for local conditions. Local knowledge, already in existence in most regions and communities, can assist in these processes of 'tempering' scientific as well as local knowledge for the purpose in hand. However, to assume that because science and local knowledge combined may possess the resources with which a biosecurity risk, can be identified and managed is sufficient is fallacious. Managing the risk is the process that brings together all required and relevant resources and this process must be carefully planned. If the guidelines stemming from this research are utilized, the members of the research team are confident that a holistic and integrated strategy can emerge that will address all levels of need in managing biosecurity across borders.

Some recommendations apply to both countries. Where this is not the case, the individual country is identified in the wording of the recommendation:

Recommendation 1: Within the limited resources of the research reported here, a large amount of vital information and networks related to managing biosecurity has been established. The Research Consortium named *AusIndoBIOCOM* is the most tangible of these, incorporating a network of active researchers and community/regional/economic/scientific researchers, community and policy personnel across a large part of Indonesia, and is well-known at the most senior policy levels nationally. It is recommended that these links and activities remain active through resourcing the existing cooperative arrangements between Australia and Indonesia.

Recommendation 2: For Indonesia, it is recommended that an interdepartmental committee on managing food and biosecurity be established and coordinated out of Kementerian Pertanian (The Ministry of Agriculture). Within this Ministry, there are some bodies relevant to biosecurity and food security namely Badan Ketahanan Pangan and Badan Karantina Pertanian. This Interdepartmental Committee should be constituted so as to be genuinely collaborative across Ministries and could take responsibility for many of the dissemination and coordination functions suggested in the remaining recommendations including:

- 2.1 the key purpose of the Committee should be to convince governments at all levels to adopt biosecurity as an integrated approach to managing all biosecurity threats
- 2.2 one strategy linked to this is to develop and implement guidelines for risk assessment, management
- 2.3 develop and establish communication procedures to be followed in case of EPP incursions in which information regarding EPPs be openly communicated and shared across all stakeholders through support to be provided to local communities in negotiating with the local government to improve its current policy on EPP detection and management (that is, to better cooperate with local communities).

Recommendation 3: It is recommended that links be made and maintained with the *Jaringan Peneliti Kawasan Timur Indonesia* (JiKTI). JiKTI is an organization and member of AusIndoBIOCOM, which is a network of active researchers concerned with development and especially biosecurity across the whole extent of the Eastern Indonesian region. This provides an immediately accessible means of networking with Indonesia about biosecurity and related issues. JiKTI is auspiced out of the donor agency foundation (NGO) based in Makassar called BaKTI: <http://www.batukar.info/>.

Recommendation 4: In Australia, extend the successful community engagement frameworks developed with Indigenous people into related agricultural and horticultural communities. This would provide a framework for engaging a range of communities in biosecurity surveillance and management including those who have been identified by as lacking capacity or reluctant to engage in biosecurity management.

Recommendation 5: In Australia, it is recommended that the implementation of community engagement of biosecurity frameworks explore the links to PaDIL (the Pests and Diseases Image Library <http://www.padil.gov.au/>) and Bowerbird (<http://www.padil.gov.au/Bowerbird>) through its socially networked space as a forum of information exchange to build awareness of others' work, recognising different expertise and building community level connections in the long term.

6. Abbreviations/glossary

ABBREVIATION	FULL TITLE
CRCNPB	Cooperative Research Centre for National Plant Biosecurity
EPP	Emergency plant pest

7. Plain English website summary

CRC project no:	CRC70138
Project title:	Community-based Biosecurity (Phase 2)
Project leader:	Professor Ian Falk
Project team:	Dr Ruth Wallace
Research outcomes:	<ol style="list-style-type: none"> 1. An evaluated model for community management of biosecurity 2. An implemented integrated strategy for managing biosecurity
Research implications:	<p>For industry: 'Industry' is complex in reality. For managing biosecurity, all 'industries' must meet at the planning table and agree to cooperate in implementing the strategy. In one implementation, the Maluku Province brings all sectors together at the planning table, and each meeting ends up with activities to carry out that aim at engaging across sectoral participants in implementing a sustainable strategy.</p> <p>For community: 'Community' is also a commonly used term but is complex in reality. The reality is that 'community' is 'everybody'. Industry is located in communities and its leaders are community members. So are governance personnel at all levels. The division between such terms is misleading. The implication is that the term 'community' must be analysed to ensure its actual sectors and stakeholders <i>in that situation</i> are mapped and engaged.</p> <p>For policy makers: 'Policy makers' are at all levels of governance, from local town management to the national level. Policy makers all live in communities somewhere and</p>

	<p>usually belong to an industry in addition to politics. The main implication for policy makers, however, concerns the need to ensure that policies have as part of their wording and legislative base the capacity to engage with the intended stakeholders in a cycle of development, implementation, evaluation and modification. The tendency in both the countries which have been involved in the research is that the further away from the political centre (Canberra, Jakarta) a place is, the less influence policy has and the less true it is to its intended form when is implemented there.</p> <p>For universities and research centres: In both Australia and Indonesia, universities are an important group of stakeholders. They often incorporate research centres, but sometimes research centres are located outside of universities. In Indonesia, the research sector is, if anything, more important than in Australia to development issues. It is unusual for high level policy makers to lack Masters or PhD awards, and they look to universities for guidance on many development issues. In the Eastern Indonesian region, government has worked with NGOs and the university sector to develop an organization called <i>Jaringan Peneliti Kawasan Timur Indonesia</i> (JiKTI) which is a network of active researchers concerned with development and especially biosecurity across the whole extent of that vast region adjoining northern Australia. This provides an immediately accessible means of networking with Indonesia about biosecurity and related issues.</p>
Research Publications:	<p>Boyle, A & Wallace. (2011) Indigenous people and e-nabling technologies: An analysis of recent experiences in northern and central Australia. Kulumun, <i>Indigenous Online Journal</i>. 1(1). pp1-14</p> <p>Falk, I & Surata, K. (2007) 'Real' social capital in Bali: Is it different from 'the literature'? Rural Society, <i>The Journal of Research Into Rural and Regional Social Issues in Australia</i>. 17(3). pp308-323</p> <p>Falk, I., Surata, K., Mudita, W., Martiningsih, E., & Myers, B. (2008). Community management of biosecurity: Overview of some Indonesian studies. Learning Communities, <i>International Journal of Learning in Social Contexts</i>, Number 2. pp 1-29</p> <p>Falk I, Wallace R & Ndoen M (eds.). 2011. <i>Managing Plant Biosecurity Across Borders</i>. Springer, Dordrecht, The Netherlands</p> <p>Jayantini, S.R (2010) Language Varieties in Translation and the Limits of Translatability, <i>Journal of Language and Literature</i> "Sphota". Foreign Language College Saraswati</p> <p>Litaay, T., Prananingrum, D.H. and Krisanto Y.A. (2011), 'Indonesian legal perspectives on biotechnology and intellectual property rights', in Hongladarom, S., (ed.), <i>Genomics and bioethics: interdisciplinary perspectives, technologies and advancements</i>, Hershey, Pennsylvania,</p>

	<p>Medical Information Science Reference, pp. 171–183.</p> <p>Martiningsih, E., Widnyana, K., Tri Djoko S., Anom. IGN (2011) Percepatan Pembangunan Pedesaan dengan Penataan kelembagaan. <i>Jurnal Ngayah</i>. Vol 1 No.1 January 2011 Denpasar, 2(2)29-44</p> <p>K, Surata, (2010) An Artistic Approach for Increasing Biosecurity Ecoliteracy of Teacher Training Students. <i>Jurnal Suluh Pendidikan</i>. Vol 7(1)</p> <p>Therik, Wilson M. A. and Ndoen, Marthen L., (2007). Nelayan dalam Jebakan Juragan: Nelayan Tradisional Suku Bajo di Pulau Rote, <i>Nusa Tenggara Timur. Kritis</i>, Vol. 19, No. 2, August-November 2007</p> <p>Wallace, R. (2011), 'The affordances of mobile learning that can engage disenfranchised learner identities in formal education', in Pachter, N., Seiplod, J. and Pimmer, C. (eds.), <i>Work Based Mobile Learning: Concepts and Cases</i>, Bern, Peter Lang AG International Academic Publishers, pp. 117–143.</p>
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