

# KNOWLEDGE MANAGEMENT STRATEGIES & APPLICATIONS

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“Partnerships in Environmental Management for the  
East Asian Seas” (PEMSEA)

Knowledge Management Evaluation – March 2003

# Executive Summary

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The most important contribution of the PEMSEA programme is the unique knowledge it has developed on ICM implementation at local, national and regional levels. This includes technical knowledge on understanding complex ecosystems, political knowledge on securing commitment from regional leaders, social knowledge on engaging local communities through stakeholder consultations, cultural knowledge on adapting the ICM framework to different contexts, religious knowledge on mobilising religious tenets and financial knowledge on securing commitment for PPP. In this process, numerous lessons have been learnt in each of these areas and PEMSEA has played a vital role in sharing this distinctive knowledge.

Even though knowledge management is not strictly part of PEMSEA's TOR, many of its practices have followed KM principles and approaches. For instance, PEMSEA has engaged in 'single-loop learning' through consolidating its learning from Phase 1 and developing routines to replicate their experience at new demonstration sites in the region. PEMSEA has also developed creative and innovative insights in the form of 'double-loop learning' through pursuing parallel sites, 'hotspots', PPP, RNLG forums and a ministerial conference. Each has deepened PEMSEA's knowledge of ICM implementation.

There is a danger that the significant intellectual capital arising from the PEMSEA programme could be lost unless it is cultivated. This is not simply the explicit knowledge but the tacit knowledge, social relationships and commitment developed at different levels which would be difficult to replicate in the future. There are a number of KM interventions that PEMSEA could pursue using its limited resources such as making the IIMS more user friendly and developing its communities of practice. However, such interventions are likely to be piecemeal and leave the real value of KM practices unrealised. The principal challenge for PEMSEA is to secure additional funding for strengthening KM strategies for sustainable ICM. This could come from co-financing arrangements from GEF or an independent foundation. The opportunity for any donor agency is ensuring that this valuable knowledge is cultivated, embedded in local communities, codified and shared rather than dissipated where the same mistakes would be perpetuated across the region. PEMSEA is an excellent example of South-South co-operation that is leading international knowledge and thinking on the implementation of ICM. However, it is not currently being communicated or shared effectively.

There appears to be little knowledge sharing between different donor projects in the same country such as USAID and DANIDA so that best practices are rarely shared. This needs to be driven by national governments. PEMSEA could play a role in helping national governments integrate the lessons learnt through a 'Regional Learning Centre' for knowledge generation, sharing and dissemination. Five recommendations are presented, namely, developing a funding mechanism for enhancing KM strategies and practices, articulating a clear ontology of ICM knowledge and systems dynamics at local sites, enhancing the communications strategy, developing the KM systems base and building communities of practice.

# Table of Contents

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Executive Summary.....	i
Table of Contents.....	ii
List of Figures .....	iii
1.0 Introduction .....	1
2.0 Knowledge Management Strategy .....	2
3.0 Organisational & Network Learning .....	4
4.0 Knowledge Sharing Practices .....	9
5.0 Knowledge Management Tools & Systems .....	13
6.0 Communities of Practice .....	18
7.0 Intellectual Capital.....	19
8.0 Recommendations.....	20

# List of Figures & Tables

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Figure 1 PEMSEA's Knowledge Management Strategy.....	3
Figure 2 Organisational Networks at PEMSEA .....	5
Figure 3 Organisational learning at demonstration and parallel sites .....	6
Figure 4 Single and double-loop learning on the PEMSEA Programme .....	9
Figure 5 Example of a technically based ICM knowledge taxonomy .....	14
 Table 1 Keyword Ranking for PEMSEA & IW: LEARN on internet search engine .....	 16

## 1.0 Introduction

- 1.1 A common criticism of many integrated coastal management (ICM) projects today is that they tend to be donor or consultant driven or habitat or conservation based. Each has merits in its own right but it is common that many global coastal management related projects have poor coordination.
- 1.2 In contrast, a major strength of the PEMSEA approach is its ability to move beyond the design phase and focus on the difficult and real-life issues of implementing ICM. This requires developing partnerships between public and private sector stakeholders, generating and sustaining commitment and responding to everyday opportunities and threats that may aid or hinder the project. Nothing is ever certain in this environment.
- 1.3 If PEMSEA was a single issue project, the traditional modes of knowledge creation and sharing would be based on strict scientific principles with dissemination directed towards professional and local stakeholder audiences. However, PEMSEA is engaged in the challenging world of ICM implementation where sound scientific principles on their own cannot suffice. Knowledge creation, representation, organisation, storing and sharing become critical assets to effectively manage ICM in these uncharted waters. The project has increasingly become one of managing complexity where the complexity has increased exponentially when one considers the everyday variations in socio-economic and political environments at the local, national and regional levels across the East Asian Seas.
- 1.4 In response to the knowledge management terms of reference (see Appendix 1), this evaluation report shall address the following areas from a knowledge management perspective:
  - PEMSEA's management and implementation goals, strategies, processes, outputs and achievements to assess the extent of knowledge management applications at different levels of the program.
  - Linkages of knowledge management applications to monitoring and evaluation, communication, dissemination of information, public awareness and adaptive management processes.
  - An assessment of the systems developed and/or used by PEMSEA to gather, manage and transfer knowledge optimally.
  - Identification of key lessons, experiences and practices that are being/have been captured, and adapted at these levels
    - PEMSEA's ongoing management.
    - PEMSEA's ICM and sub-regional seas/pollution hotspot sites.

- Participating nations or other agencies/projects in the region, or elsewhere.

## 2.0 Knowledge Management Strategy

- 2.1 The knowledge management (KM) strategy at PEMSEA is clearly informed by its overarching strategic approach employing an 'adaptive management strategy'. In strategic management schools of thought, this resembles an institutionalist approach whereby strategy is seen as dynamic, impermanent and a continual process informed by people's day to day learning<sup>1</sup>. In more simplistic terms, this is a problem centred approach whereby strategy is seen as a process of responding effectively to environmental changes over time.
- 2.2 There is also no blueprint for an adaptive management strategy apart from the general process articulated in the six stage ICM development cycle: preparing, initiating, developing, adopting, implementing and refining and consolidating. The important aspect is to get stakeholders to identify and define their problems through active participation, suggest solutions and gain ownership of the overall process. The strategy is intended to develop localised solutions to localised problems that may involve a variety of technical and institutional arrangements. Some examples of effective adaptive management strategy at PEMSEA include overcoming constraints due to shortages in funding, evolving PPP and adapting the ICM cycle to local situations such as the religious tenets in Bali. A major challenge for PEMSEA's adaptive management strategy is the continual change of political leaders at local, national and regional levels.
- 2.3 A knowledge management strategy is implicit rather than explicit in the current PEMSEA approach. The dominant KM strategy at PEMSEA can be described as a 'personalisation strategy'<sup>2</sup>. The characteristics of this strategy are that it is people-led, has a tacit knowledge orientation and channels its expertise towards innovative practices. This strategy is less about technology and more about people. Knowledge sharing, mentoring and the use of creative and analytical skills are key elements of this approach. This is encapsulated by the major focus on capacity building and enabling environments at PEMSEA.
- 2.4 There have been a number of attempts to package and exploit knowledge at PEMSEA such as technical reports, mission reports and the use of the internet. Some tools such as ICM, risk assessment and resource valuation developed in Phase 1 have been packaged into guides, training materials and audit manuals in Phase 2. However, such 'codification strategies' are relatively in their infancy compared to their 'personalisation strategies'. Codification strategies are characterised as technology-led and driven by the codification of explicit knowledge.

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<sup>1</sup> The dominant school of thought in strategic management treats strategy as a plan (known as the 'industrial organisation' perspective) rather than a process of everyday learning (known as the 'institutionalist' perspective). The drawback of the industrial organisation tradition is that only 10% of formulated strategies ever get implemented which brings the whole planning process into question. For further details, please see Jashapara, A. (2003). *Knowledge Management: An Integrated Approach*, Prentice Hall (forthcoming), Harlow Essex.

<sup>2</sup> For further elaboration on personalisation and codification strategies, please refer to Hansen, M., Nohria, N., and Tierney, T. (1999). "What's your strategy for managing knowledge." *Harvard Business Review*, March-April, 106-16.

These strategies are often employed in organisations where efficiency is the dominant force controlling the organisation. A model to understand the KM strategy and its drivers is shown in Figure 2.1.

- 2.5 In PEMSEA's current stage of development, a personalisation strategy has enabled the program to break new ground in ICM and develop creative ways to implement and adapt various conceptual tools in unique and varying environments across the East Asia Seas region. These innovative practices have arisen predominantly from face to face communication at local level to gain deeper insights into the nature and context of environmental problems. A codification strategy at this stage would have been inappropriate as the lessons learnt in one environment may not have been easily or directly transferable to another. Also, a common ontology of issues at technological, economic and political levels has not been currently developed to enable a codification strategy to be meaningful.

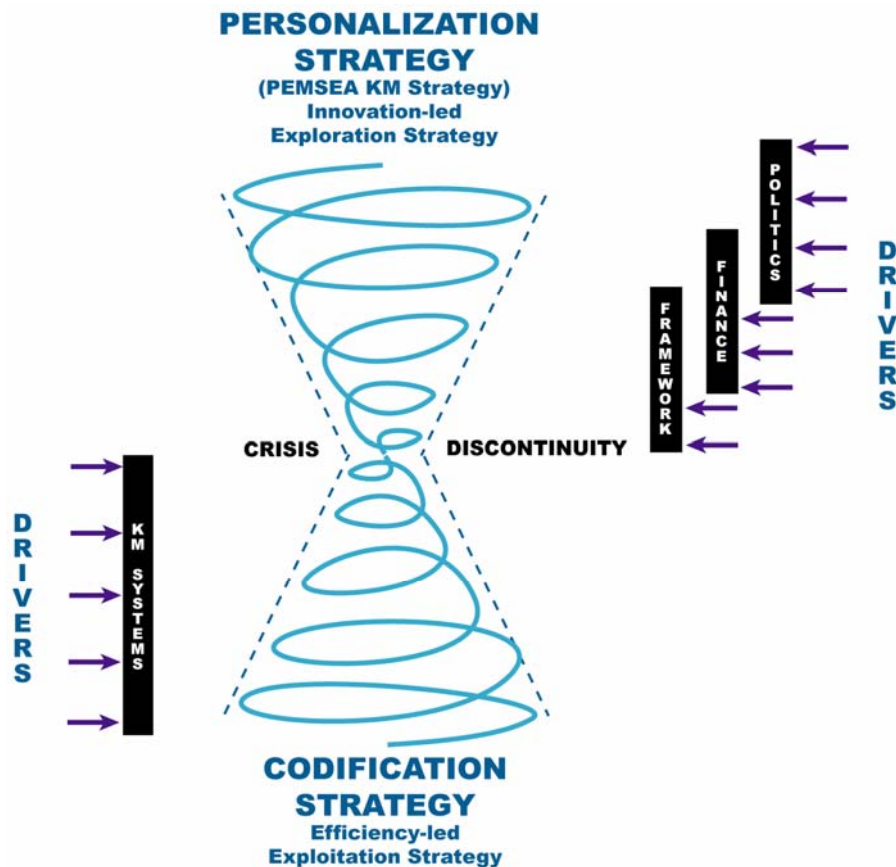


Figure 1 PEMSEA's Knowledge Management Strategy

2.6 The strategic intent of PEMSEA is to create sustainable development of ICM using a regional mechanism based on implementation of ICM at a local level. The commitment and motivation of staff at PEMSEA's RPO towards this vision is strong and self evident. It is clear that the core competence<sup>3</sup> of PEMSEA lies in the implementation of ICM and creating enabling environments at national and regional levels. PEMSEA staff have suggested that, at best, only a few programmes globally have achieved such a high level of competence in ICM implementation. PEMSEA is considerably stretched due to its high aspirations and ambitions but limited resources.

### **3.0 Organisational and Network Learning**

3.1 PEMSEA represents a complex network of organisational learning at local, national and regional levels. Certain levels of learning in Phase 1 from demonstration sites at Xiamen and Batangas Bay have been extended and transferred to a large number of demonstration and parallel sites around the East Asia Seas. At national level, there has been knowledge developed through two 'hotspot' sites at Manila Bay and Bohai Sea. In addition, there are initiatives towards developing public-private partnerships (PPP) to help embed the ICM programme financially and secure a more sustainable future. At regional level, there have been two forums for the Regional Network of Local Governments (RNLG) to share experiences, good practice and resources to encourage greater South-South co-operation. A sub-regional 'hotspot' site at the Gulf of Thailand involves collaboration between three sovereign nations. A Ministerial Conference has been scheduled for December 2003 in Malaysia to gain greater commitment from national ministers in the region. The complexity of the different forms of learning and knowledge generation is shown in Figure 3.1.

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<sup>3</sup> For further elaboration on strategies based on core competencies, strategic intent and stretch, please refer to Hamel, G., and Prahalad, C. K. (1993). "Strategy as Stretch and Leverage." *Ibid.*, 71(2), 75-84.



WSSD, MDG, Agenda 21, Capacity 2015, Conventions



Donor Agencies: GEF, UNDP, UNEP, IMO, World Bank, ADB, Bilateral donors

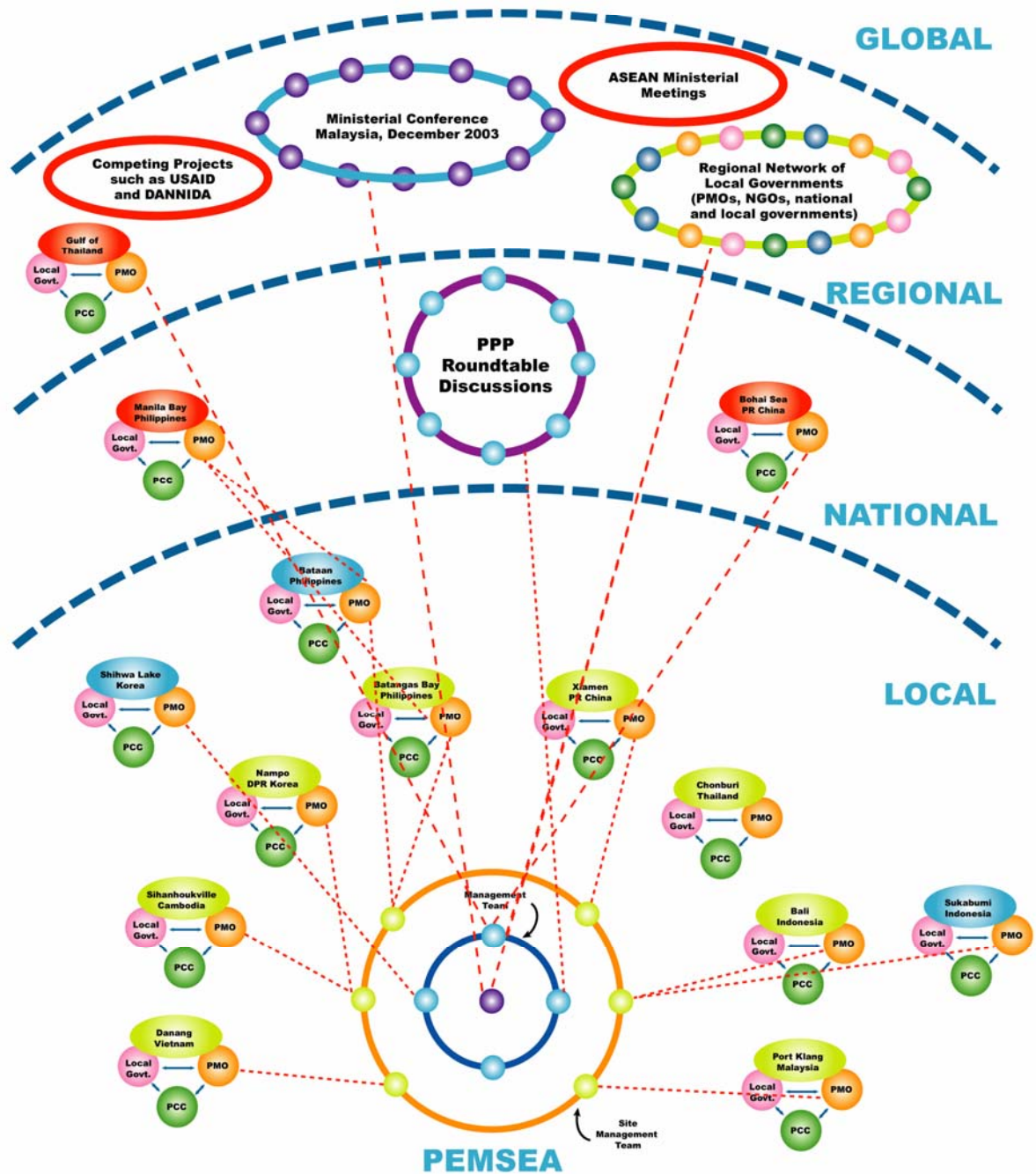


Figure 2 Organisational Networks at PEMSEA

- 3.2 The extension of the demonstration sites regionally represents a refinement and consolidation of lessons learnt in Phase 1. These include lessons such as the ICM development and implementation cycle, capacity building and stakeholder consultations have been replicated and applied to different demonstration sites in eight countries across the East Asia Seas. The replication of demonstration sites represents a form of single-loop learning<sup>4</sup> where the same processes have been applied with certain refinements depending on the country context. The ICM cycle developed is a modification of UN and other organisation project cycles.
- 3.3 The main form of exploration or double-loop learning in the new demonstration sites has been the greater use of stakeholder consultation to mobilise stakeholders, identify management priorities and gain ownership for the programme. This has resulted in the development of coastal strategies locally rather than the strategic environmental management plan (SEMP) in Phase 1.
- 3.4 There have been local differences in organisational learning at demonstration and parallel sites. One major distinction is between 'centralised learning' and 'decentralised learning' as shown in Figure 3.2. Project sites based in command economies such as China and Vietnam favoured centralised learning aimed more at mobilising committees rather than communities. This is not to say that public awareness and consultation was not important at these sites. Instead, progress in ICM implementation was much faster at these sites due to strong committee decision making structures in local government. In contrast, decentralised learning was more evident at project sites such as Bali based more on community oriented decision making. Progress at these sites was much slower as considerable efforts were placed on mobilising local stakeholders and community leaders. The distinction can be developed further as a difference between 'top down' approaches in centralised learning and 'bottom up' approaches in decentralised learning.

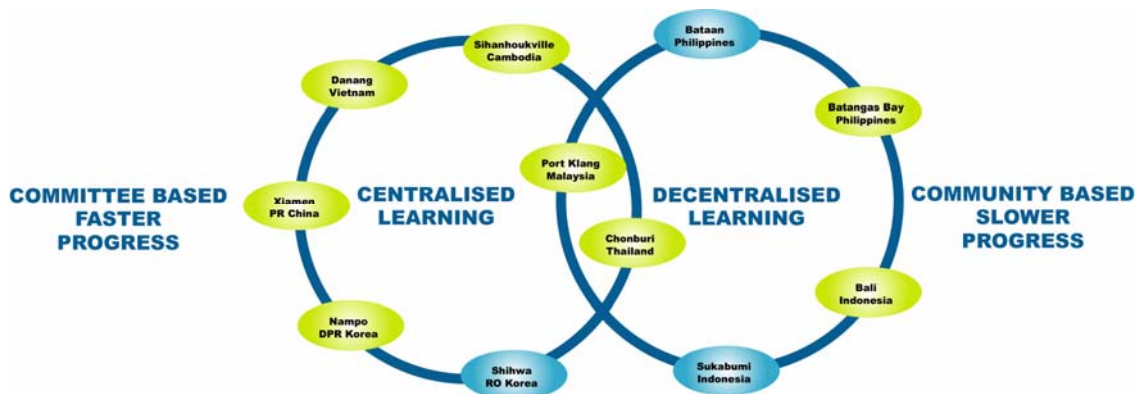


Figure 3 Organisational Learning at demonstration and parallel sites

<sup>4</sup> Single loop learning refers to organisations following traditional patterns of working in response to organisational problems. In contrast, double-loop learning is where organisations question the assumptions and values underlying their actions and look at ways of doing things differently (Argyris, C., and Schon, D. A. (1978). *Organizational Learning: A Theory of Action Perspective*, Addison-Wesley, Reading, MA.) Double-loop learning encourages greater exploration behaviours such as risk taking and experimenting with ideas whereas single loop learning is more concerned with exploitation behaviours such as the refinement of processes to suit efficiency goals.

3.5 The ICM implementation cycle has been adapted to local circumstances and the traditional routines of knowledge creation at each site have been subject to some variations. These have included:

- Setting up a Regional Task Force Team (3 members from PEMSEA and 2 members from Shihwa Lake) to assist the PMO at Sihanhoukville (Cambodia) due to their low level of technical expertise in ICM. This meant that many activities were shortened to take advantage of two months of external assistance. Knowledge was acquired through vicarious learning adopting an imitation or mimicry approach<sup>5</sup>. The PMO was able to continue with all the respective activities such as consultations and communications plans by themselves.
- Nampo (DPR Korea) wasn't able to apply risk assessment techniques due to the non-availability of data. This may be due to political sensitivities around the use of the data.
- Chonburi (Thailand) has had the lowest level of government ownership and commitment out of all the current projects. This may be due to competing interests from other externally funded projects in Thailand.
- Chomburi (Thailand) and Port Klang (Malaysia) signed their Memorandum of Agreement (MOA) one year later than planned due to legal problems with the government. This meant that separate activities such as the environmental profile were included in the coastal management strategy as one activity.

3.6 Shihwa Lake (RO Korea) is an atypical parallel site as it has accumulated considerable knowledge over a decade in coastal management and environmental monitoring prior to joining the program. There is no Project Co-ordination Committee as it is considered as a national concern and driven by the national government. Instead, the Shihwa Watershed Management Committee was set up in 2002 by national legislation to promote interagency dialogue. In 2000, Shihwa Lake became a Special Management Area and has developed an action and implementation plan in the past two years. There is also legislation that has helped speed progress at Shihwa Lake; the 1987 Marine Pollution Prevention Act and the 1999 Coastal Management Act.

3.7 There are regional differences in the implementation of the ICM framework such as the lack of the private sector involvement in the project co-ordination committee (PCC) in Xiamen, the principal religious driver ("Tri Hita Karana") in Bali and some concerns about knowledge sharing in Nampo, North Korea. These concerns are likely to be overcome through the consensus building efforts at a regional level. Tacit knowledge has been developed through a steep learning curve in Phase 1 and applied to the new parallel and demonstration sites in the following manner:

- Mobilising public support and commitment through coastal cleanup campaigns.
- Following the ICM development and implementation cycle.

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<sup>5</sup> See Huber, G. P. (1991). "Organizational learning: The contributing processes and the literatures." *Organization Science*, 2, 88-115.

- Building local capacity through training and internships.
- Gathering political support from political leaders through study tours, use of media and public awareness campaigns.
- Developing local partnerships through engaging key stakeholders in the Project Co-ordination Committee (PCC) and PPP initiatives.

3.8 There are a number of good examples of double-loop learning in Phase 2 of the programme that have led to innovative practices in the implementation of ICM as shown in Figure 3.3. These include:

- The establishment of parallel sites in Bataan in Philippines, Shihwa Lake in Korea and Sukabumi in Indonesia. These sites allow the knowledge of ICM to be embedded in local practices through ownership of the process by local governments, private sector and other stakeholders. It is very encouraging that there have been official requests for parallel sites from Cambodia and Malaysia and informal requests from Japan, Philippines, PR China, RO Korea and Vietnam.
- The development of national 'hotspots' at Manila Bay and Bohai Sea and a sub-regional 'hotspot' at the Gulf of Thailand. This encourages the further development of dynamic capabilities<sup>6</sup> at a local level to consider transboundary issues at provincial and national levels.
- An exploration of financing mechanisms such as PPP to provide a secure basis for sustainable development. This represents a significant challenge at PEMSEA to acquire the necessary knowledge, expertise and financial networks to make this a reality.
- The establishment of the Regional Network of Local Governments (RNLG). This encourages South-South cooperation and encourages knowledge sharing and good practice in ICM across the region.
- The promotion of a regional Sustainable Development Strategy (SDS) through the Ministerial Conference in 2003. This will develop an enabling environment to promote greater political commitment as a further driver for ICM knowledge creation and sharing. This consensus building with political leaders in the region is vital to avoid knowledge stagnation and to act as an exemplar in ICM learning and practice throughout the world.

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<sup>6</sup> A dynamic capability is a learned and stable pattern of collective activity through which an organisation systematically generates and modifies its operating routines in pursuit of improved effectiveness. For further details, please refer to Zollo, M., and Winter, S. G. (2002). "Deliberate Learning and the Evolution of Dynamic Capabilities." *Ibid.*, 13(3), 339-351.

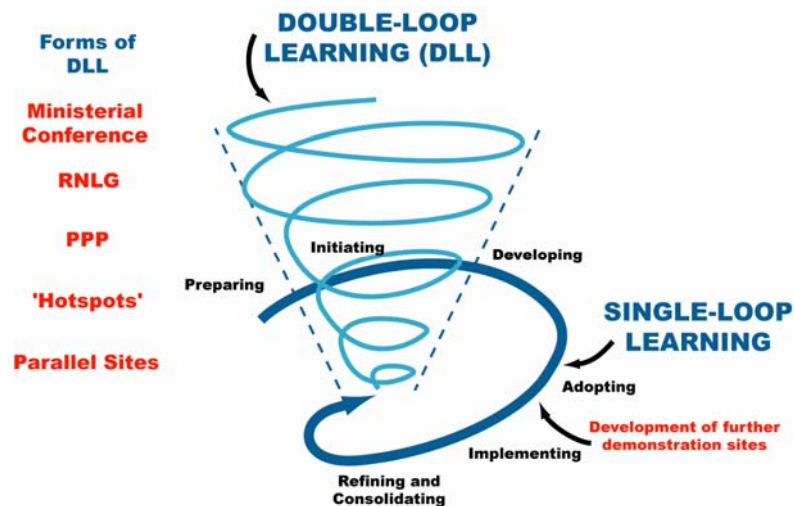


Figure 4 Single and double-loop learning on the PEMSEA Programme

## 4.0 Knowledge Sharing Practices

4.1 Different forms of learning have developed considerable levels of knowledge on this programme. The challenge is how to share this valuable tacit knowledge so that other projects and countries may benefit from the experiences of PEMSEA. There are numerous examples where the same mistakes have been repeated within a programme and across related donor funded programmes. PEMSEA has approached its knowledge sharing practices in the following manner:

- Mission reports are used by RPO staff to record issues, problems and lessons learnt after a site visit or conference. These reports are shared among RPO staff in a hard copy format.
- Technical reports and publications on programme findings are distributed to a professional audience.
- Study Tours are used as examples of good practice to mobilise and motivate environmental champions among political leaders and key stakeholders in the region.
- Capacity building practices have employed training courses, internships and linkages with local universities.
- Use of the intranet and internet for knowledge dissemination.
- RNLG provides a network for sharing experiences and lessons learnt among demonstration sites, parallel sites and 'hotspots' in the region.
- Communications activities to engage media such as newspapers, radio and television to share knowledge from the ICM programme to a wider audience.

- 4.2 The use of mission reports, technical reports and publications for knowledge sharing among RPO staff doesn't occur with the ease and regularity that may encourage new ways of looking at everyday problems. This is predominantly caused by staff being overstretched with tight project deadlines and little room to assimilate new knowledge and ideas. Information fatigue can result in key sources of knowledge being overlooked. A document management system is currently not employed to enable staff to search and retrieve appropriate knowledge when required.
- 4.3 Study tours provide a strong medium to captivate participants and share knowledge about lessons learnt at a demonstration site. Xiamen is an excellent site for these purposes as it shows how an environmental disaster has been mitigated through investment in waste management to reduce pollution. However, there are major elements of poor ICM practice that the project needs to address (see MTE report for further details). Also, participants can see some of the socio-economic benefits of ICM directly that are likely to lead to sustainable development in other parts of the region. The Xiamen site has been a strong motivator for convincing political leaders and government officials of what can be achieved through an ICM approach.
- 4.4 As knowledge of ICM processes is developed and refined across the regional sites, the resulting knowledge is captured, organised and shared through PEMSEA's capacity building exercises. This includes training PMO staff, local government staff and various stakeholders. In addition, specialised courses such as oil spill response, cost recovery damage claims and risk assessment have catered for specific audiences. New staff at the RPO are also given extra support through a mentor to give them extra confidence and embed their knowledge in practice.
- 4.5 Training has been further enhanced through collaboration with universities and the setting up of a Regional ICM Training Centre at Xiamen. This has the potential to develop an international profile in ICM but has not achieved this as yet. However, we found that the current training hasn't engendered a fully integrated approach at all sites where local staff truly understand the broader picture and the systems dynamics of ICM. This is most likely to arise from a lack of maturity at many sites after two years of existence. Ground level understanding was still at an issue based level without significant foresight on how certain actions and interventions may have detrimental outcomes on certain parts of the system. In part, this is due to structural and sectoral deliniations in countries where agricultural, forestry and fisheries issues are separate and consider problems from their own perspectives rather than an integrated whole. Integration is often left to PMO staff and it wasn't evident whether staff had the necessary training in leadership and technical skills to bring this about.
- 4.6 PEMSEA's internship programme has encouraged vicarious learning through direct exposure to practical aspects of ICM at the RPO. This has created a critical mass of practitioners; some of whom have joined PMOs at the end of their internships. Vicarious learning can also occur through local staff using valuable resources in ICM in their own countries such as links with ICM experts at universities, UN representatives, ICM consultants and specialised libraries. As the project is in its infancy, there hasn't been strong evidence of using local sources for vicarious learning. There is still an assumption that western sources of knowledge have a greater value which is clearly not the case in the PEMSEA programme. However,

there appears to be a fundamental lack of understanding of coastal systems and dynamics of coastal processes among some staff.

4.7 The RNLG annual forum has provided a formal regional network for knowledge sharing. These meetings have helped strengthen ties between participants and sharing lessons learnt on local projects. The deepening of social relationships has been important to help forge partnerships and mobilise commitment among political leaders. At a regional level, capacity building can be seen as the cumulative effect of knowledge sharing and participation. The intensity of this knowledge sharing at a regional level is somewhat restricted at present but is likely to grow as the critical mass of experience, learning from mistakes and open dialogue develops. It is at this level where the leverage of knowledge sharing experiences is likely to occur.

4.8 A detailed communications strategy has been developed at PEMSEA through a public awareness plan to encourage knowledge sharing of PEMSEA's activities and findings to a wider community in an accessible manner. The plan needs to be commended for its widespread consideration of intended audiences and media interventions to share knowledge and increase general awareness of PEMSEA's activities. The types of interventions used by the communications unit have included:

- Involving journalists in study tours in Xiamen. Also, a specialised website for media professionals called the 'Media Information Resource Centre'.
- Conducting a youth summer camp each year and the launching of a young environmentalists section on the website. Production of a few environmental comics.
- Producing two issues of 'Tropical Coasts' each year in an informal and popular magazine format. There are currently 312 regular subscribers.
- Designing and developing a dynamic and popular website exceeding 100000 hits per month. There are monthly e-updates to keep potential browsers up to date with PEMSEA's activities.
- Producing a variety of publications for a professional audience such as technical reports, conference proceedings and meeting reports of the Programme Steering Committee (PSC).
- Development of a number of videos to increase public awareness. Also, constructing exhibits for the use in conferences and workshops.

4.9 Given this extensive communications coverage, it is surprising that there wasn't greater awareness of PEMSEA's activities at grassroots levels at some sites. For instance, the fisherfolk involved in the mangrove rehabilitation initiative in Bataan had very little understanding of PEMSEA's activities and the likely effects on their lives. These grassroots stakeholders were unlikely to see PEMSEA's videos, read their literature or use the internet.



- 4.10 Language also poses a communications challenge to the programme as many key stakeholders in the East Asia Seas Region may not have the same ease with the English language to develop a shared understanding of the project. This has been overcome to a certain extent by producing leaflets and brochures in local languages. Nevertheless, the common language for more technically related documents is still English.
- 4.11 Some of the difficulties in effective impact with key stakeholders is likely to arise from the fact that the current communications strategy is trying to cover too many stakeholders at the same time with limited resources and giving each stakeholder equal importance. The danger with the current strategy is that PEMSEA may be 'preaching to the converted' such as the 312 regular subscribers to 'Tropical Coasts'. The result is that the media approaches chosen may become too bland as they try to please a wide variety of stakeholders and lose effective impact on particular segments. Instead, an adaptive management strategy used in other parts of the PEMSEA project could be used to help improve the communications strategy. This could be based on a force field analysis<sup>7</sup> identifying key stakeholders actively driving PEMSEA's goals and stakeholders resisting PEMSEA's goals at local, national and regional levels. Reinforcement communications strategies could be used for supportive stakeholders and awareness building strategies for stakeholders resistant to PEMSEA's approach. In such cases, a few stakeholders are identified, segmented and the communications activities are directly targeted at them.
- 4.12 In our visit to UNDP offices in Malaysia, we found that UNDP does have country communications managers associated with promoting country level activities. However, PEMSEA is not currently exploiting this opportunity to strengthen its communication strategy and collaborate on the most effective ways to target certain key stakeholders and audiences. There may also be opportunities to combine communications efforts with other coastal management projects in the region.
- 4.13 Knowledge sharing across demonstration and parallel sites is currently limited. At present, staff at PMO sites share their knowledge centrally with site managers at the RPO rather than horizontally across other regional sites. The linkages in knowledge sharing mechanisms between local and national levels are weak and not well defined. The main knowledge sharing occurs formally through national focal points reporting site activities to the Project Steering Committee (PSC) and their local PCC. However, there is no direct linkage between staff at local site level in the region. This needs to be addressed to consolidate ICM practices and promote best practice more widely within the region. One future challenge at local level is overcoming language barriers to ensure that shared understandings are developed and similar mistakes are avoided across the East Asia Seas region.
- 4.14 A major challenge among GEF International Waters (IW) projects is to increase and improve the use of limited resources through greater inter-project collaboration, better co-ordination of project interventions and improved knowledge sharing across projects. One approach to enhanced knowledge sharing is to strengthen the IW: LEARN internet site. There is a danger in this approach of investing considerable

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<sup>7</sup> Force field analysis is a simple tool used in strategy to identify those forces driving a change process and those forces retarding it. Strategies are developed to support and enhance the driving forces and examine ways to undermine the restraining forces. Such an analysis has a background in military planning.



resources in a knowledge repository and finding that few people visit the site. Instead, cultural factors need to be considered as participation in collaborative ventures may be low as participants feel that such interventions add an extra layer of co-ordination. Another approach to breaking down some of the project and institutional rivalry may be the use of job rotation for short periods among senior staff of related projects in a region. This could be formulated as a contractual requirement on new GEF projects. However, there may be problems of continuity such as the high turnover of PEMSEA staff. This may cause the loss of institutional memory and disruption as new staff have to learn their new roles.

## **5.0 Knowledge Management Tools & Systems**

- 5.1 PEMSEA's knowledge management approach is currently focused more on human resource development, such as capacity building, rather than the utilisation of technology to promote sustainable development goals. At the present time, the use of technology could be described as a 'data processing' approach for automating tasks as typified by the Integrated Information Management System (IIMS). Technology has not been used to leverage change in the nature of relationships with key stakeholders through knowledge based systems for capturing, organising, evaluating, storing and retrieving knowledge. As PEMSEA has developed considerable practical knowledge in ICM implementation, a forward looking approach may be to make this new knowledge much more explicit and integrated through the use of technology. This would develop a valuable knowledge repository or knowledge centre in ICM that could be used in a practical manner at local, national, regional and international levels.
- 5.2 The current knowledge repository at PEMSEA is a library with a collection of over 22,000 titles. The library contains a current awareness service and selective dissemination of information through the local area network. The knowledge repository provides a service predominantly focused on PEMSEA staff in the RPO rather than practical tacit knowledge that could be useful to staff at local site level. Even though the library service is available to all programme staff, it is currently under-utilised at local site level.
- 5.3 A key aspect of ICM is an understanding of the dynamic coastal management systems and the different inter-relationships between key elements. At local site level, there was a limited understanding of the complexity of coastal systems and how certain simplistic interventions may have detrimental effects to coastal areas. There exists an opportunity to develop simple systems dynamic models by diverse stakeholders such as fisheries, forestry and agriculture to develop shared understandings of coastal problems and aid effective decision making.

## COASTAL ECOSYSTEM

### Agro Ecosystems

Rice fields

Rice-fish systems

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.....

### Estuaries

Mudflata

Tidal swamp forests

.....  
.....

### Mangroves

.....  
.....

### Beaches

.....  
.....

### Coral reefs

Pelagic

Benthic

.....  
.....

## FUNCTIONS

**Economic**  
70 direct products

.....  
.....

**Environmental**  
Water purification  
Nursery for post  
larval fish  
Spawning area  
Flood retention  
Stabilisation of  
coastal sediments

.....  
.....

## USES

**Timber  
Production**

.....  
.....

**Conversion to  
shrimp pond**

.....  
.....

**Urban reclamation**

.....  
.....

## IMPACTS

**Loss of biodiversity**

Loss of species  
Loss of economic  
resources

.....  
.....

**Loss of flood retention**

.....  
.....

**Loss of coastal  
sedimentation control**

Loss of fishery income

.....  
.....

## CONSEQUENCES

**Failure to implement  
or meet international  
treaties, conventions  
and obligations**

**Reduced livelihoods**

**Decine in food security**

**Increase in hazards  
to life and property**

**Increased siltation  
of navigation channels**

Figure 5 Example of a technically based ICM knowledge taxonomy

- 5.4 An ontology or taxonomy to describe the ICM knowledge domain is currently implicit in PEMSEA's activities. A more explicit ontology would be useful to provide a 'knowledge map' of the area and develop shared conceptualisations of how integration occurs between technological, social, economic and political factors. Such ontologies could be used for codifying knowledge in a systematic manner and provide a further mechanism for creating, organising and sharing knowledge across sites. There have been attempts in the past to capture coastal management ontologies through simulation models such as 'Simcoast'. However, the advantage of developing an ICM ontology at PEMSEA would be that it is embedded in practice. As ontologies are dynamic, the RNLG could be used as a forum to new meanings and relationships as they develop over time. An example of a technical ICM ontology is shown in Figure 5.1
- 5.5 The PEMSEA web site has been developed professionally and the most dynamic aspect is the media resources centre with a photo library, story ideas and news releases. There are currently 16 media partners mainly from the Philippines and there is scope to develop this media network much more widely in the region. Another innovative aspect of the web site is the Young Environmentalists section with potential to grow substantially given the much higher internet usage by young people. The current target audience of the web site tends to be focused more on the general public rather than the practitioner audience. To a certain extent, this may be overcome by the development of websites for local sites. Even though the dominant language of the website is English, the local websites could be published in native languages to promote greater ownership and diversity of the regional network. The search engine on the current site needs greater visibility and updating as many publications after 2000 are not currently on its database.
- 5.6 There is tremendous potential to develop an exclusive extranet for all regional participants in the PEMSEA programme. This would build on PEMSEA's uniqueness of a repository of practical ICM knowledge based on ground level operations. The extranet could serve two important purposes; namely developing a 'Regional Learning Centre' and supporting online communities of practice that are problem centred. The social relationships in these communities could be strengthened and nurtured through the annual RNLG conference. At first, practical tacit knowledge could be placed on an extranet by the RPO in line with local user needs and frequently asked questions (FAQs) of site managers. This would take some of the pressure of site managers and allow them to focus more on atypical issues. In time, local and national sites could be encouraged to contribute to this knowledge repository so that valuable knowledge and lessons were shared and it engendered greater two-way dialogue promoting sustainability.
- 5.7 The current PEMSEA website still has a Philippines bias given that the top keywords are 'PEMSEA', 'Manila Bay' and 'Land pollution in the Philippines' and the three top visiting countries are Philippines, Netherlands and Thailand. As the internet is principally about sharing knowledge and information, a survey was conducted to ascertain how easy it was for users to find PEMSEA and IW: LEARN on internet search engines. The results are shown in Table 5.1. It should be noted

that users tend to lose interest in internet searches after scrolling 30-40 results. The IW: LEARN web site scored poorly in all the relevant keywords related to this programme.

<b>Keyword</b>	<b>PEMSEA</b>	<b>IW: LEARN</b>
Integrated Coastal Management	30	>100
Sustainable development marine water	44	>100
Marine zonation	69	>100
Coastal zonation	82	>100
Coastal partnership	>100	>100
Coastal management	>100	>100
Integrated information management system	>100	>100

Table 1 Keyword Ranking for PEMSEA & IW: LEARN on internet search engine<sup>8</sup>

5.8 The poor standing of the IW: LEARN site on search engine ranking may be principally due to its aim to develop global communities in international waters rather than supply direct explicit knowledge through a search engine. One of the difficulties in maintaining global communities of practice is sustaining the passion and interest in any given area over time. Face to face meetings are essential to renew and revitalise trust in these relationships. Community members need to feel that they are contributing and receiving in equal measure. If these relationships become unbalanced, commitment to such communities is likely to waver. From the IW: LEARN brochure, there appears to be a few hundred solid participants with a possible few thousand other interested parties globally. However, there are a number of unanswered questions that arise from IW: LEARN's e-forums:

- How are the interest areas identified and promoted?
- How are champions or e-forum co-ordinators selected to ensure that they bring the necessary passion, commitment, contacts and expertise to online discussions?
- Are e-forums problem centred or theme based?
- Is there a critical mass of participants to sustain these communities globally with all the cultural differences and language problems?
- What role does storytelling play in these communities of practice?

Currently, none of the staff at PEMSEA are actively engaged in IW: LEARN communities of practice as there appears to be an imbalance in benefits gained from their contributions and pressures on their time. For example, IW: LEARN does not provide a one-stop shop on ICM issues in the East Asian Seas which would make the site much more valuable and useful. One way of enhancing IW: LEARN's communities of practice may be to develop and co-ordinate a few regional websites such as East Asian Seas, Caribbean and so on. These regional sites could be more problem centred encouraging deeper debate and dialogue and sharing knowledge

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<sup>8</sup> The internet survey was conducted on 28<sup>th</sup> March 2003 using the Google search engine at [www.google.com](http://www.google.com).

through regional stories. It is more likely that these communities could be nurtured through face to face meetings at regional forums or conferences such as the RNLG. As these regional networks and communities develop over time, there is a greater likelihood that global communities would be much more successful as they become embedded in local and regional practice.

- 5.9 As RPO site managers are over-stretched, timely support to local sites may not always be available when required. A document management system (DMS) is not currently employed to facilitate frequently asked questions (FAQs) leaving site managers to spend more time on more complex issues. Documents and templates such as examples of Memorandum of Agreements, Environmental Impact Analysis and Pre-feasibility studies could be indexed and published on the intranet/extranet. On the one hand, local users at site level could search and retrieve necessary documents to help them solve their current problems through certain level of knowledge duplication. On the other hand, the DMS could facilitate a two-way exchange of documents from local sites so that their new knowledge in the form of documents could be shared more widely in the region. The key design criteria for a DMS would be the usefulness and relevance of the knowledge to the end user.
- 5.10 The two core competencies of PEMSEA are its technical expertise and its political persuasion skills. The political persuasion skills are derived primarily through its strong leadership at the top. However, as PEMSEA develops, these skills will be needed more widely throughout PEMSEA. A KM system used in many organisations to get closer and be more responsive to customers and stakeholders is the use of customer relationship management (CRM) systems. This moves the relationship with each customer or stakeholder away from traditional segmentation approaches and more towards customer centric orientations. Each stakeholder is treated individually and uniquely. For example, the CRM system would check its database of any incoming call and display all the details of the caller on the receiver's desktop including all transactions, emails, notes from previous phone conversations, letters, faxes and so on. Such CRM systems are not currently used at PEMSEA.
- 5.11 Apart from a strong technical knowledge base at PEMSEA, there is a wide range of expertise developing at local site level and local universities. However, many local site staff may not know that there are 'experts' with knowledge in their problem areas at other local sites or local universities. One approach to enhance sustainability through local knowledge sharing is to use a Who's Who or Expertise Yellow Pages. This would make local staff more self reliant through exploring different approaches using vicarious learning and developing greater horizontal integration between project sites. The directory would contain a listing of local project staff and external experts such as local universities and other donor funded projects who were prepared to share their knowledge and expertise in ICM.
- 5.12 As PEMSEA has developed considerable strengths in multimedia and video production, there is a tremendous opportunity to widen its dissemination of training materials through e-learning. Knowledge from training sessions could be encapsulated in CD format using video recordings of training sessions, case studies and Powerpoint presentations. There would still be a need to run training sessions to develop bonding and social cohesion between participants but e-learning

techniques could make capacity building exercises much more efficient and more easily accessible to local trainers via CD-ROM and the internet.

- 5.13 A number of PEMSEA case studies have been developed encapsulating lessons learnt in ICM implementation. As the number and complexity of cases rises, a case based reasoning (CBR) system could be employed to see if past cases could throw insights into current problems. CBR offers a technique for acquiring and storing past problems, their solutions and the reasoning behind them into a retrieval system. The CBR system could be developed in terms of descriptors such problem identification, project delivery solutions and project outcomes.
- 5.14 The Integrated Information Management System (IIMS) is still in its development phase and poses a number of challenges for PEMSEA. There is limited capacity of staff in database management for its successful future development and a limited understanding of its use at local project level. There are 192 data entry forms; much of which is uncollected at local level due to the scarcity or paucity of data. There is also some hesitancy among certain countries and agencies to share their data. In essence, IIMS is a decision support system (DSS) that combines data analysis with sophisticated models to support non-routine decision making. The current IIMS incarnation suffers from being data driven rather than user driven. The argument is that it encourages the development of baseline data to make comparisons with future interventions. However, there is limited understanding at local project level on how IIMS will help make better policies or decisions in a practical manner. Some examples identifying key indicators and mechanisms for monitoring and predicting the effect of policy and management options at a local level would be helpful. This may help to bridge the gap between the scientific community and decision makers in local government, central government and the private sector. Care needs to be taken that the IIMS doesn't become an end in itself and consumes excessive resources that could be better prioritised elsewhere.

## **6.0 Communities of Practice**

- 6.1 One of the major strengths of PEMSEA is the tacit knowledge of ICM developed at different levels and embedded in the minds of different people. One of the principal challenges is how to externalise, share and integrate this valuable tacit knowledge throughout PEMSEA and its stakeholders. Once the knowledge is made explicit there are a variety of KM tools and systems that can be employed to codify, store and retrieve this knowledge. Informal settings are more conducive for externalising tacit knowledge rather than more formal work groups or project teams. This is why organisations have recognised the intrinsic value of water coolers, coffee machines and subsidised canteens for encouraging greater informal dialogue and knowledge sharing.
- 6.2 Another approach to cultivating tacit knowledge sharing is the promotion of 'communities of practice'. These are informal, self selecting groups that are open ended without any deadlines or deliverables. People come together from similar backgrounds with a passion and interest in improving practice. Storytelling and narratives are important for embedding the tacit knowledge socially in a community of practice. Each story has a connection with certain ideas, lessons and best

practice. Stories are self-perpetuating creating new knowledge that reinforces and renews itself.

6.3 At PEMSEA, the existing networks are more formalised and characteristic of professional networks rather than communities of practice. For instance, there is a Friday club where all RPO staff get together monthly and receive a presentation from a staff member on a certain aspect of PEMSEA's activities. There is also an annual retreat to reflect and encourage knowledge sharing between participants. There is no formalised network among PMO staff across regional countries such as the use of online discussion groups. Language is likely to be a deterrent. More formalised networks also exist at national level at 'hotspot' sites and at regional level through the annual RNLG forum. Each of these networks (including the study tours) are likely to result in some informal groupings and promote certain dialogue between participants. The challenge is how to keep this dialogue alive. In its true sense, the networks at PEMSEA are more characteristic of professional networks rather than communities of practice.

6.4 PEMSEA has an opportunity to build on its professional networks and cultivate a variety of communities of practice for greater sharing of tacit knowledge. This can be promoted in the following manner:

- Providing leadership for a community of practice from a 'community coordinator'.
- Establishing events to bring the community together and giving staff time to attend these meetings.
- Having a critical mass of members in the community to avoid loss of participation or interest.
- Developing a learning agenda with some learning projects.
- Producing knowledge artefacts such as documents, tools, stories and websites.

## 7.0 Intellectual Capital

7.1 The real benefits of the PEMSEA programme are the considerable development of intellectual capital in ICM across the East Asia Seas Region. This intellectual capital could be further enhanced through the application of KM principles and practices. Intellectual capital is the economic value of two categories of intangible assets of a company: organisational ("structural") capital and human capital<sup>9</sup>.

7.2 Human capital is based on the competence of employees such as their capacity to act in a certain situation. This is clearly evident through PEMSEA's focus on capacity building, enabling environments and stakeholder awareness activities. A closely related aspect of human capital is high level of social capital developed at

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<sup>9</sup> This definition of intellectual capital comes from OECD. "Guidelines and instructions for OECD symposium." *International Symposium Measuring and Reporting Intellectual Capital: Experiences, Issues and Prospects*, Amsterdam. There is consensus in the literature customer capital needs to be included in the OECD definition. For example, please refer to Stewart, T. A. (1997). *Intellectual Capital: The New Wealth of Organizations*, Doubleday/Currency, New York, Sveiby, K. (1997). *The New Organizational Wealth: Managing and Measuring Knowledge-Based Assets*, Berrett-Koehler, San Francisco.

local, national and regional levels. In Phase 2, the emerging networks are forming social communities along three dimensions:

- Strengthening linkages and connections between members of different networks.
- Increasing interactions between different individuals regionally resulting in greater levels of trust, norms and expectations.
- Developing shared meanings, interpretations and alignment of views regionally on ICM issues.

7.3 Organisational capital refers to tangible elements within PEMSEA that remain after employees go home at night. For PEMSEA, this includes its ICM development framework, IIMS, internal systems, models and databases. Given the strong political persuasion skills developed at PEMSEA, an additional important factor in intellectual capital is customer capital. This includes the reputation and influence it has build up over key stakeholders and political leaders in the region and the strength and influencing power of these external relationships.

7.4 The collective experience at PEMSEA including its skills and general know how in ICM has led to the development of various intellectual assets. These intellectual assets exist in the form of documents, drawing (zonation plans), IIMS, data and the processes adopted at PEMSEA such as the ICM development cycle. The resulting intellectual property could be used in the development of a certification process such as ISO14001 in the future. This would require a much greater strategic and concerted effort by donor agencies and international bodies to share knowledge, expertise and best practice internationally.

7.5 There is a danger that progress may be misinterpreted at community based demonstration and parallel sites shown in Figure 3.2. Committee based learning may produce much greater results in terms of concrete developments and organisational capital. However, community based sites can be shown to develop much greater levels of social capital in local communities and more likely to lead to greater sustainability in the future.

## **8.0 Recommendations**

8.1 The most valuable asset at PEMSEA is the tacit knowledge in ICM implementation developed over the past eight years. There is a danger that the richness of this knowledge may be lost and the same environmental mistakes perpetuated in the region if the resulting intellectual capital is not managed effectively. There are five key KM recommendations that arise from this report:



**8.2 Develop a funding mechanism to broaden and enhance the knowledge management dimensions of ICM implementation in the East Asia Seas region through:**

- Exploring a medium sized grant from GEF focused on capturing, organising, evaluating, storing and retrieving the vast range of ICM knowledge and expertise through human resource interventions and the effective use of KM systems and technology.
- Exploring independent sources of funding and co-financing arrangements with other donors to ensure the future sustainability and development of ICM knowledge in this region. For such a venture to be successful, it is likely to involve much greater levels of co-operation and dialogue with other donor funded projects such as USAID and DANIDA.

**8.3 Articulate a clear ontology of ICM knowledge to promote a shared understanding of the complexity of coastal systems among diverse stakeholders through:**

- Bringing together all the key stakeholders in the PEMSEA programme such as forestry, fisheries, agriculture and economics to develop a common ontology of knowledge in ICM and its inter-relationships. This can be updated regularly at the RNLG forum.
- Institutionalising the use of a common and simple systems model showing the nature and dynamics of the coastal problem at each project site to aid enhanced decision making by PCC and PMO staff. This common understanding of the problem is more likely to lead to concerted action by various stakeholders and avoid the pursuance of simplistic and ill-defined sectoral interests. Systems modelling could be included as part of the current ICM development cycle.

**8.4 Review the current public awareness strategy and action plan to increase knowledge sharing of PEMSEA's activities and to achieve greater impact by:**

- Adopting an adaptive management approach to the communications strategy so that the communications team is more responsive to immediate changes in the behaviour of key stakeholders on the programme.
- Reducing the number of stakeholders targeted through 'force field analysis' by identifying the key stakeholders at any given time who may need to be influenced through media and PR interventions. This may include targeting provincial governors who's political support is required to speed up a process or fisherfolk who need greater awareness of PMO interventions in their neighbourhood. Stakeholder priorities could be established in conjunction with the management committee on a monthly basis.
- Reviewing and developing PEMSEA's stakeholder database to ensure that awareness campaigns are not misdirected to those already familiar with PEMSEA's programme. The review may provide the opportunity to segment

certain audiences so that the communications efforts are more focused and targeted to certain individuals.

- Exploring ways of collaborating more fully with the communications activities of communications managers at UNDP and other related coastal management programmes in the region.

#### **8.5 Review the current KM tools and systems and explore how technology could be used to enhance and embed tacit knowledge more effectively through:**

- Exploring whether the data from 192 forms in the current IIMS system is really necessary and examining how this data could be used to aid policy and decision making by providing concrete examples at local level. Future development of the IIMS needs to be more user led with greater consultation of PMO staff on the likely nature of their policies and decision making in coastal management at local and national levels and how the analytical tools in the IIMS could aid them in this process.
- Developing a knowledge repository of practical ICM issues that could be used by all PMO staff in participating countries. Again consultations with PMO staff and site managers will reveal the commonly used knowledge and information that they require on a daily basis. This may include templates of documents such as EIA, lots of examples of completed documents, legal arrangements and zonation drawings. Such a knowledge repository could be linked to a document management system and disseminated over the internet and/or via a CD-ROM.
- Constructing a Who's Who or Expertise Yellow Pages database will enhance greater horizontal integration between project sites and increase the dialogue between different stakeholders. At the same time, this may result in a reduced reliance on RPO staff and greater use of other ICM resources regionally.
- Exploring e-learning tools to improve the efficiency and overall effectiveness of the capacity building exercises.
- Examining the use of case based reasoning (CBR) systems to maximise lessons learnt from storing different ICM cases regionally and retrieving them based on problem identification, project delivery solutions and project outcomes.
- Developing an exclusive extranet for all regional participants encompassing a 'Regional Knowledge Centre' of user led ICM knowledge and supporting online communities of practice depending on changing user interests and needs.

#### **8.6 Build on current professional networks to further develop communities of practice to enhance the creative and innovative capabilities at PEMSEA by:**

- Providing training on the nature of communities of practice and their value.
- Ascertaining interests and passions among RPO and PMO staff and identifying people willing to assume the role and responsibilities of 'community co-ordinators'.
- Providing time for staff attendance at communities of practice and giving them responsibility to pursue their own learning agendas. Given the regional nature of the PEMSEA programme, some communities of practice may decide to engage as online discussion groups at a particular time of their choosing.
- Encouraging staff to regularly question assumptions and values on the PEMSEA programme to further develop innovative insights and create new ways of looking at ICM implementation.

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