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Measuring Quality of Property Rights: Development of User Rights Quality in the Icelandic Fisheries

NOS-H Workshop:

**“Advantages and Disadvantages of Strong User
Rights in Fisheries”**

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Strong User Rights have a high Quality score

- Arnason (2021)

By *strong user rights* in fisheries, I mean fishing rights that *score reasonably highly on property rights quality index* with respect to the fishing activity (not necessarily the fish stocks). Examples of such rights are (i) sole owner rights, (ii) IQs, (iii) ITQs and (iv) those TURFs that sufficiently encompass the relevant fish stocks. Certain community rights fishing rights may also qualify as being strong user rights. However, the extent to which this holds depends very much on how they allocate their rights to users....

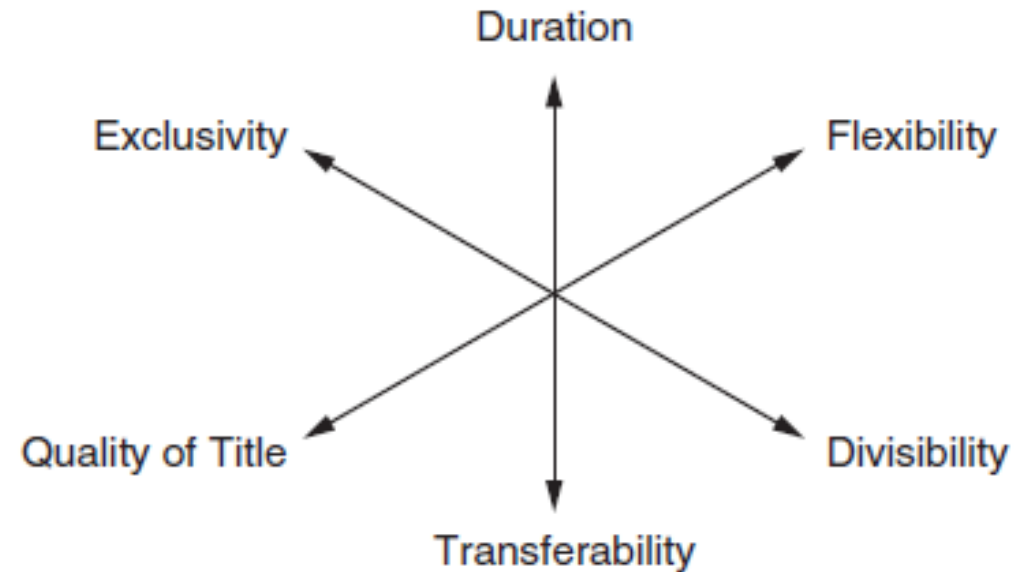
It is important to realize that a *shift in user rights regimes sets into motion a dynamic process of adjustments and readjustments*. This suggests that the long-term effects of a transition to strong property rights or the reverse, may be different from the short run effects. It immediately follows that the advantages and disadvantages of strong property rights may be different in the short and long run. Obviously, this substantially complicates the assessment of these advantages and disadvantages.

Scott's list of the six characteristics

- *Duration*. The more enduring the holder's right, the greater the opportunities to increase the productivity and value of land or resource. Easy *renewability* may be a substitute for duration.
- *Quality (or security) of title*. The more a right has of this characteristic, the smaller the likelihood that its holder will lose possession of the resource and his improvements to it.
- *Exclusivity*. The more a right has of this characteristic, the more the holder can call on the resources of the legal system to free him from spill overs and damage arising extrinsically.
- *Transferability*. The more a right has of this characteristic, the greater its value derived from its value to potential users; heirs, buyers and renters.
- *Divisibility*. With this characteristic, parts of the land or resource may be acquired by and placed under a different holder, in search of a higher value.
- *Flexibility*. This characteristic is most useful in contracts and leases. It provides the parties with powers, in the future, to agree on different terms and indeed characteristics of their bargain.

Six pointed figure from A Scott

- Figure shows Scott's (2008) six characteristics graphically.
- The arrows represent the dimension of the property right, and do not imply interactions between the characteristics.
- The measured dimensions are not necessarily independent.

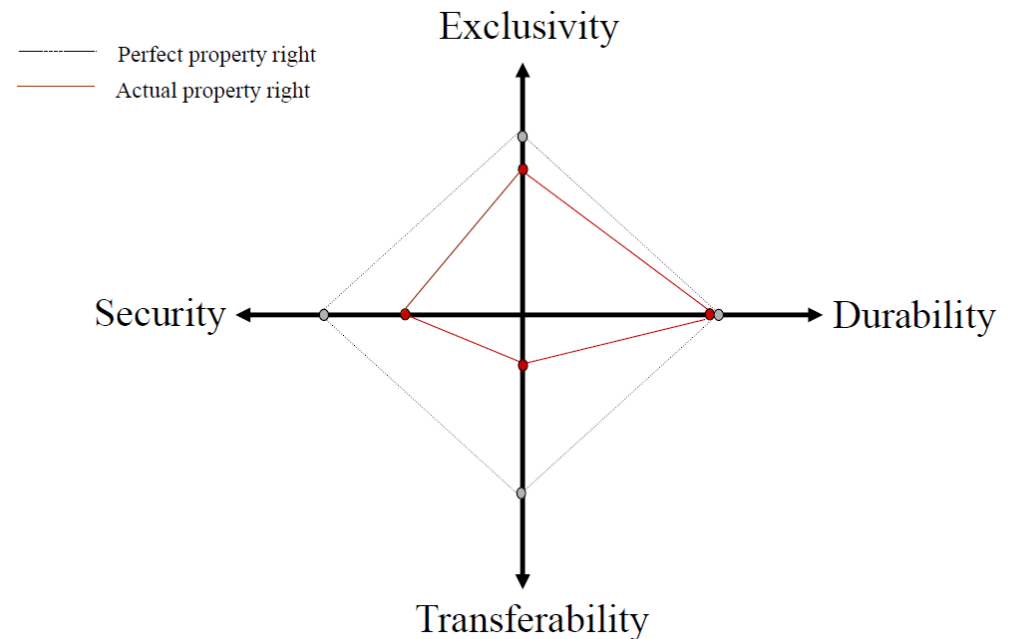


Arnason's four attributes

- ***Security*** refers to ability of the holder of a property right to withstand challenges to his property right. Best thought of as the probability that the owner will be able to hold on to his property right. Probabilities range from zero to one. A measure of unity means that the owner will hold his property with complete certainty and a measure of zero means that the owner will certainly lose his property.
- ***Durability*** refers to the time span of the property right. This can range from zero, to infinite duration. Leases are examples of property rights of a finite duration.
- ***Exclusivity*** refers to the ability of the property rights holder to utilize and manage the property without outside interference. The right of a fisherman to go out fishing has exclusivity reciprocal to the number of other fishermen with the same right. The degree of exclusivity can range from zero corresponding to no exclusivity whatsoever to perfect exclusivity which may be given the measure of unity.
- ***Transferability*** refers to the ability to transfer the property right to someone else. For scarce (and valuable) resources, this characteristic is economically important because it facilitates the optimal allocation of the resource to competing users/ uses. An feature of transferability is *divisibility*, the ability to subdivide the property right into smaller parts for the purpose of transfer. Perfect transferability implies both no restrictions on transfers and perfect divisibility.

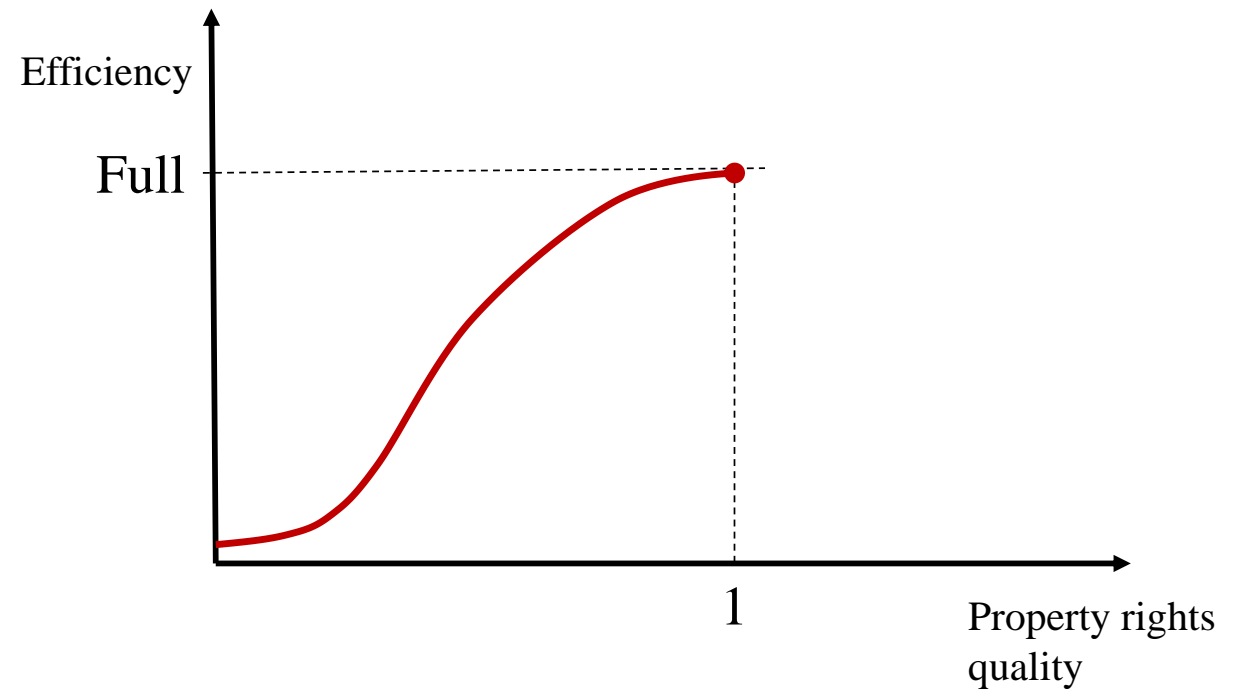
Arnason's Q-measure of property rights quality

- Value for each attribute can range from 0 to 1



Arnason's hypothesis

Likely relationship between property rights quality and economic efficiency.



What weakens quality score

- Security
 1. Probability of holding (secure) property right
 - a. Good security allows holder to receive payoff of improvements/increased value
 - b. Uncertain volume/share affects this (time dimension: „decreasing share“).
- Durability
 1. Duration of right
 2. Indefinite duration vs. perpetuity
 - a. Perpetuity requires government to compensate/buy right
 - b. Indefinite duration means rights can be revoked altogether

What weakens quality score

- Exclusivity (incl. Flexibility)
 1. A right to a volume of harvest (or a share of total TAC)
 - a. Uncertain volume or non-fixed share would violate this
 2. Number of holders/vessels may matter, fewer=>more exclusivity.
 3. To take the harvest in a way he prefers without interference
 - a. Restrictions by regulations would violate this (less flexibility)
 - i. Regulations interfere with management of harvesting
 4. Tax on quota restricts receipt of income from harvesting
 5. Restrictions on disposal, exporting unprocessed catch, is a restriction (less flexibility)
 6. Flexibility, to land above quota, carryover between fishing years, (limited) interchange between species (counting landing of one quota species against unused quota in other species)

What weakens quality score

- Transferability (incl. Divisibility)
 1. Often described as indispensable aspect of ownership rights
 2. Transferability determines the extent to which a holder may bequeath, trade or sell his interest in a resource
 - a. Restriction on collateral undermines transferability (non-transferability undermines property as right cannot be used as collateral)
 - b. Restrictions on who can hold right limits transfers
 - i. Only Icelanders/Icelandic firms (cap on foreign ownership)
 - ii. Only vessels can hold quotas (and government)
 - c. Restriction on consolidation (cap on quota holding) limits transfers
 - d. Requirements of use (harvest) limits transfers
 - e. Restriction/cap on amount of quota on a vessel (no more than vessel can reasonably catch).
 - f. Restrictions on horizontal/vertical rights limits transferability
 - g. Community pre-emption may limit transferability

Evolution of quality score in Iceland

- $Q \equiv S^\alpha \cdot E^\beta \cdot D^\gamma \cdot (w_1 \cdot + w_2 \cdot T^\delta)$,
- where S denotes security, E exclusivity, D duration and T transferability. α , β , γ and δ are parameters and w_1 and w_2 are weights.
- $\alpha, \beta, \gamma, \delta, w_1, w_2 > 0$ and $w_1 + w_2 = 1$
- Following Arnason we use the following specifications: $\alpha = \beta = \gamma = 1/3$, $\delta = 1$ and $w_1 = 0.6$ and $w_2 = 0.4$.

	1978	1984	1991	2005
Security	(0,75)	0,75	0,9	0,9
Exclusivity	0,01	0,6	0,7	0,8
Durability	0,9	0,25	0,9	0,9
Transferability	0	0,9	0,9	0,85

1978 Effort restrictions introduced

- Security (0,75) (Is it applicable?)
- Durability (0,9) (Is it applicable?)
- Exclusivity (score 0,01)
 - Open access, common pool
 - Only restriction is through access to finance (government „monopoly“ on banking and loans)
 - Cap on allowable fishing days
 - Gear and area restrictions
- Transferability (score 0)
 - No licensing or user rights

1984 ITQs introduced in important demersal fisheries

- Vessel quota system for vessels 10 GRT and larger
 - Security (0,75)
 - Durability (score 0,25)
 - 1 year duration
 - Within year quota transferable, with some restrictions
 - Quota share not transferable
 - Exclusivity (score 0,6)
 - Licensing for larger vessels (access mostly closed)
 - Small vessels common TAC (amount not share of overall TAC), open access
 - A few large vessels have option to choose effort quota
 - TAC for cod 242 thousand mt, catch 283 mt
 - Export of unprocessed catch penalized 25%
 - Transferability (0,9)

1991 Comprehensive ITQs

- Vessel quota system for vessels 6 GRT and larger
 - Security (0,9)
 - Durability (score 0,9)
 - Indefinite duration
 - Within year quota transferable, with some restrictions
 - Quota shares transferable (some restriction on transfer of vessels)
 - Exclusivity (score 0,7)
 - Small vessels common TAC (amount not share of overall TAC)
 - Small vessels two systems; cod cap and effort quota(fishing days)
 - TAC for cod 265 thousand mt, catch 274 mt (in 1991/92)
 - Export of unprocessed catch penalized 20%
 - Total number of vessels 2400
 - Transferability (0,9)
 - Harvest 25% every other year

2005 All fishing under ITQs

- Vessel quota system for all vessels
 - Security (0,9)
 - Durability (score 0,9)
 - Indefinite duration
 - Within year quota transferable, with some restrictions
 - Quota shares transferable (some restriction on transfer of vessels)
 - Exclusivity (score 0,8)
 - Small vessels in separate ITQs (TAC share of overall TAC)
 - Catch in line with TAC for cod (2005/06)
 - All species under ITQs
 - Fishing tax, special tax on quotas based on overall historical profitability)
 - Total number of vessels 1200
 - Transferability (0,85)
 - Harvest 50% every other year
 - Restriction/cap on amount of quota on a vessel (no more than vessel can reasonably catch).
 - Restriction on consolidation (cap on quota holding) limits transfers

Evolution of quality score in Iceland

- User Rights are rights to extract
- Management of fish stocks and enforcement of fisheries management system is the responsibility of government

	1978	1984	1991	2005
Security	(0,75)	0,75	0,9	0,9
Exclusivity	0,01	0,6	0,7	0,8
Durability	0,9	0,25	0,9	0,9
Transferability	0	0,9	0,9	0,85
Q-value	0,11	0,46	0,76	0,81

Another approach: Fishery Performance Indicators

- Fishery Performance Indicators (FPIs) for evaluating and comparing the world's fisheries management systems. These indicators are designed to evaluate the effectiveness of management systems at aligning ecosystem health and human well-being. The FPIs were developed in recognition of the fact that an effective management system is one that is ecologically sustainable, socially acceptable, and generates sustainable resource rents or profits.
- The FPIs fall into two categories.
- The first category is of indicators or outputs that identify and measure whether the fishery is delivering economically viable and socio-ecologically sustainable results.
- The second category is of input factors, or enabling conditions, that contribute to the process of incentivizing socio-ecologically sustainable use of fish resources.
- By analyzing relationships among the output and input metrics, the FPIs dataset can be used to understand the causes, correlations and paths toward successful and sustainable industry development that can arise from investment in, and changes to, fishery policy and practice.

Fishery Performance Indicators

- The *Property Rights & Responsibilities* component reflects how much and what type of control individuals can exercise over the resource and how much opportunity they have to establish and protect well-designed ecosystem-based resource management structures. Many economists believe such rights to be critical to creating economically sustainable fisheries.
- The *Fishing Access Rights* dimension captures the nature and strength of the resource users' rights to exclude others from using the resource.
- The *Harvest Rights* dimension captures the nature and strength of the resource users' rights to a specific quantity of the harvest.

Fishery Performance Indicators

Property Rights & Responsibility	Fishing Access Rights	Proportion of Harvest Managed Under Limited Access
		Transferability
		Security
		Durability
		Flexibility
		Exclusivity
		Proportion of Harvest Managed with Rights-based Management
	Harvest Rights	Transferability
		Security
		Durability
		Flexibility
		Exclusivity

Value for each attribute can range from 0 to 1

FPI score: equal weight

FISHING ACCESS RIGHTS		1978	1984	1991	2005
Proportion of Harvest Managed Under Limited Access		1	4	4,5	5
Transferability Index			3,5	3,5	4,5
Security Index		4	4,5	4,5	4,5
Durability Index		4	4,5	5	5
Flexibility Index		4	4	4	4
Exclusivity Index			3,5	4	4,5
Average access rights		3,3	4,0	4,3	4,6
HARVEST RIGHTS					
Proportion of Harvest Managed with Rights-based Management		1	4	4,5	5
Transferability Index			3,5	4	4
Security Index			3,5	4	4,5
Durability Index			2,5	5	5
Flexibility Index			4	4,5	4,5
Exclusivity Index			3,5	4	4,5
Average harvest rights		1,0	3,5	4,3	4,6
Average overall		2,1	3,8	4,3	4,6

Thanks!