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Citations

Please use the following citation sequence with citing this document:

1. Author.
2. Title.
Our approach: Knowledge and Communications (K&C) focus

- Knowledge critically important to development of aquaculture; eg earliest innovations China/Egypt; 60s & 70s “good science” (eg breeding) to more recent challenges (eg diseases)
- Few studies looking at aquaculture development through a knowledge lens; cf other sectors eg business (knowledge economy thinking) and health (knowledge translation) and ICT (eg K4D)
Some aquaculture K&C history

Kyoto 1976: networking and knowledge sharing highlighted

Bangkok 2000: Bangkok Declaration and Strategy includes 3 knowledge elements:
Investing in People thro education/training;
Investing in R&D and Improving info flow and communications

Phuket 2010: BKD being revisited thro Phuket Consensus

Knowledge & KM

Knowledge is expertise/skills; familiarity gained by experience/education *Oxford dictionary.*

Knowledge management (KM) comprises a range of strategies and practices used in an organization to identify, create, represent, distribute, and enable adoption of insights and experiences.
KM concepts

2 knowledge management ideas:
“Our ability to learn what we need for tomorrow is more important than what we know today”
Siemens, G. Connectivism (2005)

K concept 2

“Experience has long been considered the best teacher of knowledge. Since we cannot experience everything, other people’s experiences and hence other people, become the surrogate for knowledge. I store my knowledge in my friends is an axiom for collecting knowledge through collecting people.”
Stephenson, K.,
Communications/reach thinking

- Knowledge use is not just outputs but outcomes and impacts, influencing strategies, change........what knowledge and knowledge with/to whom questions.

- Knowledge translation (KT), Implementation or aquafacing thinking more generally.

Research & Knowledge Production:

some supply side estimates

- 42 “aquaculture journals”
  [http://ag.arizona.edu/azaqua/extension/journals.htm](http://ag.arizona.edu/azaqua/extension/journals.htm)

- 24,000 “science journals” & 1,350,000 articles published annually (2006 data) and numbers growing very rapidly [Bjork, B-C., Roos, A. and Lauri, M 2009](http://ag.arizona.edu/azaqua/extension/journals.htm)
Other types of knowledge: farmer, and other stakeholders

• Shrimp farmers know that when it rains and the temperature is high, shrimp growth and health conditions are good.
• When it is dry and temperature drops, shrimp start having problems and diseases are more common.
• Practice and traditional ecological knowledge or farmer knowledge.

Knowledge sharing

• Early days in terms of examination of knowledge sharing processes and their adequacy in meeting the needs of our increasing numbers of aquaculture stakeholders.
• Initial work on shared learning around practices (eg BMPs) and other knowledge processes.
Catfish Vietnam: NT Phoung, F B Davy, B Ingram & S S DeSilva

Indian shrimp farming communities: V Bhat & N R Umesh

an example of environmentally sound management of small-scale aquaculture
Salmon farming Chile: R. Infante

Seabass Turkey: G. Yucel-Gier
FEAP (The Federation of European Aquaculture Producers) & EATIP  C. Hough

Farmer-farmer interactions
Farmer networking
Addressing issues of regional importance

Asia NACA: Y Derun, S Wilkinson, SS De Silva, F B Davy

Farmer-farmer interactions
Farmer networking
South-South Cooperation
Specialized training courses
Addressing issues of regional importance
Publications
Our initial case based review

- Each case reviewed aspects of the thinking around this conceptual base.
- We have tried to summarize some initial very general lessons learned across the 6 cases just to provide a very rough glimpse of some of our thinking in the slides that follow

### Issue Comparison 1 examined through a knowledge-communications lens

<table>
<thead>
<tr>
<th>Issue</th>
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<td>Early history, common starting points, constraints.</td>
<td>Modest production levels via traditional cage culture system in Vietnam and region</td>
<td>Traditional shrimp farming in coastal lagoon systems; disease an increasing problem.</td>
<td>Cage culture in Chile region with very rapid growth over the 90’s. Salmon farmers well organized in farmers association and thought to be well positioned against crises</td>
</tr>
</tbody>
</table>
## Issue Comparison 2

<table>
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<th>Issue</th>
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<tbody>
<tr>
<td>What changed? Main current knowledge management uses</td>
<td>Rapid increase in production around 2000 when seed supply/ research knowledge and new pond culture systems &amp; farmer knowledge developed</td>
<td>Marked reduction in disease problems led by new science based BMP cluster approach started in 2000 driven by strong participation, K sharing. Creation of new nat’l organization (NaCSA) guided these changes.</td>
<td>Imported “know how” from main salmon countries as the same companies were involved. Government funded research increasing but with limited impact on aquaculture production (implementation issues)</td>
</tr>
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</table>

## Issue Comparison 3

<table>
<thead>
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<tbody>
<tr>
<td>Who generates main knowledge; Who disseminates knowledge? Who uses this knowledge?</td>
<td>Farmers, researchers, government develop, share knowledge</td>
<td>Cluster organizations of farmers effective in sharing of knowledge and working with local agencies</td>
<td>Partnerships between University-Farmers and government</td>
<td>Important role of the private sector in the generation of new knowledge; poor incentives for knowledge sharing</td>
</tr>
</tbody>
</table>
## Issue Comparison 4

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<th>Issue</th>
<th>All</th>
<th>FEAP</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Who generates, disseminates, uses knowledge?</td>
<td>Partnerships between university, farmers and government developing; clusters playing an important role</td>
<td>New forms of knowledge sharing being developed and refined. Knowledge platforms providing improved knowledge dissemination</td>
<td>Training and extension programs, website and a variety of improved sharing and dissemination strategies being implemented eg around BMPs</td>
</tr>
</tbody>
</table>

## Comparison 5

<table>
<thead>
<tr>
<th>Issue</th>
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<tr>
<td>Main Challenges; What is not (yet?) working and potential solutions or innovations in KM; Future implications</td>
<td>Farmer to farmer and social organization shared learning still in early stages of development. Value added marketing and certification</td>
<td>Disease related knowledge exchange between farms and between companies not open nor rapid. Farmers association as a knowledge sharing platform needs work</td>
<td>Shared learning using platforms or other mechanisms is slowly starting.</td>
<td>Many small scale farmers remain difficult to reach; continue to experiment and learn/adapt; intra regional dissemination; strengthen the science based elements &amp; approaches</td>
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<tr>
<td></td>
<td>coming but takes more time</td>
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## Initial lessons learnt -1

- Disease and management problems were a common thread across most cases. Most changes recent; in last 10 years and still on going.
- Initially poor knowledge sharing often driven by market competition (e.g., Chile case). Now improved knowledge sharing seems to outweigh “market 1st” paradigm.

### Comparison 6

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<td>Continued effort on knowledge sharing among better organized farmers and other stakeholders including govt</td>
<td>Improving collaboration &amp; shared learning within &amp; across levels (from farmer to farmer, state to state and nationally) works</td>
<td>International partnerships &amp; communications platform experiences positive and expanding</td>
<td>Increase transparency and efficiency in the transfer of information among companies and between companies and government. Increase sense of the “common good” both public and private</td>
<td>Short history and need more time for shared learning to develop.</td>
<td>Continue blended approach to T&amp;E using new and traditional tools. Give farmer innovations more prominence and disseminate widely. Main problems linked to funding and coping with expanding training needs</td>
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</table>
Initial lessons learnt -2

• Strengthened social organization and shared learning among stakeholders provided important benefits to cross major barriers/constraints (eg India water quality-disease link).
• Barriers and wider knowledge sharing tool development including “knowledge platforms & Knowledge brokers” showing benefits.

Other opportunities for shared learning

• Health sciences have recently embarked on a variety of new knowledge directions around knowledge translation and links to policy both globally, regionally and national levels. These experiences offer some interesting opportunities for comparative learning with aquaculture.
Knowledge networking & communications

- Back to our 2 initial quotations.
- Knowledge storage in partners but also in other stakeholders whether competitors or regulators or others.
- CoPS: Increasingly need to adopt a shared learning approach that recognizes the knowledge stored with each and move to new shared learning paradigm based on “good aquaculture neighbours”!

Aquaculture Knowledge management challenges

- Aquaculture = change!
- Knowledge use and translation
- Q: With increasing numbers of stakeholders are their K needs being adequately met?
- Sustainability, BKD and where we are going? Knowledge management will play a key role both in management and its monitoring.
Knowledge Gaps

• Limited knowledge examination in general in aquaculture.
• Other forms of knowledge: Traditional knowledge (TEK) studies related to aquaculture seem relatively few; in fact social analysis and social science seems a relative gap. Not clear why this is so.
• Regional disparities in knowledge collection, sharing and management.

Knowledge supply vs demand

Move to more demand driven
Implementation or aquaface thinking

Thanks for your attention
Impact factors in Fisheries

- 1.913 REVIEWS IN FISH BIOLOGY AND FISHERIES
- 1.824 FISH PHYSIOLOGY AND BIOCHEMISTRY
- 1.287 CANADIAN JOURNAL OF FISHERIES AND AQUATIC SCIENCES
- 1.222 REVIEWS IN AQUATIC SCIENCES
- 0.837 AQUACULTURE
- 0.818 FISHERY BULLETIN

- 0.798 TRANSACTIONS OF THE AMERICAN FISHERIES SOCIETY
- 0.731 ICES JOURNAL OF MARINE SCIENCE
- 0.691 JOURNAL OF FISH DISEASES
- 0.588 NEW ZEALAND JOURNAL OF MARINE AND FRESHWATER RESEARCH
- 0.585 AUSTRALIAN JOURNAL OF MARINE AND FRESHWATER RESEARCH
- 0.410 AQUACULTURAL ENGINEERING
The Knowledge Value Chain

Growth Phases in Aquaculture

- Phase I: "Pond 72" - Aquaculture development is initiated; recognized as a significant potential contributor to protein food supplies.
- Phase II: 1970s - Aquaculture grows and is recognized as a potential contributor to global food supplies.
- Phase III: 1980s - Environmental concerns, growth slowed to ensure sustainability and regulatory compliance.
- Phase IV: 1990s - Aquaculture regains momentum with improvements in technology and sustainability practices.
- Phase V: 2000s - Aquaculture produces higher quality, more nutritious products, and is recognized for its ecological benefits.

Blue Revolution:
Aquaculture as a key contributor to global food security.

Aquaculture is environmentally friendly and sustainable.

Products to vary GCC guidelines.
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<td>Traditional shrimp farming in coastal lagoon systems; disease an increasing problem.</td>
<td>Rapid regional growth in Eastern Med of seabass industry; limited local knowledge tradition in aquaculture.</td>
<td>Cage culture in Chile region with very rapid growth over the 1990’s.</td>
<td>Recently established as a regional producer led group.</td>
<td>Early regional body with significant training &amp; extension including partnerships with and cases cited here.</td>
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<td>Rapid increase in production around 2000 when seed supply/research knowledge and new</td>
<td>Marked reduction in disease problems led by new science based BMP collaboratively started in</td>
<td>Similar to other cases where good science played an important role</td>
<td>Imported “know how” from main salmon countries as the same companies were involved.</td>
<td>Refining knowledge platform around 5 main KM issues.</td>
<td>Stronger govt and research knowledge links. Regional knowledge sharing (T&amp;E) blended approach to KM; use of thinking</td>
</tr>
<tr>
<td>pond culture systems &amp; farmer knowledge developed</td>
<td>2000 in AP driven by strong participation and cluster organization of farmers</td>
<td>funded research increasing but with limited impact on aquaculture production</td>
<td></td>
<td>Strong industry links; use of value chain</td>
<td>internet and new IC technologies with more traditional study tours exchanges etc.</td>
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<td>Who generates main knowledge?</td>
<td>Farmers, researchers, government develop</td>
<td>COF generate (??) effective in generating and sharing of knowledge. Creation of NaCSA to work with farmers on certification and int’l marketing.</td>
<td>Partnerships between university, farmers and government developing new knowledge</td>
<td>Important role of the production sector in the generation of new knowledge</td>
<td>Knowledge platforms providing important link in knowledge dissemination</td>
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Cluster of farmers organizations, farmers associations = CFO
D.4  Do NACA generates knowledge?? or rather disseminate research?
Soto, 3/09/2010

D.5  not too clear how is this related to knowledge dissemination in general
Soto, 3/09/2010

BD1  Brian Davy, 17/09/2010
### Comparison 5

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<td>Limited economies, marketing and new governance &amp; implementatio n experience. Training and extension needs more effort</td>
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Nepal

K&C and Success thinking (see Table 10.1)
Table 1: The timeline of *tra* catfish seed production development

- **Date** | **Important Change Events**
- Prior to 2000
  - The striped catfish wild larval collection and nursery have started in 1940s. It has become a key activity of a number of farmers since 1954. This activity provided seed stocks for home-pond culture until the beginning of 2000 when the hatchery-reared seed stock became available.
- **Late 1980s: initial years of research**
  - Research on induced spawning of striped catfish was initiated in 1979. The first fingerlings of striped catfish were produced in 1979 by a joint effort of Long Dinh Vocational School, Nong Lam University (Anh, 1979). The initial successes could not be repeated and the research activities were scaled down until 1995. The period of 1978-1980 could be considered as a starting point of the research on induced spawning of striped catfish.
1995-1998: successful years

Research re-initiated in 1995 under European Commission of Can Tho University involving French Agricultural Research Centre (CIRAD), Research Institute for Development (IRD) France, Can Tho University and An Giang Fisheries Import-Export Joint Stock Company (AGIFISH). The induced spawning technique was successful in 1995 with complete success in the following years.

2004-present: rapid growth years

Striped catfish hatcheries, especially large scale hatcheries from private companies were rapidly established. The hatchery operation technique was mainly transferred or consulted by Can Tho University and Research Institute for Aquaculture (RIA) No. 2.

Striped catfish genetic improvement research was initiated in 2002 and the first batch of improved broodstock was obtained and introduced to some selected hatcheries.

Recently, seed production technique of striped catfish can be done in most freshwater hatcheries in the Mekong Delta. The technique has also been introduced to other parts of.

Consolidation of the sector through the development and adoption of BMPs and a cluster approach to adoption is taking place rapidly. These adoption will enable small scale farmers to remain economically viable and ensure the sustainability of the sector, and most of all ensure market access.

Progress of implementation of the concept of cluster farming in India
Figure 1. IISD Influencing Strategy.

Figure 2. Relative Influence Along the Results Chain
(source: Smutylo 2001)
Spectrum of Influence

<table>
<thead>
<tr>
<th>Action</th>
<th>Change</th>
<th>an observed change (decision making, public policy, or process)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active</td>
<td>Using, owning</td>
<td>policymakers are using our frameworks or information to create new policy</td>
</tr>
<tr>
<td></td>
<td>Engaging</td>
<td>joint efforts to research policy options</td>
</tr>
<tr>
<td></td>
<td>Demanding</td>
<td>policymakers request targeted and general information</td>
</tr>
<tr>
<td></td>
<td>Seeking</td>
<td>policymakers seek new information related to our work</td>
</tr>
<tr>
<td>Passive</td>
<td>Receiving</td>
<td>influential persons receive our information</td>
</tr>
</tbody>
</table>

More Implementation

- Aquaface (cf coal face) thinking
- Health sciences: