

# **The Allocation and Dissipation of Resource Rents: Implications for Fishery Reform**

By

Terry L. Anderson

And

Gary D. Libecap

April 1, 2009

## **Abstract**

In the move to adopt rights based arrangements for renewable resources in order to avoid the losses of open access and the inefficiencies of prescriptive regulation, we argue that grandfathering the allotments of local users can be the most efficient distribution mechanism. We differ from the standard support among economists for auctions. Rents are *not* a fixed stock as is commonly assumed, but rather depend upon the actions of those who use the natural resource and convert it into valuable goods and services. First-possession allocation assigns ownership and rents to existing users, reinforcing their incentives for stewardship. By contrast the alternative, auction allocation, assigns ownership to winning bidders, but the rents are captured by the auctioneer, often the state, not local agents. We argue that there can be important efficiency effects. Our empirical focus is on fisheries, but the implications extend to other settings.

Prepared for *The Political Economy of Natural Resource Use: Lessons for Fisheries Reform*, Property and Environment Research Center and World Bank, May 2009

## **I. Introduction.**

How natural resources contribute to economic development largely depends upon whether they become assets, nurtured by users, or whether rents are dissipated through a “tragedy of the commons.”<sup>1</sup> Maximizing the rental stream requires a system of property rights that avoids a competitive race for rents and instills incentives for conservation of the resource and efficient production from it. The alternative of open access leads to excessive short-term output, under investment, and limited trade, reducing the wealth and welfare of those whose livelihood often depends upon the natural resource.

In developed countries, the initial response to open access generally has been prescriptive regulation to control entry and production. Both input and output controls are familiar regulations in fisheries, and they include limitations on seasons, entry, vessel sizes, and various harvest equipment and techniques, as well as restrictions on the amount and type of fish harvested. In most cases, these have not been successful and there has been a move toward rights-based management (RBM) involving individual transferable quotas (ITQs), individual vessel quotas (IVQs), or other forms of catch shares of a total

annual allowable harvest (Libecap, 2008). In this process, an important issue is allocation of rights.

In this paper we argue that first-possession or grandfathering the allotments of local users in existing fisheries can be the most efficient distribution mechanism for assigning property rights in fisheries.<sup>2</sup> In the case of renewable natural resources, the direct involvement of incumbent users is critical not only for management success, but for *increasing* rents. Locals often have the most complete information about the asset and the most effective and low-cost ways of producing from it and investing in it. Indeed, the capturing of additional resource rents *created* by entrepreneurial activities provides incentives for innovative new production/harvest methods and activities that conserve and enhance the resource. Rents are *not* a fixed stock as is commonly assumed, but rather depend upon the actions of those who use the natural resource and convert it into valuable goods and services. First-possession allocation assigns ownership and rents to existing users, reinforcing their incentives for stewardship. By contrast the alternative, auction allocation, assigns ownership to winning bidders, but the rents are captured by the auctioneer, often the state, not local agents.

In contrast to the conventional view, we argue that there can be important efficiency effects from the allocation rule. In the case of renewable resources, such as fisheries, the assignment of rents to the state changes motivation for wise use and management by actual users. Natural resource rents can be reduced by the actions of the parties involved when they are heterogeneous in skills. Further, competition for the revenues secured by the state dissipates rents. Although there can be rent-seeking in

determining the grandfathering rule, we argue that losses are likely to be comparatively small in most incumbent fisheries.

We describe first-possession and auction allocation, and then illustrate some of the problems associated with auctions by presenting a political model that outlines opportunity for rent seeking with proposed CO<sub>2</sub> emission permits. The efficiency arguments for auctions, whereby revenues are used to reduce distortive income taxes, are weakened by overriding political incentives to divert revenues to influential constituencies and the underlying wasteful competition this encourages. Experiences with the tobacco trust fund allocations demonstrate the point.

We conclude by summarizing the benefits from regularizing fisheries across the world through rights-based systems and argue that grandfathering allocation mechanisms is preferable. Grandfathering rights to local fishers creates a stake in fishery management that encourages rent enhancement to increase wealth.

## **II. Movement toward RBM**

Natural resource rents can be the basis for wealth creation, but they are vulnerable to dissipation under open-access conditions. As noted above, the lack of clear property rights (informal or formal, group or individual) to a resource encourages competition among agents, resulting in the standard losses of open access. Further, in the absence of any recognized property rights, the parties have little basis for bargaining with one another to constrain harvest or extraction and to re-allocate the resource to higher valued uses.<sup>3</sup> In the absence of price signals to reveal opportunity costs and in the presence of free riding, valuable labor and capital inputs are diverted from productive use to predation and defense, which in turn dissipates the *in situ* rents. Through these actions

involving common-pool resources there is too much air pollution, overfishing, excessive deforestation, or undue depletion of groundwater and oil and gas deposits.

Rights-based arrangements increasingly are considered as a solution to the tragedy of the commons.<sup>4</sup> The more complete are property rights, the more the private and social net benefits of resource use coincide, reducing the losses of the common pool. Such arrangements may evolve from local practices as they did for land and minerals in the American West in the 19<sup>th</sup> century or they may be created from administrative decisions as in the case of tradable emission permits under the Clean Air Act Amendments of 1990.<sup>5</sup>

The principal benefit of RBM is that it creates incentives for investment in the resource, provision of collateral for accessing capital for investment, more flexible exchange, greater information generation, and improved cost savings in meeting conservation or environmental objectives. For example, tradable emissions permits under the SO<sub>2</sub> abatement program have been successful in meeting reduced pollution targets relative to prescriptive regulation, with a cost savings of over \$1 billion (Stavins, 2007, 23)

In the case of fisheries, individual transferable quotas or shares to the annual allowable catch (TAC) were first suggested by fishery economist Francis Christy in 1973. (Hannesson, 2004, 71). Under this arrangement, the TAC is set by regulators based on assessments of the condition of the stock, and catch shares are assigned to fishers as a property right to the flow or harvest. In this manner, those fishers with ITQs have a long-term indirect ownership relationship with the stock, and hence, are more motivated to protect it.

Since 1973 economists have documented many advantages from implementing RBM in fisheries. Arnason (2002) summarizes international experiences with ITQs; Hannesson (2004) describes a general pattern of moving from uncontrolled entry to centralized governmental regulation (command and control) to adoption of property rights of some type; and Grafton, Squires, and Fox (2000) demonstrate the benefits of ITQs in the British Columbia halibut fishery. Using a global database for 11,135 fisheries from 1950 to 2003, Costello, Gaines, and Lynham (2008) find that implementation of catch shares halts, and even reverses, the trend toward widespread collapse.

Although it is well established that ITQs can raise fishing incomes and motivate fishers to conserve stocks, they are found in less than two percent of the world's fisheries (Costello, Gains, and Lynam, 2008). A fundamental question is how to expand their coverage and what characteristics to include in their design.

It is important to note that the losses of open access conceptually could be eliminated through the use of a Pigouvian tax. Such a tax placed on use of the common-pool resource would raise the cost and reduce the effort to use it. In fact, however, such taxes are rarely applied. This is either because governments do not have the information to set a tax necessary to encourage optimal resource use, do not have the political power to do, so or both. Hence, though discussions of optimal taxation may be an interesting theoretical exercise, the only practical way to reduce or eliminate the tragedy of the commons in light of the ineffectiveness of most prescriptive regulation is through rent-creating RBM.

### **III. Alternative Allocation Systems**

The implementation of rights-based management requires an allocation

mechanism, and as we will discuss below, the method chosen can have significant implications for rent maximization. Although there are a number of ways to assign property rights, we examine the two most common, first-possession and auction.

### *First-possession*

First-possession or grandfathering assigns ownership to existing users who generally obtained their claim on a first-come, first-served or first-in-time, first-in-right basis. Such first possession rules recognize incumbent parties, who have experience in exploiting the resource and hence, are likely to be low-cost, high-valued users having out-competed less-efficient parties. Having a direct stake in access to the resource, incumbent users will be important constituents in a property rights distribution because they will want consideration of past investments---physical or human capital---in specific, non-deployable assets. By recognizing historical production patterns and capital outlays, first-possession rules signal security in property rights and encourage future investments including those in the resource itself. First possessors recognize that the value of human and physical capital dedicated to the fishery depends upon maintaining and enhancing the value of the stock.

Further, under first-possession the market can determine optimal allocation size, whereas bureaucratic or political processes generally will define the nature of allotments based on other criteria not consistent with efficient production. For example, 19<sup>th</sup> century ranchers on the American frontier developed customary grazing territories encompassing the thousands of acres necessary for viable production under semi-arid conditions. In contrast, federal land laws imposed a 160-acre limitation that either led to farm failure or to costly efforts to circumvent legal restrictions (Libecap and Hansen, 2003; Hansen and

Libecap, 2004; Libecap, 2007). When initial allotments are not optimally sized, if transaction costs are low, as is likely among incumbents, then trade can take place if exchange is not restricted by size limits, as was the case under U.S. land law. Moreover, first possessors have an incentive to find ways to economize on transaction costs because they internalize any gains.

First-possession has been criticized on fairness grounds because it discriminates against new entrants and may encourage large holdings. If first-possession ownership is viewed as rewarding those who by luck and connections got early access, such criticism may be warranted and may lead to political opposition to sanctioning of claims based on first possession (Alesina and Angeletos, 2005, 960-80).

There may also be rent dissipation under first-possession, depending on the criteria used for allocation. For example, the rule-of-capture that applies in fishing, oil and groundwater extraction is a type of first-possession rule. Ownership is granted to the party that invests in extraction. But the rule-of-capture grants ownership to the flow and not generally to the resource stock. Hence in the presence of open-access conditions, first possession can exacerbate competitive extraction incentives, especially after first comers signal the value of the stock.<sup>6</sup> If the competing parties are homogeneous and ownership is short-term, then full dissipation is possible as parties rush to capture the asset. If, on the other hand, the parties are heterogeneous and use rights are long-term, first-possession assignments may be associated with limited rent dissipation.<sup>7</sup>

The same criticism of first-possession rules and rent dissipation applies if homogeneous claimants race to establish property rights to the stock (Anderson and Hill 1990).<sup>8</sup> But as before, if the parties are heterogeneous and the resulting rights are secure



and permanent, full dissipation will not occur. Moreover, the winners of such a race are likely to be successful because they invested in the information and human capital necessary to obtain first possession and as suggested earlier, may be the most efficient producers. The more that allocation rules are based upon historical, unalterable use patterns, the less there will be significant dissipation. On the other hand, in new fisheries, for example, where there is no record of past harvest, then announcement of the proposed rule can lead to wasteful efforts to be in compliance.<sup>9</sup> Most of the world's fisheries at risk of over exploitation, however, have comparatively long-standing harvest patterns.

Finally, it is important to recognize that first-possession encourages efficiency because it draws upon existing local knowledge and encourages production of additional information and cooperation once rights are established. These actions can *increase* resource-based rents. In the case of fisheries, knowledge of the response of the stock to different management regimes, exogenous weather effects, and shifts in endogenous factors, such as fishing effort, is especially valuable. Based on this information, fishers can coordinate harvest practices to enhance their returns as well as the condition of the stock, and they can collaborate with regulators can in setting the total allowable catch which in turn not only reduces resistance to the catch limit, but incorporates stock and habitat information collected by the industry. Because there is less antagonism between fishers and regulators in these circumstances, marine scientists are more likely to take account of industry recommendations and insights to advance the fish stock and achieve more effective regulatory policies. Accordingly, ITQs based on first-possession can lead to more beneficial private and collaborative fishing along with the setting of more optimal annual harvest rates, reduced free-riding, and greater compliance by fishers.<sup>10</sup>

## *Auction*

Auctions are another way of allocating access rights to the commons, and there are several reasons to support this method on efficiency and equity grounds.<sup>11</sup> First, auctions may place the resource directly into the hands of those who have the highest value for it and thereby avoid the transaction costs of re-allocation. Second, auctions generate information about the value of the resource. And finally, auctions transfer rents to the state (as the seller), an issue we examine in detail below.

The amounts and distribution of rents created by an auction depend upon auction design, which can be complex. The net amount of the rents created depend on the auction costs, on measurement and enforcement costs following the auction, and on the lobbying costs invested in influencing the terms that may provide specific advantages to certain groups during or after the auction.<sup>12</sup>

In practice, auctions have been adopted more rarely than economists who espouse their virtues might like. For example, ITQs in fisheries have generally been grandfathered rather than auctioned, and SO<sub>2</sub> permits under the Clean Air Act Amendments of 1990 were granted to existing emitters (Joskow and Schmalensee, 1998) Nonetheless, auctions have been called for to allocate CO<sub>2</sub> emission permits to limit greenhouse gas emissions under cap and trade regimes.

The major argument for auctioning permits for carbon emissions to create a cap-and-trade system is that the auction revenues can go to the state, as compared to individual firms, and that these revenues can be used to broadly benefit the public by reducing distortive income taxes. If this happens, society could achieve both the public good of less carbon emissions and a more efficient tax structure. Whether this happens,

however, depends on the political framework that actually determines the allocation of auction revenues. Later we will analyze the probable allocation results in the context of a realistic model of political rent allocation.

#### **IV. The Nature and Role of Rents in Resource Management.**

Although there is consensus among economists and resource managers that rights-based management is the most practical way of reducing losses from open access and of generating wealth associated with natural resources, questions remain about whether the rents created by RBM will be subsequently captured, enhanced, or dissipated. Here we focus on how allocation of the rents to users or to government will affect the rents spawned by RBM.

In general the economics literature contends that resource allocation is invariant to rent taxation and that an auction (which can be thought of as a form of taxation) is the preferred method for assigning rights because it ensures that they will go to those users who value them the most.<sup>13</sup> Rents are viewed as *fixed* and therefore, agents will continue to produce efficiently even if they are taxed away via a lump sum tax or auction. For example, Clark, Major, and Mollett (1989, 138) argue that the economic rent generated by the creation of transferable fishing quotas “can either be taxed away by the government or left in the fishery to be capitalized into the value of the ITQ.” If the right is auctioned, the winning bid will be determined by the highest expected future value of the rental stream. In this context, rents are returns over and above opportunity costs, and therefore their distribution will not affect resource allocation.

We argue, however, that the amount of rents created and saved through RBM is *not* invariant to allocation for at least three reasons. The first is that the rents created by

RBM and transferred to government, whether by auction or taxation, will be competed for in a potentially-rent dissipating political process. As we discuss below there are theoretical and empirical reasons to believe that such rent dissipation is more likely than not.

The second reason lies in the process whereby rents are created. The notion of *in situ* resource rents suggests that they arise simply from the existence of the resource to which homogeneous units of other inputs are applied. Computing the rents is a simple matter of subtracting the cost of other inputs from the value of the output created. As long as the resource remains open to access by all, rents at the margin will be fully dissipated by competing entrants. Hence, rents are dissipated or created by increasing or reducing the amount of additional factors employed in resource use.

Ignored in this reasoning is the role that heterogeneous resources play in the production process. Following Johnson and Libecap (1982) and Johnson (1995), it is important to recognize that even under a completely open access regime, some rents will be captured by infra-marginal users. These users might be first entrants who recognized the value of the resource before others, users who apply superior management skills to the resource production process, or those who have invested in human capital most likely through learning-by-doing. In any case and especially for a resource that has been exploited for a long time by local users, there will be a sorting process that leaves some rents for the infra-marginal, more efficient producers. The amount of these rents, of course, will depend on the contribution that heterogeneous inputs make to the value of the production process. In any case, not all resource rents arise solely from the mere existence of the asset. Some additional rents are *generated* by the productive activity of

inputs that turn the resource into valuable products and services. An example is harvesting and marketing fish in a manner that insures that the highest valued product is delivered to market. Such actions generally involve added costs and coordination among fishers.

In this context, consider the incentive effects of redistributing these rents to government whether by auction or taxation. What are the implications for the inframarginal, low-cost producer who has managerial or entrepreneurial talent that generates additional value? Such talents are likely to have *alternative* uses. If rents are eliminated in the resource sector, the entrepreneur/manager will shift effort elsewhere where the inputs are somewhat lower valued, but earn rents, thus creating an allocation effect. Of course, exit by one resource users will open the door for another, but the new user will be less efficient and therefore will create fewer rents from the resource and less social value.

The third reason that rent distribution matters for rent creation relates to information and coordination costs in the production process. In general those who acquire first possession rights do not do so randomly. Whether they are rushing for gold or racing to fish, first entrants have some reason to believe they are best able to generate and secure rents.<sup>14</sup> Moreover, once first possessors acquire rights, they begin securing production information that *increases* the rents they capture. Redistribution of those rents to the state reduces the incentive to discover and the incentive to acquire information thereafter. As a result, total wealth generated from the resource is reduced.

This implication is even more apparent once secure rights are assigned under RBM in fisheries. The owners of an ITQ have an incentive to make two types of

investment. One type of investments would generate private returns. These returns could result from investing in finding better information about where the more productive locations are or from augmentation of the resource's future production if that value is captured by the investor. Known investment potential would be incorporated into the expected value of secure quotas, but opportunities that *evolve* as owners search for additional rents require added effort. If entrepreneurs expect the returns on those investments to be taxed away, the incentive to engage in this socially-valuable activity is eroded.

An example from the New Zealand abalone fishery is illustrative.<sup>15</sup> Until RBM was implemented in 1986, abalone divers needed only a non-transferable license to harvest in what was otherwise an open-access resource. Under these conditions, they harvested as much as possible and did not invest in the stock, which declined.<sup>16</sup> RBM, however, allowed divers a tradable share in a total cap established by fishery authorities. As a result, quota values rose an order of magnitude from approximately NZ\$33,000 per metric ton in 1988 to NZ\$320,000 per metric ton in 1993.

Some of this increase resulted directly from reduced access, but additional returns were due to value-enhancing investments by individual fishers. Under RBM there was an opportunity to earn even more than the divers initially were realizing. To achieve these gains, the diving business had to be redefined with a new business model. Specialized dive boats with support crews for harvesting abalone were introduced. Research into other abalone fisheries, market trends, and processing operations was conducted, and abalone aquaculture was started with the development of an "aqua barrel," a molded polyethylene barrel in which abalone could be planted, grown, and harvested.

Such innovations resulted from investment made by heterogeneous, entrepreneurial fishers such as Roger Beattie. He diversified into Sea-Right Investments Limited, a company that invested in developing an abalone pearl culture operation. Sea-Right obtained permits for developing a five-hectare marine farm site in Akaroa Harbour in 1994 and purchased farmland adjacent to the marine farm for NZ\$600,000 to secure the company's interests by protecting it from effluent.<sup>17</sup> Beattie described the importance of RBM for the success of his business: "Property rights changed the company from a hunter/gatherer at the ends of the earth to a business launching into the top end of the fine jewelry market in sophisticated world capitals."<sup>18</sup>

The disincentive created by reallocation of rents away from the producer is even more critical if they require collective action. Johnson (1995, 337) notes that a quota system "provides incentives for the industry to act collectively to lower costs and engage in activities such as product development and fishery management that have the potential to increase quota value." Pooling information on resource availability could increase collective rents. Cooperation to invest in technology dependent on economies of scale is more likely if the returns on such investments cannot be competed away by unrestricted entry. Again quoting Johnson (1995, 337) "because the identities of the participants are known, organizational costs are lower than in an open access setting." Creating collective rents requires undertaking coordination costs for which there is only a return once rights are established. If those rents *resulting* from their coordination efforts do not remain with the owners, the investments will not be made, a welfare loss will occur, and social wealth will be less.

Again an example, this time from Alaska, is illustrative as described in recent work by Deacon, Parker, and Costello (2008). The Chignik sockeye salmon run has suffered from the same open-access issues that plague most such fisheries. Access was limited by regulation of season, licensing, and equipment, but the fishery continued to be over exploited. Between 2002 and 2004, however, a self-selected cooperative operated under approval from the Alaska Board of Fisheries. Because members of the cooperative shared in the rents created by the cooperative, they had an incentive to undertake the costs of collective action. These cooperative efforts included, reducing the number of vessels in the fishery by 60 percent, pooling of information about the location of fish, and positioning barriers or “fences” to channel fish to locations where they could be more effectively caught in nets. Importantly, such actions were not undertaken by independent fishers who did not join the cooperative, suggesting that rights to the rents created were critical for investment decisions.

Because rent creation and augmentation are sensitive to rent distribution, there is good reason to base RBM on first possession and to allow rents to be captured at the local level. Competition for first possession could lead to some dissipation, but as we describe above, when the parties are heterogeneous not all rents will be lost. Moreover, in fisheries, if grandfathering is based on historical catch and vessel size, there will be little opportunity for competitive waste. Local users have the greatest knowledge of the resource and of how it is likely to respond to alternative management schemes. Moreover, the wealth and well-being of local users depend upon the protection and indeed, maximization of rents. If these parties perceive that their actions to reduce exploitation and to conserve the resource are linked to a commensurate increase in rents



that they capture, then they are motivated to protect and enhance the value of the resource. When incumbent users are residual claimants to rents that are created, there will be “buy in” for a new regime.<sup>19</sup>

On the other hand if they expect the rents to be taxed away through auction, there is an incentive for the most efficient users to exit; for reduced investment in the resource; and accordingly, for lower levels of wealth and welfare. Those who remain with fewer other options will provide lower value and may have less incentive to comply with management. Moreover, the revenues raised from auctions have no clear property rights, resulting in political rent dissipation as potential recipients compete for control. We now turn to this issue.

## **V. The Politics of Allocating Resource Rents**

The literature in economics and political science indicates that government delivery of collective goods for the broad public and particularistic goods for private constituencies results from a complex political process. The mix depends upon political bargaining among legislators who prefer public goods or private goods or some combination of both. Politicians have to weigh the political benefits and costs of the tradeoffs associated with these choices, issues that have not been carefully addressed by auction advocates. Accordingly, it is not possible to assert that auction revenues will be targeted to income tax reduction or other public goods activities, rather than to interest group transfers. They may, or may not, depending on political preferences and negotiations.

In the United States vote-maximizing politicians represent narrow jurisdictions and must be responsive to them, at least to some extent, in considering broader policy

objectives. Volden and Wiseman (2007) describe how politicians trade off the political returns from providing various combinations of collective and particularistic goods, subject to the constraint of a fixed budget. A winning congressional coalition must be assembled before any proposed mix can be selected.<sup>20</sup> Proponents of a particular policy must offer budget distributions to constituencies and projects favored by their colleagues in order to win their support. These necessary political exchanges reduce the funding available for the initial public objective. Volden and Wiseman (2007, 84) argue that paradoxically, the greater the value placed on the public good, the more it will be underprovided by Congress. Those who support the public good will be willing to pay even more to entice the backing of their reluctant colleagues. In the case of auction revenues, this argument suggests that even if tax reduction is highly valued by many members of Congress, at least some and perhaps a considerable amount of the funds will be directed to particularistic constituent services valued by those who otherwise would oppose cap-and-trade. Moreover, in this case, politicians prefer an open rule allowing for amendments in debate, making it more difficult to *ex ante* to lock in income tax reduction as part of legislation authorizing a permit auction.<sup>21</sup>

Accepting that auction revenues are likely to be diverted to private constituent services, we must ask how revenues are allocated among competing demands and to what extent this competition for transfers will dissipate rents. Following Peltzman (1976) and Becker (1983), vote maximizing politicians must trade off the marginal votes gained from providing transfers to interest groups with votes lost from taxpayers. Under their models none of the parties get all that they want; taxpayers pay more taxes than they would otherwise prefer; and constituent groups get fewer transfers. In this process,

politicians balance the incremental gains or losses in votes as tax-funded transfers are provided to interest groups.

Now amend this framework to consider a scenario where politicians distribute revenues from a lump-sum tax on a well defined group—for example, revenue from auction of resource use rights---rather than revenue from an income tax. In this case, because the revenues are generated as part of a regulatory process to control access to a resource, the marginal votes lost from using the revenues to fund constituent transfers may be less than if taxes are explicitly levied for these transfers. Hence, tax revenues so generated will be considered a windfall by politicians. Political theory (Gramlich and Galper, 1973; Fisher,1982; Hines and Thaler, 1995) suggests that revenue windfalls result in expenditure increases that exceed those that would be funded through taxes on similar increases in income.<sup>22</sup> Accordingly, Congress may use an auction windfall to provide more transfers than would otherwise be the case.

How will the distribution of the revenue windfall be decided? Again, following Peltzman (1976) and Becker (1983), as well as the insights of Krueger (1974); Buchanan, Tollison, and Tullock (1980); and Murphy, Shleifer, and Vishney (1993), interest groups will compete for transfers by lobbying. The more homogeneous, wealthy, and small the group, the more likely it will be successful because the groups interests are aligned, because the group has resources and because there is less opportunity for free-riding (Olson, 1965). Under these conditions, a large, heterogeneous group of taxpayers, who might prefer the income tax reductions suggested by auction proponents, are at a relative disadvantage in political bargaining, making less money available for tax reduction than auction proponents have suggested. Making matters worse, competition among interest

groups preferring particularistic goods from auction revenues will further dissipate rents.

In support of these concerns consider the proposed use of cap-and-trade auction funds by the Obama Administration of \$645 billion or more. The administration plans to dedicate \$15 billion a year of revenue from the sale of emissions permits to develop new sources of clean energy. But that leaves a large pool of potential government income that will be up-for-grabs by lobbyists as they compete for funds for constituent projects rather than for balancing the budget or reducing income taxes as suggested by auction proponents.<sup>23</sup>

#### *Tobacco Trust Fund Allocations*

To get a sense of how politicians actually have distributed funds between public and particularistic goods and the rent dissipation involved in determining who receives those transfers, we consider the case of the Tobacco Trust Fund allocations. In November 1998 a settlement was reached between the major U.S. tobacco producers and 46 states.<sup>24</sup> The lawsuit was brought by the states' attorney generals on behalf of their state's Medicaid programs seeking compensation for healthcare expenditures attributed to smoking. The Master Settlement Agreement (MSA) between the states and four major tobacco companies, representing over 99 percent of the domestic cigarette market, required that the tobacco companies make annual payments to the states in perpetuity. It also restricted the marketing and advertisement of cigarettes and required a five-year, \$1.5 billion dollar contribution toward the establishment of the American Legacy Foundation for anti-smoking education. In exchange, state lawsuits against the participating tobacco manufactures were dropped.<sup>25</sup> Total payments were projected to be \$206 billion over the first 25 years (Schroeder 2004). Funding first became available in

2000. To date, \$79.2 billion from tobacco settlement money has been received by the states.

The MSA stated that the awards were to provide “significant funding for the advancement of public health, the implementation of important tobacco-related public health measures” (MSA, 2), and most states indicated their intent to use the funds to pay for the costs of Medicaid from smoking-induced illnesses and pay for tobacco control programs (Schroeder 2004). Indeed, part of the formula determining the allocation of payments across states was based on smoking-related medical costs and expenditures.<sup>26</sup> These latter costs are paid in annual installments from 2008 through 2017 (Singhal 2008).

The annual payments states receive are adjusted in two ways—inflation and volume. The volume adjustment is based on the total volume of cigarettes shipped nationally and is not state specific. State allocations of the initial and annual funds are based on two equally-weighted factors: a state’s share of smoking-related medical costs and a state’s share of smoking-attributable Medicaid expenditures (Singhal 2008). The Center for Disease Control and Prevention (CDC) provided states with a minimum funding recommendation for tobacco control programs based on the demographics of each state (CDC 1999).

Given the focus on tobacco-related health expenses, tobacco control programs to reduce smoking, and compensation for communities adversely affected by the settlement, it is instructive to see how the states have actually used the settlement funds. Table 1 describes the allocations across categories between 2000 and 2005. What is most noticeable is that Budget Shortfalls are the second largest category and that other expenditures are for areas unrelated to tobacco health or control issues. Debt service on

securitized funds (5.4 percent) reflects the actions by states to issue bonds based on future annual payments from the tobacco settlement. These funds are used to help balance state budgets (NCLS 2003). Between 2000 and 2005 16 states securitized some or all of their settlement proceeds. In 2005, four states, California, Rhode Island, South Carolina, and Wisconsin, allocated all of their annual MSA payments to servicing debt on securitized funds (GAO 2006, 2007).

A report titled “A Decade of Broken Promises” written by four anti-smoking lobbies found that in the last 10 years states spent only 3.2 percent of total tobacco generated revenue (MSA funds and tobacco taxes) on tobacco prevention and cessation programs.<sup>27</sup> No state funding tobacco prevention programs at the CDC-recommended level, and only nine states fund them at over 50% the recommended levels (Campaign for Tobacco-Free Kids 2008).<sup>28</sup>

**Table 1  
Tobacco Trust Fund Allocations**

Category	Amount	Percent
Health	\$16.8 billion	30%
Budget Shortfalls	12.8	23
Unallocated	6.6	12
General Purposes	4.0	7
Infrastructure	3.4	6
Education	3.1	5.5
Debt Service on Securitized Funds	3.0	5.4
Tobacco Control	1.9	3.5
Economic Development for Tobacco Regions	1.5	2.7
Social Services	1.0	1.7
Reserves/Rainy Day Funds	.8	1.4
Tax Reductions	.6	1.1
Payments to Tobacco Growers	.5	.9

GAO (2007).

It is apparent that much of the tobacco trust fund allocations support activities

unrelated to tobacco health or control despite the spirit of the MSA. The associated political allocation likely involves rent seeking activities as lobby groups mobilize to channel funds in their direction or to protect existing allocations. Windfall allocations attract lobbying from interested parties who seek to direct funds their way. A survey by Austin-Lane et al. (2004) found that tobacco control and prevention advocacy is one of the most important factors influencing revenue allocation. Sloan et al. (2005) find that interest groups behaved as expected: tobacco-producing states spent less on tobacco-control and states with more per capita teachers and more American Medical Association members per capita spent more on it. Further, reports issued by the American Cancer Society, Campaign for Tobacco-Free Kids, the American Lung Association, and the American Heart Association, suggest that those groups are actively working to influence MSA payments (Campaign for Tobacco-Free Kids 2008).

## **VI. Fishing for Rents**

In general, the opportunity to use RBM in fisheries as a revenue source has not attracted the attention of politicians in the same way that potential windfalls from CO<sub>2</sub> emission permits have. Perhaps in part for that reason, the movement towards RBM in fisheries has occurred through first possession, rather than auctions. And they have had remarkable success. But much more is possible.<sup>29</sup> The following case examples from the developing world suggest the potential economic rents available from RBM. The loss of economic benefits in fisheries is not restricted to developing countries, however. Partly because of higher subsidies in developed countries the loss of economic rents can be even higher than in the developing world.<sup>30</sup>

Bangladesh: The hilsa shad (*Tenualosa ilisha*) fishery is the largest single species fishery in Bangladesh. The potential annual net economic benefits from the fishery are in the order of US\$ 260 million compared to little or no net economic benefits under the existing management regime. The fishing effort (measured in standardized boat units) required to attain sustainable maximum economic benefits is about one-third of the current fishing effort.<sup>31</sup>

Vietnam: Currently there is excessive capacity and over fishing in the fisheries in the Gulf of Tonkin. The potential net economic benefits from improved management are some 56 percent greater than the current level, and the catch could be achieved with approximately 46 percent of the current level of fishing.<sup>32</sup>

China: The loss of rents in the Bohai and Yellow Sea fisheries due to over exploitation are in the order of US\$1 billion annually, or approximately double the current level of net economic benefits (economic rents).<sup>33</sup> Remedies will require major reductions in fishing effort and the number of vessels involved.

Peru: The Peruvian anchoveta fishery is the largest single stock fishery in the world. The El Nino phenomenon, as well as excess capacity, has resulted in economic losses of US \$400 million annually. Excessive fleet and processing capacities are estimated to be in the order of 60-70 percent and between 65 and 80 percent, respectively.<sup>34</sup>

Namibia: Despite a reputation for being comparatively well managed, the net economic benefits (economic rent) in the Namibian hake fishery of N\$ 222 million in 2002 could potentially quadruple to an estimated N\$1200 million if the fish stock were allowed to recover and the fishing fleet were rationalized.<sup>35</sup>



## **VII. Conclusion**

This discussion suggests that there are large benefits to be gained from improved management of the world's fisheries, especially in inshore fisheries. Rights-based systems have a proven record in promoting fishing practices that raise rents and welfare. For community-based fisheries, where the participants are often poor, but well informed about the resources on which they depend for their livelihood, effective policy design is essential. A key aspect of this process is the allocation mechanism. There are strong reasons to believe that first possession, or grandfathering based on past fishing effort and capacity, is more likely to elicit local support, maintain the rents in the community, reduce costly rent seeking, and direct the actions of fishers toward advancing the stock. An RBM approach not only encourages more efficient use of the fishery or other natural resources, but it helps build an institutional infrastructure based on property rights and the rule of law that can sustain economic growth where traditional development approaches have failed.

References:

- Alesina, Alberto, and George-Marios Angeletos. 2005. Fairness and Redistribution. *American Economic Review* 95 (4): 960–80.
- Anderson, Terry, L., and P.J. Hill. 1975. The evolution of property rights: a study of the American west. *The Journal of Law & Economics* 18 (1): 163-179.
- Anderson, Terry, L., and P.J. Hill. 1983. Privatizing the commons: an improvement? *Southern Economic Journal* 50 (2): 438-450.
- Anderson, Terry, L., and P.J. Hill. 1990. The race for property rights. *Journal of Law & Economics*. 33 (1): 177-197.
- Anderson, Terry, L., and P.J. Hill. 2004. *The Not So Wild, Wild West: Property Rights on the Frontier*. Stanford: Stanford University Press
- Arnason, Ragnar. 2002. A review of international experiences with ITQ.” Annex to Future Options for UK Fishing Management, Report to the Department for the Environment, Food and Rural Affairs, CEMARE, University of Portsmouth, UK.
- Austin-Lane, Joy, Deborah C. Girasek, and Galen L. Barbour. 2004. A qualitative study of post-settlement influences on state tobacco control funding. *Health Promotion Practice* 5 (3): 46-56.
- Austen-Smith, David and Jeffrey Banks. 2000. Elections, coalitions and legislative outcomes. *The American Political Science Review* 82 (2): 405-422.
- Banks, Jeffrey and J Duggan. 2006. A general bargaining model of legislative policy-making. *Quarterly Journal of Political Science* 1: 49-85.
- Baron, David P., and Daniel Diermeier. 2001. Elections, governments, and parliaments in proportional representation systems. *The Quarterly Journal of Economics* 116 (3): 933-967.
- Baron, David P., and John A. Ferejohn. 1989. Bargaining in legislatures. *The American Political Science Review* 83 (4): 1181-1206.
- Battaglini, Marco and Stephen Coate. 2007. Inefficiency in legislative policymaking: a dynamic analysis. *American Economic Review* 97 (1): 118-149.
- Broder, John M. 2009. *Obama’s greenhouse gas gamble*. *New York Times*. 27 February.
- Buchanan, James M., Robert D. Tollison, and Gordon Tullock, eds. 1980. *Toward a Theory of the Rent-Seeking Society*, College Station: Texas A&M University Press.
- Campaign for Tobacco-Free Kids. 2009. A broken promise to our children: The 1998 state tobacco settlement eight years later. Available at: <http://www.tobaccofreekids.org/reports/settlements>. Accessed 22 March 2009.
- Clark, I.N., J.M. Philip, and N. Mollett. 1989. The development and implementation of New Zealand’s ITQ management system. In *Rights Based Fishing*. P.A. Neher, R. Arnason, and N. Mollett, eds., 117-45. London: Kluwer Academic Publishers.
- Coase, Ronald. 1960. The problem of social cost. *Journal of Law and Economics* 3: 1–44.
- Costello, Christopher, Steven D. Gaines, and John Lynham. 2008. Can catch shares prevent fisheries collapse? *Science* 19 September 2008. 321 (5896): 1678 – 1681.
- Crocker, Thomas D. 1966. The structuring of atmospheric pollution control systems. In Harold Wolozin, ed. *The Economics of Air Pollution*. New York: Norton.
- Dales, J.H. 1968. *Pollution, Property and Prices*. Toronto: University of Toronto Press.

- Deacon, Robert T., Dominic P. Parker, and Christopher Costello. 2008. Improving efficiency by assigning harvest rights to fishery cooperatives: evidence from the Chignik salmon co-op. *Arizona Law Review* 50 (2): 480-509.
- Department of Health and Human Services. 2000. *Tobacco control activities in the United States, 1994-1999; report to congress*. Atlanta: Centers for Disease Control and Prevention.
- Department of Health and Human Services. 2002. *Investment in Tobacco Control: State Highlights*. Atlanta: Centers for Disease Control and Prevention.
- Epstein, Richard. 1979. Possession as the root of title. *Georgia Law Review* 13: 1221-44.
- Fisher, Ronald C. 1982. Income and grant effects on local expenditure: the flypaper effect and other difficulties," *Journal of Urban Economics* 12 (November): 324-345.
- Givel, Michael, and Stanton A. Glantz. 2004. The "global settlement" with the tobacco industry: 6 years later. *American Journal of Public Health* 94 (2) 218-224.
- Grafton, R. Quentin, Dale Squires, and Kevin J. Fox. 2000. Private property and economic efficiency: a study of a common-pool resource. *Journal of Law and Economics* 43 (2): 679-713.
- Gramlich, Edward M., Harvey Galper, Stephen Goldfeld and Martin McGuire. 1973. State and local fiscal behavior and federal grant policy. *Brookings Papers on Economic Activity* 1 (1973): 15-65.
- Government Accountability Office. 2006. Tobacco settlement: states' allocations of fiscal year 2005 and expected fiscal year 2006 payments. Available at: <http://www.gao.gov/new.items/d06502.pdf>. Accessed 22 March 2009.
- Government Accountability Office. 2007. Tobacco settlement: states' allocations of payments from tobacco companies for fiscal years 2000 through 2005. Statement of Lisa Shames, Acting Director of Natural Resources and Environment. Available at: <http://www.gao.gov/new.items/d07534t.pdf>. Accessed 22 March 2009.
- Gross, Cary P., Benny Soffer, Peter B. Bach, Rahul Rajkumar, and Howard P. Forman. 2002. State expenditures for tobacco-control programs and the tobacco settlement. *New England Journal of Medicine* 347 (14): 1080-1086.
- Haddock, David D. 1986. First possession versus optimal timing: limiting the dissipation of economic value. *Washington University Law Review* 64: 775-791.
- Hannesson, Rognvaldur. 2004. *The Privatization of the Oceans*. Cambridge: The MIT Press.
- Hansen, Zeynep K., and Gary D. Libecap. 2004. The allocation of property rights to land: U.S. land policy and farm failure in the northern great plains. *Explorations in Economic History* 41: 103-29.
- Hines, Jr. James R., and Richard H. Thaler. 1995. Anomalies: the flypaper effect. *The Journal of Economic Perspectives* 9 (4): 217-226.
- Humphreys, Macartan, Jeffrey D. Sachs, and Joseph E. Stiglitz, eds. 2007. *Escaping the Resource Curse*. New York: Columbia University Press.
- Johnson, Ronald N. 1995. Implications of taxing quota value in an individual transferable quota fishery. *Marine Resource Economics* 10(4): 327-340.
- Johnson, Ronald N., and Gary D. Libecap. 1982. Contracting problems and regulation:

- the case of the fishery. *American Economic Review* 72 (5): 1005–22.
- Klemperer, Paul. 2002. What really matters in auction design. *Journal of Economic Perspectives* 16 (1): 169–89.
- Kousser, Thad. 2005. *Term Limits and the Dismantling of State Legislative Professionalism*. Cambridge: Cambridge University Press.
- Krueger, Anne O. 1974. “The political economy of the rent-seeking society. *The American Economic Review* 64 (3): 291-303.
- Leblanc, William, James M. Snyder, Jr. and Micky Tripathi. 2000. Majority-rule bargaining and the under provision of public investment goods. *Journal of Public Economics* 75 (1): 21-47.
- Libecap, Gary D. 2007. The assignment of property rights on the western frontier: lessons for contemporary environmental and resource policy. *The Journal of Economic History* 67 (2): 257-291.
- Libecap, Gary D. 2008. Open-access losses and delay in the assignment of property rights. *Arizona Law Review* 50 (2): 379-408.
- Libecap, Gary D., and Zeynep K. Hansen. 2002. Rain follows the plow’ and dryfarming doctrine: the climate information problem and homestead failure in the upper great plains, 1890–1925. *The Journal of Economic History* 62, (1): 86–120.
- Lueck, Dean. 1995. The rule of first possession and the design of the law. *Journal of Law and Economics* 38 (2): 393–436.
- \_\_\_\_\_. 1998. First Possession. In *The New Palgrave Dictionary of Economics and the Law*, 2, edited by Peter Newman, 132–44. London: Macmillan Press.
- McAfee, R. Preston, and John McMillan. 1987. Auctions and bidding. *Journal of Economic Literature* 25 (2): 699–738.
- McMillan, John. 1994. Selling spectrum rights. *Journal of Economic Perspectives* 8 (3): 145–62.
- McKinley, Andrew, Lee Dixon, and Amanda Devore. 2003. State management and allocation of tobacco settlement revenue 2003. *National Conference of State Legislatures* (September). Available at: [www.ncsl.org/programs/press/2003MSA.pdf](http://www.ncsl.org/programs/press/2003MSA.pdf). Accessed 22 March 2009.
- Mayhew, David R. 1974. *Congress: The Electoral Connection*. New Haven: Yale University Press.
- Milgrom, Paul. 1989. Auctions and bidding: a primer. *Journal of Economic Perspectives* 3 (3): 3–22.
- Murphy, Kevin M., Andrei Shleifer, and Robert W. Vishny. 1993. Why is rent-seeking so costly to growth? *The American Economic Review* 83(2): 409-14.
- Modisett, Jeffrey A. 1997. An Analysis of Various Methods of Allocating Tobacco-Settlement Proceeds Among the States (Allocation Subcommittee Draft Version). unpublished manuscript.
- National Association of Attorneys General. 1998. Master Settlement Agreement. Available at: [www.tobacco.neu.edu/tobacco\\_control/resources/msa/multistate\\_settlement.htm](http://www.tobacco.neu.edu/tobacco_control/resources/msa/multistate_settlement.htm). Accessed 22 March 2009.
- Olson, Mancur. 1965. *The logic of collective action: public goods and the theory of groups*. Cambridge: Harvard University Press.
- Rose, Carol M. 1985. Possession as the origin of property. *University of Chicago Law*

- Review* 52 (1): 73–87.
- Schroeder, Stephen A. 2002. Conflicting dispatches from the tobacco wars. *New England Journal of Medicine* 347 (14): 1106-1109.
- Singhal, Monica. 2008. Special interest groups and the allocation of public funds *Journal of Public Economics* 92, (3-4): 548-564
- Sloan, Frank A., Jennifer S. Allsbrook, Leanne K. Madre, Leah E. Masselink, and Carrie A. Mathews. 2005. States' allocations of funds from the master settlement agreement with tobacco companies: evidence from six states. *Health Affairs* 24 (1): 220-227.
- Sloan, Frank A., Carlisle, Emily Streyer, Rattliff, John R., and Justin Trogon. 2005. Determinants of states' allocations of the master settlement agreement payments. *Journal of Health Politics, Policy and Law* 30(4): 643-686.
- Stavins, Robert N. 1995. Transaction costs and tradeable permits. *Journal of Environmental Economics and Management* 29 (2): 133-148.
- Stavins, Robert N. 2007. Market-based environmental policies: what can we learn from U.S. experience (and related research)? In *Moving to Markets in Environmental Regulation, Lessons from Twenty Years of Experience*. Jody Freeman and Charles D. Kolstad eds. 63-94.
- Tietenberg, Tom. 2005. *Environmental and Natural Resource Economics*. 7<sup>th</sup> ed. Boston: Pearson, Addison Wesley.
- Volden, Craig and Alan E. Wiseman. 2007. Bargaining in legislatures over particularistic and collective goods. *The American Political Science Review* 101 (1): 79-92.
- Wall Street Journal*. 2009. An inconvenient tax: cap and trade yields 'climate revenues.' but don't call it a t-. 27 February.

---

<sup>1</sup> Resources solely with amenity values may not require investment and production for value. For the losses of open access, see Hardin (1968). Indeed, under certain circumstances resources can be a barrier to growth as argued by the resource curse literature. See Humphreys, Sachs, and Stiglitz (2007).

<sup>2</sup> See discussion of first possession in Epstein (1979), Rose (1985), and Lueck (1995, 1998).

<sup>3</sup> Bargaining of the kind discussed by Ronald Coase (1960) is not possible.

<sup>4</sup> See Stavins (2007) for discussion of the movement toward market-based instruments.

<sup>5</sup> For discussion, see Libecap (2007, 2008) and Anderson and Hill (2004). For example, consider success under the Clean Air Act Amendments of 1990 in designing air pollution emission permits for lowering the cost of meeting air quality targets (Tietenberg 2005 395-402).

<sup>6</sup> The property right is granted to the flow, rather than to the stock, because stock ownership may be too costly to define and enforce due to the nature of the resource or to political constraints. For discussion of reasons to limit alienation in these cases, see Johnson and Libecap (1982).

<sup>7</sup> Johnson and Libecap (1982) show that heterogeneity among fishers limits rent dissipation even under open-access and the rule of capture.

<sup>8</sup> Stavins (1995) refers to grandfathering as a give away. See also Haddock (1986) for criticism of rent dissipation when the parties are homogeneous.

<sup>9</sup> This situation is illustrated by the race to capture land rights under the Oklahoma land rush and the origin of the term “sooners.” See Anderson and Hill, chapter 9.

<sup>10</sup> In a similar setting, Johnson (1995) has shown that the imposition of taxes on quota rents in ITQ (individual transferable quota) fisheries could lead to reduced incentives of fishers to conserve (invest in) the fish stock.

<sup>11</sup> For summary of auction issues, complications, and applications, see McAfee and McMillan (1987), Milgrom (1989), and Klemperer (2002).

<sup>12</sup> See discussion by McMillan (1994) regarding the experimentation and costs of designing auctions for the spectrum.

<sup>13</sup> An important exception is Johnson (1995) who challenges the view that resource rents can be taxed without distortionary effects.

<sup>14</sup> The allocation rule under first possession can have a sorting effect to raise values. In the case of the Homestead Act under US land law in the 19<sup>th</sup> century, the requirement to occupy and farm a plot for five years may have served to direct claiming to those who had farming skills.

<sup>15</sup> For a more complete discussion see “Property Rights in New Zealand Abalone Fisheries,” Graduate School of Business, Stanford University, Case Number P-28, May 2001.

<sup>16</sup> There was an indirect limit imposed on the abalone harvest, because abalone processors faced a cap on what they would buy due to export quotas. These export quotas were neither property rights nor transferable, however, and so they did nothing to encourage divers to stop the fishery’s decline or help the fishery grow.

<sup>17</sup> Akaroa Harbour was to the southeast of Christchurch, across the Banks Peninsula.

<sup>18</sup> Email communication from Sea-Right Investments Limited, December 2, 1999.

<sup>19</sup> Consider the In defense of the former, witness the ability of cattlemen’s associations to establish customary grazing rights. See Libecap 2007. Anderson and Hill (1975, 1983, 1990, 2004) provide multiple examples from the American West consistent with bottom-up evolution of property rights in response to changing resource values and changing costs of definition and enforcement.

<sup>20</sup> Volden and Wiseman (2007) begin with a homogeneous legislature where politicians have similar preferences and then relax that assumption. In either case, the predictions hold.

<sup>21</sup> Volden and Wiseman’s argument is in contrast to Baron and Ferejohn (1989) who argue that politicians generally prefer closed rules (no amendments) to reduce bargaining costs, when a single good is valued.

<sup>22</sup> This is the so-called “flypaper effect,” a description of how government block grant money sticks where it hits.

<sup>23</sup> Obama’s Green House Gas Gamble, John Broder, NYT, 2/27/09

<sup>24</sup> Four other states, Florida, Minnesota, Mississippi, and Texas, had previously reached individual settlements with tobacco companies that totaled \$40 billion. Also the District of Columbia, Puerto Rico and four territories joined the 46 States in the MSA.

---

<sup>25</sup> The four major tobacco companies to initially settle were Brown & Williamson, Lorillard, Philip Morris, and R.J. Reynolds. Since 1998, other tobacco companies have joined the Master Settlement Agreement.

<sup>26</sup> There are three types of payments under the settlement: an initial allocation distributed across the first five years of payments, 1999-2003; annual payments, which are paid in perpetuity; and contributions to a Strategic Contribution Fund that compensates states' previous lawsuit costs. \$86.1 billion will go into the Strategic Contribution Fund, according to the National Conference of State Legislatures 2003 report "State Management and Allocation of Tobacco Settlement Revenue."

<sup>27</sup> The report "A Decade of Broke Promises: the 1998 State Tobacco Settlement Ten Years Later" was written by the Cancer Action Network, Campaign for Tobacco-Free Kids, the American Lung Association, and the American Heart Association.

<sup>28</sup> The nine states funding tobacco prevention programs at greater than 50% the CDC recommended levels are Alaska, Delaware, Wyoming, Hawaii, Montana, Maine, Vermont, South Dakota, and Colorado.

<sup>29</sup> See "The Sunken Billions: The Economic Justification for Fisheries Reform," Agriculture and Rural Development, The World Bank, October 2008.

Examples of Economic Studies on Specific Fisheries

<sup>30</sup> Fisher's behaviour with individual vessel quotas — Over-capacity and potential rent. Five case studies. Marine Policy 32 (2008) 920–927. Study undertaken by: Asche, Frank et. al. 2008. E-mail addresses: Frank.Asche@uis.no and was undertaken independently of the PROFISH Rent Drain project.

<sup>31</sup> The Economic Potential of the Bangladesh Artisanal Hilsa Fishery. Study undertaken by Masud Ara Mome (Department of Fisheries, Bangladesh) through the Department of Economics, University of Iceland. Contact: masudara\_momi@yahoo.co.uk

<sup>32</sup> Economic Assessment of Tonkin Gulf Fishery, Vietnam. Study undertaken by Nguyen Long (Research Institute for Marine Fisheries (RIMF), 224(170) Le Lai, Hai Phong, Vietnam).

<sup>33</sup> Fisheries in the Bohai and Yellow Sea. China Case Study for FAO/World Bank Rent Drain Project. Prepared by: Zijiang Yang, Chinese Academy of Fishery Sciences, zijy0505@cafs.ac.cn and Xiaojie Nie, Dalian Fisheries University, victory\_sq@yahoo.co.uk

<sup>34</sup> The Peruvian Anchoveta Sector: Costs and Benefits. A study undertaken by Carlos E. Paredes, Instituto del Perú, cparedes@intelfin.com.pe and Maria Elena Gutierrez, Intelfin, mgutierrez@intelfin.com.pe

<sup>35</sup> Case study of the Namibian hake fishery. A study by U. Rashid Sumaila and A. Dale Marsden for the FAO/World Bank rent drain project. Fisheries Economics Research Unit, Fisheries Centre, the University of British Columbia, Vancouver, BC, Canada.