Towards TAC-based Fisheries Management in Korea – Experiences and Challenges

Jungsam Lee
1. Production and Policy Goals
2. Introduction of TAC-based Management
3. Expansion and Operation
4. Is TAC-based Management Successful?
5. Current Issues and Future Direction
1. Production and Policy Goals
Decreasing Capture Fisheries Production

*Seaweed included

Aquaculture

Capture

Korea

World

x 10000 M/T


0 2,000 4,000 6,000 8,000 10,000

x 10000 M/T

0 50 100 150 200
Transition of Fisheries Policy Goals

  - Increasing harvests

- **Stagnant period** (1987~1996)
  - Excessive fishing efforts
  - Environmental contamination
  - Decreased fishing grounds

- **Declining period** (1997~Present)
  - Decreased fishing grounds
  - Depleted fish stocks

**Policy goals**

- **More Production**
  - Vessel construction and modernization
  - Renewing equipments

- **Business Stabilization**
  - Restructuring started
  - Cost reduction

- **Sustainable Fisheries**
  - Intensive restructuring
  - Stock enhancement
  - TAC, Stock Rebuilding Plan

**Environmental change**

- Transition of Fisheries Policy Goals

- (1970~1986)
- (1987~1996)
- (1997~Present)
2. Introduction of TAC-based Management
Fisheries Management Instruments

Regulation + Promotion + Others

Regulation
- Technical Measures
- Input Control
- Output Control

Promotion
- Stock Enhancement
- Artificial Reef, Fry Release, Marine Ranching, Marine Forest

Others
- Size, Season, Fishing Ground
- License, Gear, Vessels
- TAC, IQ
- Co-management, Stock Rebuilding

Co-management, Stock Rebuilding
Conventional Fisheries Management

- Based on input control and technical regulation
- Started with Fisheries Act legislated in 1953
- Needed more fishing vessels to increase production (no reason to regulated output)

**Regulation**
- **Technical Regulation**
  - Size, Season, Fishing Ground
- **Input Control**
  - License, Gear, Vessels
- **Output Control**
  - TAC, IQ
Limitations of Korean Conventional Fisheries Management

• Fish stocks in the coastal water have been depleted
  - Decreasing catch (plummeting production of pollock and filefish)
  - Decreasing CPUE (catch per horsepower) in overall fisheries
  - Increasing proportion of juvenile fish

• Real fishing efforts have increased and offset the effects of vessel and gear restrictions

• Technical regulation methods were not flexible in rapidly changing fisheries circumstances

• Timely assessment of the fish stocks was neglected by excessively concentrating on input restrictions
Horsepower per Vessel & Catch per Horsepower
Main Institutional Change

- Decrease in fisheries landings led to new systems and regulations
- Korea started TAC for 4 species in 1999 and expanded to 11 species until 2009
3. Expansion and Operation
<table>
<thead>
<tr>
<th>Expansion of TAC-based Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Pre-test Stage</strong></td>
</tr>
<tr>
<td>(Sep.16 ~ Oct. 30, 1998)</td>
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<tr>
<td>Mackerel (large purse seine fishery)</td>
</tr>
<tr>
<td><strong>2. Second Stage</strong></td>
</tr>
<tr>
<td>(1999 ~ 2001)</td>
</tr>
<tr>
<td>4 species (mackerel, jack mackerel, sardine, Red queen crab)</td>
</tr>
<tr>
<td>2 fisheries (large purse seine, off-shore trap fishery)</td>
</tr>
<tr>
<td><strong>3. Third Stage</strong></td>
</tr>
<tr>
<td>(2001)</td>
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<tr>
<td>3 species added (purplish washington clam, pen shell, Jeju island top shell)</td>
</tr>
<tr>
<td>2 fisheries (diver fishery, village fishery)</td>
</tr>
<tr>
<td>(2002 ~ 2003)</td>
</tr>
<tr>
<td>2 species added (Snow crab, blue crab)</td>
</tr>
<tr>
<td>1 fisheries (off-shore gill net fishery)</td>
</tr>
<tr>
<td>(2007 ~ 2009)</td>
</tr>
<tr>
<td>3 species added (squid, sandfish, mottled skate)</td>
</tr>
<tr>
<td>1 species dropped (sardine)</td>
</tr>
<tr>
<td>6 fisheries including large trawl and offshore squid jigging</td>
</tr>
</tbody>
</table>
TAC Determination Criteria

✓ High commercial value with large production volume
  - mackerel, jack mackerel, sardine

✓ Conservation Purpose (seriously depleted stocks)
  - snow crab, purplish Washington clam, Pen shell

✓ Trans-boundary species
  (needs international management with adjacent countries)
  - mackerel, jack mackerel, sardine

✓ Necessity of local management
  - Jeju island top shell, purplish Washington clam, mottled skate
TAC Species

SCIENTIFIC STOCK ASSESSMENT & MONITORING, DESIGNATION OF SELLING AREAS, PROVIDING INCENTIVES TO PARTICIPATING FISHERMEN
Process of TAC Creation by Central Gov.

1. Stock Assessment (NIFS)
2. Establishment of Annual TAC Implementation Plan
3. Opinion Collection From Industries
   - (Deliberation of the TAC Council)
4. Deliberation of the Central Fisheries Management Committee
5. TAC Set-Up
   - By Fisheries, By Fishing Area, By Fishing Period
Process of TAC Creation by Regional Gov.

- Opinion Collection from NIFS
- Establishment of Annual TAC Implementation Plan
- Deliberation of Regional Fisheries Management Committee
- Approval of MOF
- TAC Set-Up

By Fisheries, By Fishing Area, By Fishing Period
TAC Allocation System

- **TAC Set-Up**
  - Allocation for Regional Governors
    - Allocation Plan
      - Assignment to Fishermen
        - Distribution of Allocation Certificate
  - Allocation for Minister
    - Allocation Plan
      - Assignment to Fishermen
        - Distribution of Allocation Certificate

- **< 90% of TAC >**
  - President of Regional Coops And Fishermen

- **< 10% of the remaining TAC >**
  - Remaining Quotas can be adjusted by Provincial Gov. depending upon each TAC Species’ or each fisheries’ situation

- **< 90% of TAC >**
  - President of Coops by Fishery And Chiefs Of Other Associations

- **< 10% of the remaining TAC >**
TAC Monitoring System

- 85 observers from FIRA cover 118 designated selling areas
- (‘00) 9 → (‘06) 15 → (‘07) 30 → (‘09) 43 → (‘10~) 70 → (‘18~) 85

Ministry of Oceans and Fisheries

Regional and local Gov.

Fisheries cooperatives

Fishermen (Land and sell catches)

Processors:
Fishing communities

Consignment sale

Submit checking document

Weekly and monthly report

Fisheries Resources Agency

Monthly report

Daily report

TAC Observers

Check catches at designated selling areas

Landing of TAC species
**TAC Monitoring System**

- Check landing volume
- Sample classification
- Check bycatch composition
- Check size limit
4. Is TAC-based Management Successful?
Plummeting Coastal & Offshore Production

- Coastal and offshore production hit the historic low in 2016 since 1972
- 908 thousand M/T in 2016 and 927 thousand M/T in 2017

(‘17) : 0.93 million M/T

자료: 수산정보포털
Causes of Plummeting Production

- Overfishing, derelict fishing gear and ghost fishing, climate change and destruction of marine forest, illegal squid fishing by foreign vessels
- Overfishing by Korean vessels’ increased fishing capacity (horsepower still increase)
- TAC-based management failed to expand and work as central fisheries management instrument (TAC species cover only 30% of total production)

Note: Horsepower is recalculated as of 1986
Compared with non TAC species, production of TAC species decreased less.
- Rapid decrease in 2017 is largely due to decreased squid production caused by Chinese vessels’ overfishing

Note: Catches are recalculated based on the average catches of 2 or 3 years before TAC implementation.
Production of TAC Species

Except for mackerel and squid, overall production of TAC species increased after TAC adoption.
5. Current Issues and Future Direction
**Current Issues**

- TAC set higher than stock status
  - Even though runout rate is lower than TAC, stock status does not improve
- Lack of monitoring: only 70 observers cover 118 designated landing places
  - Observers: (‘00) 9 → (‘06) 15 → (‘07) 30 → (‘09) 43 → (‘10~) 70 → (‘18~) 85
- Many fisheries catching TAC species do not participate in TAC allocation process

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<thead>
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<th>Species</th>
<th>Stock status</th>
<th>Direction</th>
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<tr>
<td>Mackerel</td>
<td>Middle</td>
<td>Stagnant</td>
</tr>
<tr>
<td>Jack mackerel</td>
<td>Middle</td>
<td>Stagnant</td>
</tr>
<tr>
<td>Squid</td>
<td>Middle</td>
<td>Stagnant</td>
</tr>
<tr>
<td>Sandfish</td>
<td>High</td>
<td>Increasing</td>
</tr>
<tr>
<td>Red queen crap</td>
<td>Low</td>
<td>Stagnant</td>
</tr>
<tr>
<td>Blue crap</td>
<td>Middle</td>
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### Quota runout rate(%)

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<th>Species</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
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<tbody>
<tr>
<td>Total</td>
<td>72.6</td>
<td>80.9</td>
<td>61.0</td>
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<tr>
<td>Squid</td>
<td>71.3</td>
<td>68.8</td>
<td>42.4</td>
</tr>
<tr>
<td>Mackerel</td>
<td>73.0</td>
<td>96.6</td>
<td>76.8</td>
</tr>
<tr>
<td>Jack Mackerel</td>
<td>75.8</td>
<td>62.9</td>
<td>58.9</td>
</tr>
<tr>
<td>Sandfish</td>
<td>58.5</td>
<td>92.4</td>
<td>72.7</td>
</tr>
<tr>
<td>Red queen crap</td>
<td>89.1</td>
<td>88.1</td>
<td>73.6</td>
</tr>
<tr>
<td>Blue crap</td>
<td>35.4</td>
<td>59.4</td>
<td>63.0</td>
</tr>
<tr>
<td>Snow crap</td>
<td>46.7</td>
<td>70.1</td>
<td>102.2</td>
</tr>
<tr>
<td>Pen shell</td>
<td>66.3</td>
<td>63.6</td>
<td>75.8</td>
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</table>
**Future direction**

**Main Goal**

- Conventional management failed to reduce increasing fishing capacity
- From an additional and formal output management instrument to a central fisheries management instrument
  - Expand TAC species to cover 70–80% of coastal and offshore fisheries production

**Future Direction**

- Expand TAC species and participating fisheries
  - Implement TAC to species of which stock decreases (from voluntary participation to designation of species and relevant fisheries)
  - Expansion of participation to fisheries in excess of 10% of TAC fish production
- Strengthen dockside monitoring
  - Increase observers from 85 to 250 to cover 118 main landing places
Future direction

Strengthening scientific stock assessment
- Expand role of Fisheries Resources Research Center and build stock assessment ships (build additional 1,500 ton class research ship and increase researchers from 11 (2018) to 43 (2022))
- Conduct additional stock assessment during extreme catch variation and increase runout rate of allocated quota

Develop more incentive for fisheries to expand voluntary participation to TAC program
- Introduce income insurance to protect TAC program participating fishermen
Thank you!