Fisheries Management in New Zealand
Economic principles, performance and practice
(potential applications in developing countries)

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Assisting with development and implementation of a reconstruction and rehabilitation strategy in Sri Lanka (joint FAO / ICEDA)

Assisting with the development of a coordination, fisheries management, and livelihoods programme in Indonesia (ARC funded)

Coordination of regional initiatives (e.g. meetings and outputs of CONSRN – BoB, FAO, NACA, SEAFDEC, Worldfish & others)
Overview

• Background
  – Where is the wealth of nations?
  – How is fisheries wealth created – some economic principles and definitions
• NZ Fisheries (performance 2007)
• Economic principles in practice in NZ
  – from single stock to systems management
• What was the impact (conventional “costs”)
• Where does the wealth reside?
• Lessons learnt
• Applications for developing countries
  – eg Sierra Leone
Where is the wealth of nations?

- However sustainable development is defined, achieving it is, at heart, the process of maintaining wealth for future generations. Wealth is conceived broadly to include not only the traditional measures of capital, such as produced and human capital, but also natural assets. Natural capital comprises assets such as land, forests, [fisheries] and sub-soil resources. (p35)

- Low-income countries are highly dependent on natural resources. How these resources are managed will affect both current welfare and the prospects for development in poor countries. (p31)

- [Fisheries] assets are renewable and can produce sustainable income streams ... For natural resources the general prescription is not to simply reduce exploitation, but rather to reduce incentives for overexploitation, which will typically entail reforms in the resource sectors. (p14-15)

- Natural resources play two basic roles in development:
  - first as a basis of subsistence ...
  - second as a source of development finance ... (p8)

- How then do we reconcile these two roles?
How fisheries wealth created?

Some economic considerations
OPEN ACCESS – NO RESOURCE RENTS

Increasing number of vessels / fishing effort

Cost of fishing

Catch value curve

Increasing level of catch / value of catch
MAXIMUM SUSTAINABLE YIELD – RESOURCE RENTS SUBOPTIMAL

- Increasing level of catch / value of catch
- Increasing number of vessels / fishing effort

Catch value curve

CATCH LIMIT

RENT

Cost of fishing

MAXIMUM SUSTAINABLE YIELD

RESOURCE RENTS SUBOPTIMAL
MAXIMUM ECONOMIC YIELD – RESOURCE RENTS MAXIMISED

Increasing level of catch / value of catch

Cost of fishing

Catch value curve

Increasing number of vessels / fishing effort
Some definitions

• **Asset value**
  – calculated using the Integrated Environmental and Economic Accounting (SEEA) method as either the total market value of quota value or calculated using a net present value approach (i.e. Asset Value (V) = Total Annual Rent (R) available from the fishery divided by the discount rate (r) or V=R/r.

• **Sustainable yield**
  – stock is at or above a biomass that will produce Maximum Sustainable Yield (allows for management at MEY)
NZ Fisheries

Economic performance and practice
Location / Size of NZ
United States landmass  7,956,000 sq km

New Zealand EEZ  4,363,000 sq km

3,781,000 sq km

4,363,000 sq km

7,956,000 sq km
Performance

• NZ total wild fish catch 482,000 tonnes
  – 130 species taken commercially
  – 92 species (592 stocks) under quota management

• Sustainability
  – Stocks status information available on 60-70% stocks (by weight and value)
  – 82% of these stocks at or near target level (rebuilding strategies are in place for the remainder)

• Utilisation
  – Total export value in 2006 (FOB) NZ$1 billion
  – No direct subsidies
  – Total asset value in 2006 NZ$3.8 billion (US$2.47 billion)

• NZ’s fisheries are sustainable and are being managed in a way that creates wealth
**Open access no-management**

- **1978 to 1986**
  - **90,000 (1978)**

**Science (MSY) management**

- **1986 to 1994**
  - **410,000 (1986)**
  - **560,000 (1994)**

**Resource rents drive management**

- **1994 to 2007**
  - **480,000 (2006)**

- **Increasing level of catch / value of catch**
- **Increasing number of vessels / fishing effort**
- **Cost of fishing**
- **Catch value curve**

**OPEN ACCESS – NO RESOURCE RENTS**

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**MAXIMUM SUSTAINABLE YIELD – RESOURCE RENTS SUBOPTIMAL**

- **Increasing level of catch / value of catch**
- **Increasing number of vessels / fishing effort**
- **Cost of fishing**
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**MAXIMUM ECONOMIC YIELD – RESOURCE RENTS MAXIMISED**

- **Increasing level of catch / value of catch**
- **Increasing number of vessels / fishing effort**
- **Cost of fishing**
- **Catch value curve**
Preconditions for MEY based management

- quota allocated in perpetuity – transferable, divisible 1986
- quota made proportional 1990
- cost recovery introduced 1994 (replaced resource rentals)
- industry institutions realigned 1997 onwards
  - fisher / processor based organisations rationalised and new structures developed around asset ownership
  - collective frameworks developed – now 20+ Fisheries Management Companies (FMC)
- QMS system streamlined (systems based management enabled)
  - separation of ACE from quota
  - retrospective balancing
- allocation process completed
  - from 140 to 592 stocks
  - from commitment and dependence to tender of quota
- government institutions realigned
  - fisheries management services outsourced (research 1994, quota and catch registries 1999)
  - fisheries planning and service purchasing / delivery outsourced (MOU / evergreen contracts established with FMCs)
Principles for institutional reform

**DEFAULT**
- Fisheries plans developed by Government
- Government implements plans
- Ministry monitors operations

**PREFERRED**
- Fisheries plans developed by resource users
- Resource users implement plans

Check, enforce, prosecute
Operate (registry etc.)
Inform & Educate
Monitor catch, effort etc
Research stock and risks
Resolve disputes, litigate

Fisheries plans developed by Government
Government sets standards and allocates
Ministry monitors operations
SYSTEMS BASED MANAGEMENT UNDER ITQS

ACE DEMAND

ACE Price $

NO SCARCITY

Fish supply (TAC)

Catch

DV 0
SYSTEMS BASED MANAGEMENT UNDER ITQS

Single species fishery
Multi species fishery – constraining bycatch stock
What was the impact ("costs")

Total number of vessels in the New Zealand fishing fleet has reduced by more than 30%
Total tonnage (GRT) of all vessels in the New Zealand fishing fleet has remained relatively constant but domestic capacity has increased.

What was the impact (“costs”)?
Percentage ownership of NZ quota shares (excludes Crown holdings)
Approx. 60 billion shares across 592 fish stocks (100 million shares per stock)

- Te Ohu Kai Moana Trustee Limited: 16%
- Sanford Limited: 11%
- Talley’s Group Management Limited: 5%
- Chatham Islands Management Limited: 5%
- Aotearoa Fisheries Limited: 4%
- Kaimoana Pacific Limited: 3%
- Others (< 3% of shares): 51%
- Pupuri Taonga Limited: 5%
Who are the wealth beneficiaries?

- The general economy from the injection of capital value to underpin investment and development (quota is supported by a government guaranteed registry)
- General taxpayer base benefits given that there is no subsidisation and positive (taxable) earnings
- Direct allocative beneficiaries initially were the fishers (based on catch history) and the Treaty of Waitangi Fisheries Commission
- Now quota owned by Maori 31%, Sanfords Limited 11% and to a lesser extent Talley’s 5%
- Now will examine the largest owner group (Maori) in more detail
Context

- **1987** Maori challenged the allocation of ITQ (many Maori were initially excluded by the allocation process)
- **1989** An interim settlement is reached. (10% of quota plus cash for capacity building)
- **1992** The Crown and Māori reach a full and final settlement. (50% of Sealord and 20% of quota). The Treaty of Waitangi Fisheries Commission is set up to hold these assets on behalf of iwi and establish a fair way of allocating the assets.
- **1993 – 2003** The Commission seeks agreement on allocation. Key issues include whether quota should be allocated based on an iwi’s population or coastline, what the entitlements are for ‘urban Māori’ disassociated from their iwi authorities, and whether the entire settlement should be distributed out or consolidated in a central organisation
- **May 2003** An allocation model supported by 93.1 percent of iwi is presented to Government. Commission grows asset by 300% to $NZ 750 million.
- **September 2004** The Māori Fisheries Act 2004 is passed to legalise the allocation agreement. The Treaty of Waitangi Fisheries Commission is dissolved.
- **November 2004** Te Ohu Kai Moana Trustee Limited and Aotearoa Fisheries Limited are formally established.
- **It took 20 years to develop an allocation formula and the capacity to allocate. This process is still ongoing. Assets were successfully managed in Trust in the interim**
Allocation formula

• 57 iwi (or tribal groups) are recognised for allocation of assets.
• The total number of Maori belonging to iwi and legal beneficiaries is registered at 679154 (around 15% of New Zealand’s population).
• Iwi are to receive assets in the form of cash, quota and income shares based on iwi population and/or coastline length or a combination of both (see diagram).
• All iwi have to meet mandate requirements to receive assets (i.e., governance requirements).
• Around half (NZ$350 million) of all settlement assets (including a 50% share in New Zealand’s largest fishing company) are held by Aotearoa Fisheries Limited.
• Beneficial interests are allocated through mandated iwi organizations (usually a combination of company / trust arrangements).
Aotearoa Fisheries Ltd

- Goal is to generate returns above its cost of capital by 2008/09
- Uses a Economic Value Added (EVA) approach
  \[ EVA = \text{net operating profit after taxes} - [\text{value of capital} \times \text{cost of capital}] \]
- Management objectives and commercial activities are aligned to Government objectives and monitoring methodology i.e. NZ Monetary Stock Accounts (the SEEA methodology)
### Allocation of AFL Income Shares to Mandated Iwi Organisations

<table>
<thead>
<tr>
<th>Region and Iwi</th>
<th>Population</th>
<th>AFL shares</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAITOKERAU</td>
<td></td>
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</tr>
<tr>
<td>Ngaitakoto</td>
<td>509</td>
<td>75</td>
</tr>
<tr>
<td>Whangaroa</td>
<td>2,040</td>
<td>300</td>
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<tr>
<td>Ngati Whatua</td>
<td>13,113</td>
<td>1,931</td>
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<tr>
<td>Te Rarawa</td>
<td>11,998</td>
<td>1,767</td>
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<tr>
<td>NGAPUHI</td>
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<tr>
<td>Ngapuhi</td>
<td>107,242</td>
<td>15,791</td>
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<td>TAINUI</td>
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<tr>
<td>Waikato</td>
<td>46,526</td>
<td>6851</td>
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<tr>
<td>Ngati Raukawa ki Waikato</td>
<td>9,051</td>
<td>1,333</td>
</tr>
<tr>
<td>Hauraki</td>
<td>13,622</td>
<td>2,006</td>
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<tr>
<td>TE ARAWA WAKA</td>
<td></td>
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<tr>
<td>Te Arawa (eleven iwi)</td>
<td>40,533</td>
<td>5,968</td>
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<tr>
<td>MATAATUA</td>
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<td></td>
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<tr>
<td>Ngati Awa</td>
<td>13,252</td>
<td>1,961</td>
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<td>Ngai Tai</td>
<td>2,266</td>
<td>334</td>
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<tr>
<td>Tuhoe</td>
<td>29,726</td>
<td>4377</td>
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<td>Ngati Pukenga</td>
<td>1,243</td>
<td>183</td>
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<tr>
<td>POROURANGI</td>
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<tr>
<td>Ngati Porou</td>
<td>63,613</td>
<td>9,366</td>
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<td>TAKITIMU</td>
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<tr>
<td>Ngai Tamanuhiri</td>
<td>1,207</td>
<td>178</td>
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<tr>
<td>Mahaki</td>
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<td>Rongowhakaata</td>
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<td>Ngati Kahungunu</td>
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<td>HAUARU</td>
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<td>Ngati Mutunga</td>
<td>1,652</td>
<td>243</td>
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<td>Te Atiawa (Taranaki)</td>
<td>14,147</td>
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<td>Taranaki</td>
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<td>Ngati Ruanui</td>
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<td>Te Atihauuni a Paparangi</td>
<td>9,780</td>
<td>1,440</td>
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<td>Ngati Apa (North Island)</td>
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<td>Ngati Hauliti</td>
<td>1,039</td>
<td>153</td>
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<td>TE MOANA O RAUKAWA</td>
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<td>Atiawa ki Whakarongotai</td>
<td>493</td>
<td>73</td>
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<td>Te Atiawa (Wellington)</td>
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<td>Ngati Tama (Te Tau Ihu)</td>
<td>628</td>
<td>92</td>
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<tr>
<td>Ngati Raurua</td>
<td>805</td>
<td>119</td>
</tr>
<tr>
<td>Ngati Kula</td>
<td>1,266</td>
<td>186</td>
</tr>
<tr>
<td>Ngati Apa ki te Waipounamu</td>
<td>649</td>
<td>96</td>
</tr>
<tr>
<td>Ngati Koata</td>
<td>885</td>
<td>130</td>
</tr>
<tr>
<td>WAIPOUNAMU / REKOHU</td>
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<tr>
<td>Ngai Tahu</td>
<td>41,496</td>
<td>6,110</td>
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<tr>
<td>Moriori</td>
<td>601</td>
<td>88</td>
</tr>
<tr>
<td>Ngati Mutunga</td>
<td>1,132</td>
<td>167</td>
</tr>
</tbody>
</table>

**TOTAL INCOME SHARES**: 74,818
Conclusions

• Align the incentives of resource use with enhancing the value of the asset from the outset
• Address equity issues through allocation of ownership of the capital asset not by compromising the efficiency of production
• Draw a bridge between subsistence fishers and wealth generation by making them the direct beneficiaries (eg Maori allocation approach)
• Recognise that the process will take time (15-20 years) and the asset needs to be protected and nurtured in the interim
Sierra Leone

Period of operation of the Soviet Union fishing fleet

Development of industrial fishing 1951-1976
(Before 1951 there was artisanal fishing only)

Period of post war economic development

Period of Civil conflict

Catch (tonnes)

Year

OPEN ACCESS – NO RESOURCE RENTS

MAXIMUM SUSTAINABLE YIELD – RESOURCE RENTS SUBOPTIMAL

MAXIMUM ECONOMIC YIELD – RESOURCE RENTS MAXIMISED
Figure 1: Industrial catches and potential yields

- All industrial
- Industrial pelagics
- Other industrial

Potential yields for all industrial fisheries
Potential yields for demersal & other non-pelagics

Year: 1959-2005
Catches (tonnes): 0-220,000
Figure 2: Artisanal catches (tonnes)