NOS-H Workshop Series
The advantages and disadvantages of strong user rights in fisheries

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On relative magnitudes of the impacts of SURFs

(strong user rights in fisheries)

Workshop 3
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The nature of the problem

Consequence i for individual j at time t: $x(i,j,t)$

Vector shorthand: $\boldsymbol{x}(j,t)$

Utility: $U(\boldsymbol{x}(j,t),j;t)$

User rights (Q) to consequences: $\boldsymbol{x}(j,t) = \boldsymbol{\Gamma}(Q, z; j,t)$

Utility: $U(\boldsymbol{\Gamma}(Q,z;j,t), j,t)$

The nature of the problem (cont.)

Impact of a change in SURFs:

$$\Delta PV = \sum_{j=1}^{J} \Delta PV(j) = \sum_{j=1}^{J} \int_0^T U(\Gamma(Q_1, z; j, t), t; j) - U(\Gamma(Q_0, z; j, t), t; j) dt$$

An immense measurement problem:

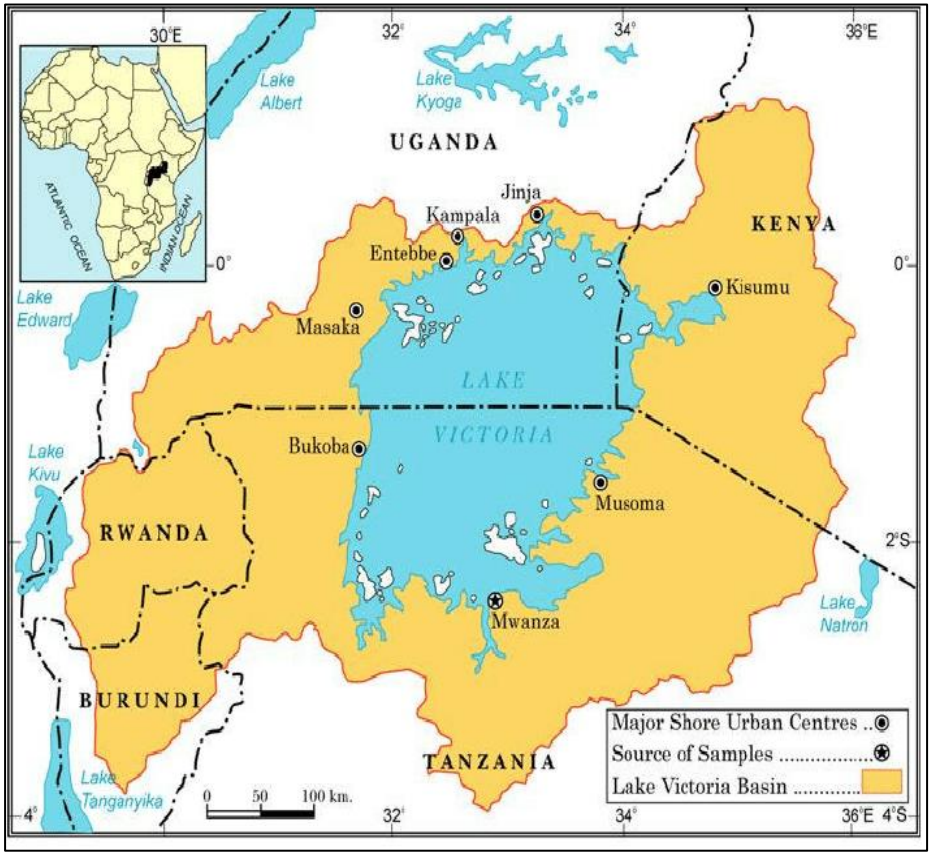
- Many consequences,
- Many individuals,
- Many unknown relationships

Important considerations

- Transition to SURFs is generally not a Pareto improvement
  - Many consequences, affect individuals with different preferences in different ways
- The Hicks-Kaldor criterion (Foundation of C-B analysis)
  - Can the gainers compensate the losers?
  - Need measurement to know this (Cost-benefit analysis)
- So, cannot avoid measurement
  - But perhaps, it turns out benefits greatly exceed losses

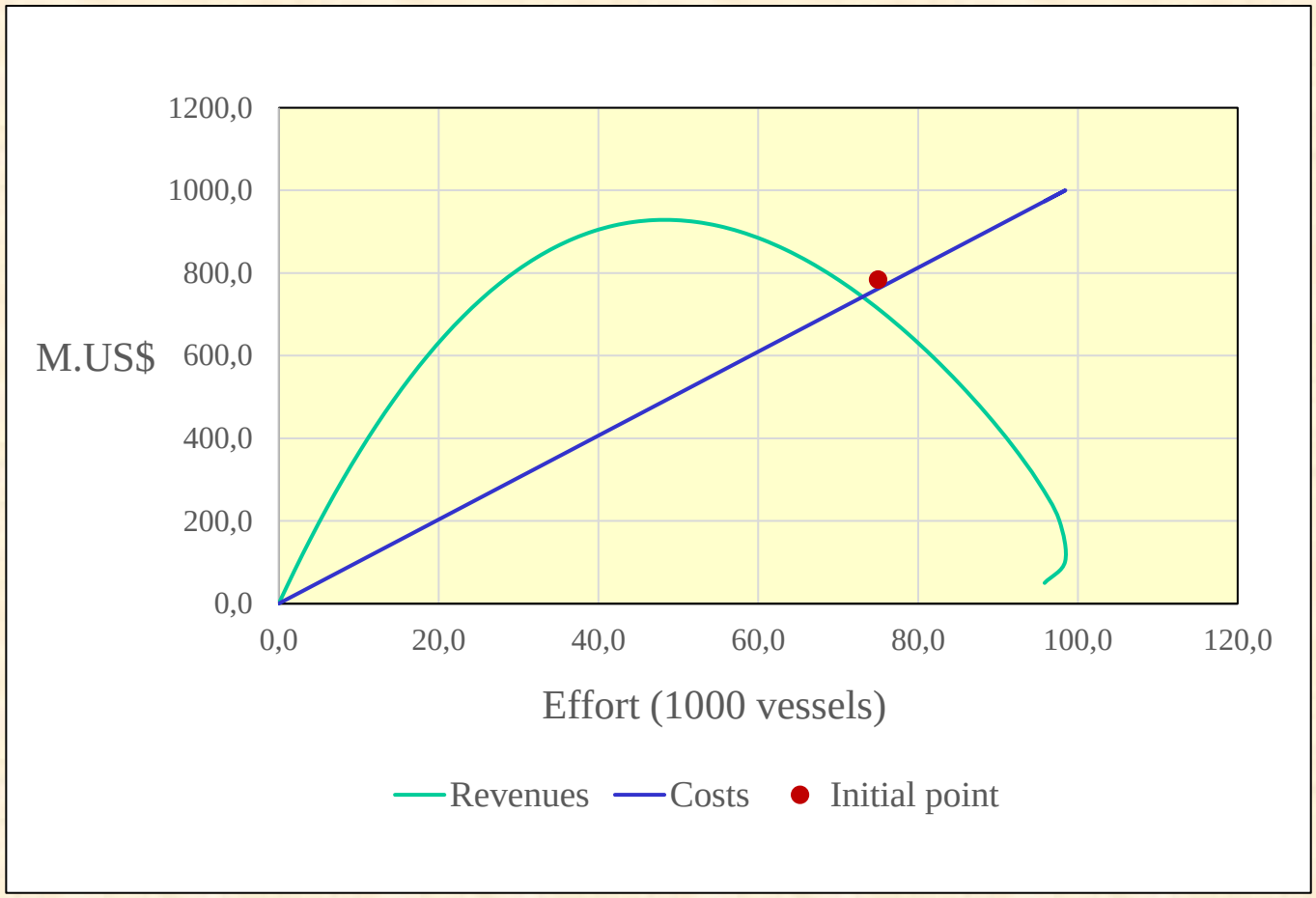
An empirical example: Lake Victoria Fisheries

"Know" current status
Have modelled the impacts of SURFs



- Four species (Nile perch, tilapia, dagaa, haplocromides)
- MSY about 850K mt
- Typical open access fishery
- Currently overexploited and depressed stocks

Current and sustainable fishery



Transition to SURFs in Lake Victoria

	Units	Current	Optimal	Difference	% difference
Biomass	1000 mt	1496.769	3590.263	2093.494	140%
Harvest	1000 mt	800.000	735.860	-64.140	-8%
Effort	1000 boats	75.000	34.260	-40.740	-54%
Labour use in fishing	1000 indiv.	225.000	102.780	-122.220	-54%
Landings Price	US$/kg	0.980	1.167	0.187	19%
Revenues	M.US$	784.000	859.044	75.044	10%
Costs	M.US$	762.000	348.083	-413.917	-54%
Economic surplus (profits)	M.US$	22.000	510.961	488.961	2223%
Surplus per unit revenue	Ratio	0.028	0.595	0.567	2020%
Surplus per unit effort	B.US$	0.29333	14.91416	14.62083	4984%
Surplus per unit harvest	US$/kg.	0.028	0.694	0.667	2425%

Valuating the impacts: Summary

	Annual valuation (million US$)	
	Low	High
I. Economic impacts		
Increase in profitability	489	489
Increase in value of user rights	0	50
More operational stability	0	5
Higher quality of landed catch	0.5	0.5
Economic growth effects	0	126
Total economic benefits	489.5	670.5
Reduced use of labour & inputs	-180	-6
Operation and enforcement	-50	-10
Reduced fish supply	-0.5	-0.5
Altered geographical location	-1	-4
Unequal distribution	?	?
Total economic costs	-231.5	-20.5
Net economic benefits	258	650
II. Environmental impacts		
Increased commercial stocks	2	210
Reduced fishing effort	0.5	4
Surf-holder's environmental protection	?	?
Total environmental benefits	2.5	214
III. Social impacts	?	?
Grand total	261	864

Transition to SURFs in the Lake Victoria fisheries appears hugely beneficial.

PV of net benefits (4% disc.rate): 6.5 to 21.6 billion US$.

Note: This ignores certain potentially high social costs

- However, these need to be very high to reverse the outcome

Largest benefits: Profits, economic growth effects and environmental improvements

Largest costs: Redundant economic resources, and enforcement

$\Rightarrow$ These items should be focus of empirical research

Do these findings generalize?

END