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The Implications for Participatory Fisheries Management of Intensified Commercialization on Lake Victoria¹

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ABSTRACT Participation by stakeholders in fisheries management has become widely accepted. It is held that it increases both the effectiveness and the legitimacy of management. Many empirical studies of fisheries management, however, have found that political struggles over the profits from fishing drive management decisions. The present paper looks to sociological debates about agency, structure, and embeddedness for guidance in theorizing about the social dimensions of fisheries management in a way that considers both the need for participation and the political economy of the fishery. It argues that focusing on the effect that economic and political structures have on communications between stakeholder groups is one way to link participation and political economy, and we present the management of the Nile perch on Lake Victoria in Tanzania as a case study. The paper evaluates potentials for participatory management by asking how changes in economic and political realities affect stakeholders' claims about the resource, create social distances that affect communications, and privilege particular claims and perspectives. The paper concludes that management measures are undercut when they ignore the needs of groups excluded from the resource. Effective management of the Nile perch fishery is possible, but would require changes in the approaches of the responsible agencies.

Introduction and theoretical framework

Stakeholder participation in fisheries management has been widely accepted as a desirable goal by governments (McCay and Jentoft 1996) and the international development community (IBRD 1996). While participation has facilitated management in many cases (Pinkerton 1989), most empirical studies show that fisheries policy actually results from political struggles between classes, ethnic groups, and sectors of the industry in which "participation" is best seen as either resistance or co-optation (Kearney 1989). Thus, as we seek to theorize the social dimensions of management we are faced with the dilemma that one key concept, participation, assumes the possibility of cooperation between stakeholders and rational state management, while another, political struggle, assumes a competitive relationship between stakeholders and a state that is pursuing

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its own interests and/or has been captured by powerful outside interests. We argue that the connection between participation and political struggle can be illuminated by linking sociological debates over agency and structure to the communicative systems theory of Jurgen Habermas (1987). After a short discussion of this theoretical strategy, we apply it to fisheries management on Lake Victoria in Tanzania.

Agency and structure in approaches to fisheries management

The organizing concept of the agency approach to fisheries management is the “tragedy of the commons.” Fisheries are exploited to a point where their wealth is dissipated because utility-maximizing actors receive the entire benefit of their own exploitation while externalizing the costs of overexploitation onto all users. This situation requires a management regime that either internalizes costs by mimicking private property or directly governs fishing effort and/or techniques. While most such management is done through state-based regulation, there are many instances of “common property” regimes where ownership of the resource is vested with some group larger than the individual. This agency perspective is the context for the concept of participation. Participation is believed to aid management by increasing information (Pinkerton 1989), management legitimacy (Jentoft 1989), accountability (Magrath 1989), and respect for indigenous perspectives (Pomeroy 1993).

Studies approaching fisheries management in agency terms have produced three key conclusions. First, absent management or property rights, a fishery will be overexploited. Second, to be effective, management institutions must either mimic private property rights or regulate fishing behavior. Third, the effectiveness of regulations is greatly increased by the willing participation of stakeholders.

Structural accounts focus on how fisheries management actions affect the allocation of fishing profit between various classes and groups. Struggles over management decisions have been shown to reflect ethnicity (Bailey 1986), gender (Medard and Wilson 1996), colonial domination (Johannes 1978), fishing sector, and class (Davis and Bailey 1996). In spite of the insights offered by the agency approach, empirical studies have shown that management decisions are better described as the product of social power than as the result of autonomous actors cooperating to avoid the tragedy of the commons.

Embeddedness and communications

Granovetter (1985) argues that the agency approach sees actors as “undersocialized,” independent agents pursuing only their own interests, while the structural approach sees behaviors as choiceless expressions of structure-determined socialization. He seeks to re-

solve these exaggerations by proposing that we conceptualize social structure in terms of actors' "embeddedness" in social networks. The strength of the network approach is that it is "anti-categorical" (Emirbayer and Goodwin 1994). It provides a concept of social structure that allows us to treat individuals as more than just instances of structural categories. Social networks, however, present a communicative model of society that considers only position and access. Emirbayer and Goodwin (1994) argue that we can move beyond position and access, while maintaining this "anti-categorical" strength, by attending to the cultural discourses, identities, and narratives that help define and maintain networks. Thus communicative idioms give an important new twist to Granovetter's (1985) concept of embeddedness. Agency and structure-based theories are alike in an important way, they both treat the meaning content of communications as an epiphenomenon—as either expressing structurally determined attitudes or rhetorical strategies to attain utilities.

Habermas (1987) provides an account of how idiomatic communications are related to political and economic structures. He begins with the idea of "lifeworlds," which are the background assumptions to communications. Communications between individuals depend on references to shared lifeworlds. He conceives of markets and bureaucracies as systems which depend on mechanisms for shortcutting communications by defining how interactions can come to closure while relying only minimally on shared lifeworlds. Markets depend on money, through which interactions are defined by the decision to take or leave an offer. Bureaucracies depend on the authoritative power that attaches to offices and minimizes the need for a mutual understanding about how a decision will be made.

Habermas' concepts can be used to link cultural discourses, identities, and narratives to the social structure. We identify three ways in which changes in economic and political systems affect communications. First, changes in political and economic situations will mean changes in rhetoric. It is commonplace to observe that the claims people make in communications are influenced by their search for increased money and power. Second, as political and economic systems become more complex and differentiated they reduce the degree to which lifeworlds are shared. Third, Habermas (1987) argues that communications can be "distorted" and that lifeworlds can be "colonized" by social systems. Lifeworlds become distorted because situations are defined by the political and economic systems. The imperatives of these systems become the basis of validity, privileging some perspectives over others. Values that depend on more complex communications and shared meanings are excluded from any role in coordinating social life. The relationship

between the political economy and stakeholder participation in fisheries management, therefore, can be illuminated by examining the claims being made, the degree to which background assumptions are shared, and the ways in which system imperatives privilege particular arguments.

This paper demonstrates the value of looking at communications in a case study of the Nile perch fishing industry on the Tanzanian side of Lake Victoria. We use a multi-site, multi-method (Louis 1982) comparative description based on field research that took place at a point in time when an international market for fish was advancing across the lake. We were able to compare communities and fishing operations that were heavily integrated into the international market with others that were barely touched. The data presented here were collected in field work that extended from June, 1992 through December, 1994 in nine communities, hereafter called "beaches," where fish are landed and sold. Participant observation, focus groups, and in-depth interviews were done during the approximately two weeks that the research team stayed on each beach. Interviews were also done in the major lake-side towns with fisheries management professionals, fish processing plant managers, and others who work in the fisheries sector. In addition to the qualitative research, a formal survey was conducted with stratified random samples of boat management (n=145) and crew (n=241), riparian households (n=178), and fish processors and traders (n=95).² The quantitative data is used in the case study to generate descriptive statistics and to compare fishing operations that are differentially integrated into the international market.

The political economy of the Nile perch fishing industry

In the late 1970s, an explosion in the population of the predatory, non-native Nile perch (*Lates niloticus*), in combination with eutrophication from agricultural and waste runoff (Bundy and Pitcher 1995), reduced the Lake Victoria fisheries from many species to three commercially important ones: Nile perch, Nile tilapia (*Oreochromis niloticus*), and the sardine like *dagaa* (*Rastrineobola argentea*). The Nile perch vastly expanded the value of fish production and the fishery attracted many entrants (Reynolds and Gréboval 1988). A second phase of fisheries expansion has been fueled by international demand for frozen Nile perch fillets. An industrial processing and export industry grew up in Kenya and Uganda during the 1980s and in Tanzania in the early 1990s (Reynolds et al. 1992).

²This data set is described in detail at <http://www.isp.msu.edu/AfricanStudies/Plea/tanset.htm>

Overfishing

Recent estimates of the maximum sustainable yield (MSY) for Nile perch are in the 300,000 metric ton range for the whole lake (Pitcher and Bundy 1995). The quite rough official statistics on the catch in the Tanzanian half of the lake fluctuated between 146,000 and 213,000 tons between 1988 and 1993 (CIFA 1994), suggesting some overfishing. All informal observations that we solicited from 1992 to 1994, from both fishers and fishery professionals, indicate that the CPUE for Nile perch has fallen from its high point in 1988. Mean size of the perch being caught is also falling (IFIP 1990). Fish processors report that finding roe (fish eggs) is becoming increasingly rare. These drops in size, CPUE, and fertility are signs of overfishing. They are not, however, conclusive proof. Very large Nile perch are not caught in gill nets, the most common Nile perch fishing gear, and these fish are extremely fecund (Ligtvoet and Mkumbo 1990). Pitcher and Bundy (1995), however, review the data available for the whole and cautiously conclude that the stock is overexploited.

The government response to overfishing has focused on banning beach seines, very long nets set out by a boat and then pulled to shore, and controlling the mesh sizes used in other nets. Beach seines and mesh sizes for *dagaa* nets of less than 10mm and for gill nets of less than 127 mm have been banned. Gill nets, looking like large tennis nets suspended in the water, ensnare fish by their gills. Pitcher and Bundy (1995), however, argue that restrictions on effort (i.e., the overall amount of fishing), will be needed for effective management. Limits on access, (i.e., who can go fishing), are very unpopular on the beaches (Wilson and Medard 1999) and are rarely raised publically by management professionals. Some exploration into using closed areas (RTF1 1995) as a management tool is beginning.

The major organizational actors in fisheries management

Two government agencies are involved in Tanzanian fisheries management: the Tanzanian Fisheries Research Institute (TAFIRI) and the Tanzanian Fisheries Division (TFD). TAFIRI is responsible for researching and providing biological and socio-economic information about the fisheries, while the TFD is responsible for direct fisheries management. The fisheries officers are a small force concentrated on the larger beaches, and they have no boats or vehicles to carry enforcement to other beaches.

Many international actors have involved themselves in these fisheries. Important groups and agencies involved with Lake Victoria include the International Limnological Society, the World Wildlife Fund, FAO, the European Union, a World Bank funded Global En-

vironment Facility, and the International Development Research Council of Canada. The latter three, in particular, have put millions of dollars into lake-side research and management efforts. Their influence, mediated through the research and management funds on which African managers and scientists are almost wholly dependent, is crucial.

The central players in the industry are the eleven (in 1994, this number fluctuates) filleting plants that process fish for export. Many firms have investment from, and/or long-term contracts with, global conglomerates. Based on interviews with plant managers, we estimate the yearly capacity of the plants in Tanzania in 1994 to have been 138,000 metric tons, with an actual production of 53,000 tons of raw Nile perch. Using 1993 market data (Pitcher 1995), this production was worth 13 million dollars on the beach and 50 million dollars on the world market. These plants use 36 percent of the estimated MSY for the Tanzanian half of the lake and are capable of using 87 percent. The processing plants are a direct expression of structural adjustment policies. The Investment Promotion Center, an agency charged with increasing foreign investment, has exempted all but one from most taxes for five years.

Effects of the international market

Wherever the procurement efforts of the filleting plants penetrate, they become the driving force in the fish market. The strategies they use to gather fish include making credit available to fishers in return for regular supplies, fleets of trucks, and collection boats, and on larger beaches, resident agents. These activities reduce the fish available to others, increase stratification in the industry, and change the relations of production.

Reducing the fish available to other users. The first major effect of the plants' demand is to reduce the availability of Nile perch for other users. When plant agents are present, they take all decent-sized perch. Whole-fish traders on bicycles must wait until they are gone or bicycle farther and farther to escape the factory agents. Many have switched to gathering fish from the smaller beaches for the agents. Table 1 reports the distribution of Nile perch by market and type of beach. On isolated³ beaches, where processing factories are intermittent customers, the bidding of local consumers, tiny enterprises serving the local region, and larger national traders results in a fairly even distribution of fish between these markets. Where the factories have established a strong presence, they take a large majority of the fish. Women who process and sell fish locally are

³We defined a central beach as one on which 30 percent or more of the catch sold by sample boats the week before the survey would eventually go to the processing factories.

Table 1. Percentages of Nile perch by weight sold to various markets

Type of beach	Consumers	Regional traders and local processors	National traders	Processing factories
Isolated	25	36	30	9
Central	4	7	12	77

Table reports average percentage of Nile perch sold on each market on each beach in the week before the interview from six isolated and three central beaches. National trader category also includes some overland trade to Rwanda, Burundi, and the DRC (Zaire).

particularly vulnerable to competition from the plants (Medard and Wilson 1996). They resort to frying and selling the fingerlings, which the factories do not want. The fish business is an alternative to agriculture for single women with less land and an avenue of increased independence for married women (Medard and Wilson 1996). Many of the women fish processors are single and have no other means of support.

Increasing stratification of the fishing industry. In addition to taking most of the resource, the international market is changing the distribution of harvesting capacity locally. A smaller group of larger fishing operations controls more and more of the fishing power. Table 2 shows large differences in both meters of gill net owned and value of fishing operations in the ratio of the lowest to highest quartile when comparing isolated and central beaches. The gap between the richest and the poorest on central beaches is much higher, indicating a correlation between the degree of stratification and integration into the international market. It should be noted that in all cases the major leap in the magnitude happens between the third and fourth quartiles. The primary source of the stratification is a small number of well endowed fishers who drive up the figures in the highest quartile.

Stratification is being advanced by both outside investors and fishing operations that were well established before the export market began. Regression analysis shows that outside investment produces the greater disparities (Wilson 1996), but some local fishers who began in a position of strength, often by inheriting fishing boats, have been able to take advantage of the new opportunities. On two isolated beaches, we found a single, large, family operation using engines to get their fish to processors. Such transportation was available to the other fishers only if they sold the larger operation their fish. Many of the larger operations from around the lake have also moved to more central beaches.

Credit for new nets and engines is available from two main sources. The largest by far is the processing factories who use loans to tie fishers to them as suppliers. The loans usually take the form

Table 2. Quartile analysis of length of gill net owned and value of operation

Quartile	All beaches		Isolated beaches		Central beaches	
Mean of meters of gill net owned N = 118						
	Meters	Ratio	Meters	Ratio	Meters	Ratio
1	333	1	239	1	459	1
2	907	3	604	3	1,319	3
3	2,043	6	1,082	5	2,930	6
4	12,593	39	3,514	15	18,292	40
Mean of value of Nile perch operations in U.S. dollars N = 124						
	Dollars	Ratio	Dollars	Ratio	Dollars	Ratio
1	202	1	115	1	296	1
2	465	2	308	3	672	2
3	990	5	567	5	1,417	5
4	5,803	29	2,085	18	7,903	27

Table reports means by beach of two measures of the size of fishing operations owned by fishers—meters of gill net owned and monetary value. Cells contain the average value for all fishers in their respective quartile. Length of net owned is a more direct measure of fishing power. Monetary value is more inclusive because it also contains fishers who use longline gear. “Ratio” is quartile average over 1st quartile average.

of equipment, and repayment is often made by selling fish to the factories at lower than prevalent prices. The other source is the Kagera Fisheries Development Project (KFDP), a fisheries development project in the western part of the lake that at the time of our research was funded by FAO. Management of both the factories and the KFDP told us that they search out established fishers who they know or who have collateral and a record of catching fish. These criteria favor local fishers who already have larger operations. Credit is also a very important tool for the factories in managing their relationship with fishers. We documented at least one attempt by fishers to organize for higher fish prices. One leader told us that the effort failed because factories offered soft loans to key organizers.

These credit schemes, in combination with management measures, are concentrating risk onto the artisanal fishers. As the flexibility of a fishery using a variety of gear disappears and is replaced by nets that catch only Nile perch of a certain size, the fishers become more vulnerable to ecological change. The risk of theft is also very high, fully 70 percent of fishers who had been fishing for at least five years before our survey had had a boat or some sort of fishing gear stolen from them during that time. The credit agreements place the risk of loss of harvesting equipment on the fisher while tying the fisher to a factory as a quasi-employee. One factory



manager described his procurement strategy to us as "sharecropping." The factories extending the credit even avoid risk by demanding farmland as collateral.

The overall impact of this changing structure is the concentration of harvesting capacity in the hands of a smaller number of fishers using a less diverse set of gear and techniques. This has mixed implications for management. Lindquist (1990) argues, in reference to Lake Victoria, that the flexibility of small-scale fisheries makes them more difficult to manage, and from the perspective of bureaucratic control, he is probably right. He also points out that flexible, small-scale fisheries may need less bureaucratic management because they can respond to changes in species abundance at lower cost. This flexibility should be particularly evident where fishing is only one part of a household strategy and shifting between species and gears can be easily accomplished.

Changes in relations of production. The gap between the owning and laboring classes within the industry is also growing. Most of the actual fishing is done by crews who do not own shares in boats or gear. In our survey, only six percent of those who had been on the last fishing trip held a share of the boat. An additional 14 percent held a share of the gear but not the boat. Fishers almost always also farm, but our survey, based on respondents' estimates, found crew household income to be as dependent on fishing as that of owners.

Crew are almost always paid with a share of the catch. The fishing boats on the central beaches make more money, and have smaller crews, but a higher percentage of the catch goes to owners of boats and gear. Thus, while crew on central beaches make 1.6 times as much as crew on isolated beaches, the gap between owners and crew is wider. Owners on isolated beaches get 3.75 times as much as their crew, while owners on central beaches get 7.3 times as much as their crew.

Diaw (1989) argues, that in West Africa the systems for dividing catches are used to legitimate increased exploitation under conditions of intensifying commercialization. We found some evidence of this. Share systems often assign engines and newer gear substantial "maintenance and depreciation" payments that are deducted before the catch is shared. These payments reduce actual crew shares while retaining high nominal shares. The increased skill level of crew who work with engines, however, translates into higher pay in comparison to boats without engines, and the higher pay on motorized boats more than offsets the deductions (Wilson 1998).

The international market has had a profound effect on a crew member's career path. In the traditional path, a good crew member, a concept that includes both skill and character, begins by buying a small net, then a larger one, and finally buying or renting a boat. This path is becoming much steeper. Fishing units that sell on

the international market represent five times the investment of those that do not, and crew members do not have a record that allows them to get credit at that level.

Other implications of the expansion of the international market for crew members are illustrated by the difference between two fish camps in the western part of the lake. Rubiri, the most central beach we visited, sells 88 percent of its fish to the factories through collection boats, while Mchangani sells about 15 percent to the same market. Mchangani and Rubiri make a startling contrast. Mchangani is much cleaner than Rubiri and fishers are much more likely to bring their wives there. At night Rubiri is very loud, rough and urban, while Mchangani is much quieter. We saw no serious fights or punishments in the latter, while we saw several altercations on Rubiri and three public floggings by the village government during our two and one half week stay. The boat owners claim most of the credit for Mchangani's relative peace. They see themselves as more responsible for their crews. Some had brought crew members from distant homes and say that they must answer "to their fathers." On Rubiri crew members are much less likely to be related to the boat owner. Only one (3 percent) of our sample of 36 Rubiri crew was a relative of the boat owner, while on Mchangani 28 percent were. Kin do still play a role in the Rubiri operations, but as shore supervisors rather than fishing crew. On Rubiri hiring a crew member is often entirely impersonal. We found several instances where a boat owner or manager did not know the name of a crew member they had hired the week before. We never found this on other beaches. Changes in patterns of kin hiring are evident. In our sample, 44 percent of crew on isolated beaches work for relatives while only 17 percent do so on central beaches, and compensation patterns for kin on the more central beaches are more likely to be similar to those of non-kin crew members (Wilson 1998).

From the perspective of managing the fishery, the growing economic and cultural alienation of crew members from their employers and their communities is one of the most worrisome changes. The danger is that they will loose any sense of ownership or long-term commitment towards the resource.

The fisheries management discourse

Having briefly outlined the changing political economy of the Nile perch fishery, we now ask the three key questions about how these changes have affected communications between the various stakeholder groups that might participate in fisheries management: a) what are the claims made about management by different stakeholders; b) how are the social distances and shared lifeworlds between groups changing; and c) how do the political and economic systems privilege particular arguments. We emphasize two current

management measures: the encouragement of larger-meshed gill nets and the banning of beach seines.

Claims making

Among the various international and local agencies and organizations involved with Lake Victoria, Harris (1998) notes the formation of epistemic communities in which three goals struggle for priority. The first is to move Lake Victoria closer to its historic distribution of fish species. Proponents of this construction have sought to paint the lake as "dying" in the popular press. The second goal is the economic rationalization of the fishery. The third is to meet the basic human needs of local people (Harris 1998).

The position of the export processing plants on how the fishery should be managed is straightforward. Their filleting operations have an optimum size range of Nile perch of between three and nine kilograms. Gill nets are selective for fish size and the processors want gill nets that catch fish of these sizes to be the dominant, if not the only, gear being used in the fishery. The mesh sizes that catch fish in this range are from 160 mm to 263 mm (Ligtvoet and Mkumbo 1990). In interviews, the managers of the plants expressed concern about the use of beach seines and small-mesh nets by fishers and anger that the government was doing nothing to prevent such nets.

TAFIRI recommends the use of 168–192 mm mesh sizes for gill nets. This relative agreement between TAFIRI and the factories, however, is not a result of any close relationship. TAFIRI has been critical of the amount of investment in industrial processing, and its recommendations are based on a policy of reducing fishing pressure on juvenile fish.

The fishers generally support some form of government management and respect fisheries science as a source of valid knowledge. Most fishers perceive a decline in overall catches. Among fishers and traders, 47 percent said they do not worry about future catches while 53 percent said they do. In our survey, 74 percent rated mesh size restrictions on gill nets as a good or very good on a five-point scale. Seventy-seven percent supported such restrictions on *dagua* nets and 79 percent supported them for beach seines. On the other hand, fishers are very opposed to limits on access. Seventy-two percent of respondents gave a negative evaluation of proposals to limit the number of people allowed to fish. In one focus group, a respondent said that "in fishing there is no segregation" using a Swahili word, *ubaguzi*, which has strong historical overtones from colonial abuses and the fight for independence. Fishers also resist restriction on their own gear.

A beach seine ban is very controversial. Beach seines are expensive and tend to be owned by locally prominent people, but they

are important to the communities because anyone can pull a seine and be paid with a fish. Families who do not have fishing gear can send their sons to the beach to pull a seine for a few hours and bring home high quality protein. These people complain that when the seines are gone many will lose their best access to fish. Seine owners say that banning seines might improve fishing, but the improvements would benefit only those who use engines and gill nets farther offshore. No consensus exists among management professionals that banning beach seines is a good measure and, privately, some fisheries officers express opposition to it. They argue that the beach seines are destructive, but that there are so few places on the lake shore where they can be used, because of rocks and vegetation, that they are insignificant.

A management regime based on control over gear is bureaucratically attractive because gear bans are the easiest type of regulation to enforce. Even compared to other gear, a ban on beach seines is relatively easy to enforce because the seines are very substantial pieces of equipment used on the shore by large groups of people. Given the limited number of fisheries officers, banning beach seines is one of their few feasible options. The TFD had this advantage in mind when it banned beach seines in order to reduce pressure on juvenile fish. Under pressure from both the factories and the donor community, it sees the ban as an opportunity to demonstrate its effectiveness.

In follow-up work, Medard (1996) found strong resistance to the ban. She looked at three beaches on Speke Gulf. Seventeen beach seines were present and being used at night, while enforcement was hampered by bribery. Those groups who have not benefitted from the export market, particularly the smaller fish traders, were the most supportive of the continued use of beach seines and other illegal, small-meshed nets.

Social distances

Around Lake Victoria, economic and social distance is growing along three dimensions: between the migratory fishers and a sedentary population of both fishers and nonfishers; between the owners of larger and smaller fishing operations; and between the owning and non-owning classes. These distances are reflected not just in assets but in the degree to which a communicative lifeworld is shared. This can be seen in changes in styles of operations and how people talk about the resource.

Management measures are seen as benefiting the larger fishing operations, not only by poorer lake-side people who are losing access to fish altogether, but by prominent locals who are losing their beach seines. Larger, more migratory fishers are not well integrated into the villages where they are working. Their fish camps are geo-

graphically, architecturally, and socially distinct from the surrounding villages. They have little attachment to the the places where they are working, and tensions exist between the leading fishers and local village leadership.

Within the fish camps a sub-culture is emerging that encourages a more "specialist" approach to fishing. This group follows more standardized day-to-day procedures. Some hold regular meetings of the crew where they address problems and grievances. They keep detailed records, which most fishers do not do, and they use more technical language when discussing the fishery. Fishers exhibiting this style are more conversant with, and take more seriously, general fisheries management issues. Most already use nets with a large mesh size. For them, the costs of management are relatively small, while the ability to take advantage of its fruits is relatively large. They are more likely to talk about management issues on the scale of the whole lake rather than of their own beach.

Similar differences can be seen between large and small fishing operations, and these dimensions overlap to some degree because the "specialist" group tends to have larger operations. The largest operations are owned by outside investors who expect very high returns on their investments. The largest operation we interviewed, according to its own figures, recoups its entire investment in a fishing boat, net, and engine in 178 days. Thus the largest outside investors have little "invested" in the long-term health of the fishery. They discuss the lake and the fishery in terms of one investment among many others. This contrasts with the tiny operations of local fisher-farmers who are perforce committed for the long-term. They are much more likely to talk about the lake in terms of their people's history and as a legacy for their children.

A large group of outside investors are truly "outsiders" and distant from both the other owners and crew members. These growing economic distances are reflected in physical and social distances as well. Many of these investors live in urban areas, are from other ethnic groups and, often, other races, which adds cultural distance to the differences in wealth. On Rubiri, the Arabs, who own the largest operations, live on one end of the island, away from everyone else and near the only pit latrine. Hostility between outsiders and locals is not always hidden. One investor found himself accused of witchcraft when the catches of other fishers decreased.

Crew are conscious of the implications of this distance for the politics of management. When the subject of co-management arose in one focus group with crew on a central beach, they expressed concern that an organization of fishers would benefit the boat owners and exclude them. They feared it would be an "owners' union" and would remove their ability to shift between boats, the only real bargaining chip they have.

Systematic privileging of participants and perspectives

Habermas's (1987) concepts of "systematically distorted communications" and "colonization of the lifeworld" are central to his theory and are the keys to relating the meaning content of communications to the imperatives of political and economic systems. Because the market and bureaucracies function by bypassing the need for people to draw on rich lifeworld resources to reach a mutual understanding, they also make it more difficult to use these richer lifeworld resources to reach more nuanced understandings in social domains that have been "colonized," (i.e., come to be commonly coordinated by markets and bureaucracies). The result is that system imperatives appear to be more valid in discourse, and other values are discounted.

The salience of the role that fisheries officers and other government officials have taken in day-to-day life on central beaches is an example. Formal state participation is seen as necessary for any fisheries management even at the most local level. The officers are looked to for leadership in fisheries issues and treated with considerable deference in conversations. In discussions of the possibility of community management, many fishers said that violators of management measures can only be legitimately held accountable by the fisheries officers. While government management officials recognize that co-management or other forms of fishers' participation would be a good thing (Ssentongo 1992), there are no mechanisms for it. As our research on fishers' perceptions of the resource shows, the management professionals have an exaggerated view of the level of ignorance of science and management reasoning among artisanal fishers (Wilson and Medard 1999). This misperception leads them to conceive of participation almost exclusively in educational terms (RTF1 1995). The experts want to tell the fishers what they should know and what they should do, and the fishers are expected to participate by complying.

Habermas (1987) suggests that social and economic systems can distort communications by affecting background assumptions. One such assumption here is that the Nile perch fishery will be managed in ways defined by the imperatives of the export industry. This assumption is rarely directly defended, rather the dominance of the export market is cast as a natural, and inevitable, occurrence. This assumption is not anyone's articulated policy, nor does it result from any conspiracy. It stems from a combination of economic imperatives that have their genesis in the international economy and bureaucratic imperatives related to both political influence and ease of enforcement. It is a fortunate coincidence that the size and type of gear dictated by international demand make the Nile perch gill net fishery conceivably sustainable.

The practical effect of these distorted communications is that the management problem is defined in terms of control over gear and this definition sets the agenda of the debate. The factories want open access, they want fish caught by gill nets of a certain size, and they want other gear restricted. The government agencies have promulgated regulations that take this approach in spite of the facts that a) these agencies do not articulate any particular support for the factories either publically or privately and b) the poorer lake-side people are being progressively excluded from the resource. The biology of the Nile perch has made the justification of these decisions possible, but alternatives to restrictions on gear, such as closed areas and limits on access, have not been a serious part of the discussion.

Conclusions

We have sought to combine a realistic political economy with a recognition of the critical role of participation in fisheries management. The changes that have taken place do provide a politically and economically feasible opportunity for the management of the Nile perch fishery. The incentives of both the larger fishers and the processing plants are compatible with maintaining a sustainable fishery through selective gear restrictions. The government, the processors, and the larger fishers could work together to manage the lake on this basis. The government would have to be a central player in any kind of cooperative fisheries management because it is the only effective source of legitimacy for rule-making and rule-enforcing. The processors would have to be central players because they are the ones with access to effective communication networks and they control both marketing and gear. The larger fishers have strong incentives for ensuring that the Nile perch grow to the size the factories want, and they own the outboard engines that are required for effectively patrolling the lake. This approach could be successful—if no one else were present. Others are present, however, and no sub-set of the riparian population can set itself up in meaningful control of the fisheries without the active consent of the rest of the population. Such a system would quickly be undermined by tactics ranging from bribery to witchcraft accusations.

Successful management will have to include other Nile perch users including riparian households, small fishers, and small traders. Managers will have to make sure that the risks of fishing are fairly distributed, and their analysis must acknowledge the danger of overspecializing in particular gear and markets. The closed area approach currently under investigation (RTF1 1995) could contribute to such management. While closed areas, like any on-lake measure, are difficult for the government to enforce, a program in which fishers and the government cooperated in manage-

ment could do so successfully. Finally, the crew members would have to be included in the process and given opportunities both to obtain a fair share of the proceeds and to advance in the fishery. For management to be successful, the state must take the lead and perform a balancing act. No other group is able to play such a role. But, such a management program is only possible if the voices and values of all the riparian groups are heard; simply setting up some new bureaucratic rules and a staff will not produce success.

The embeddedness perspective has revealed several issues important for management. The developing differences between the migratory, specialist fishers and local, residential communities is one. Each of these groups tend to draw on different constructions of the lake, the fish resource, and management. The first draws on a more commodified view of the lake as an arena of investment to be rationally managed and exploited, the second on a more traditional, permanent, and place-based view of the lake as one resource among the many that make up a household economy. These differences are intensified by the growing cultural gap that exists between many of the outsiders, migratory fishers and investors, and local community residents. Another issue is the alienation of crew members as they shift from working for family fishing operations to anonymous boat owners. This alienation, especially as expressed in the fear of the "boat-owners union" has direct implications for the organization of management. Finally, this approach has exposed the subtle ways in which political and economic imperatives make certain management measures seem more valid than others.

This theoretical perspective, however, moves beyond simply drawing attention to social factors that affect management and might otherwise be overlooked. It suggests a way in which the effects of a political economy on fisheries management decisions can be understood without gutting the concept of state-coordinated, rational management. The communicative perspective reveals the multiple ways that the state is central to responding to ecological changes. It also reveals that the state is a complex environment for government officers. The global economy and Tanzania's role in it take concrete form in an export market that can outbid other users and in structural adjustment-driven state policies that encourage this industry. These systemic imperatives place constant pressure on fisheries officers because their requirements seem both valid and inevitable. These officers, however, work within many networks and epistemic communities, including ones in which conservation values are strong and which offer concrete incentives in the form of research and programmatic opportunities and other avenues and criteria of professional advancement.

The behaviors of these officers are not instances of a structural category expressing the political and economic interests of a supra-

individual state. Nor are any of the other actors mere expressions of their political and economic positions. They are individuals interacting within communicative networks where fisheries conservation, meeting the basic needs of local people, and rational economic management are treated as substantial goals with implications for professional lives. As actors interact within these networks, systemic imperatives from both the state and the market appear, not as determinants of outcomes, but as pressures to be encouraged, worked around, or challenged. These imperatives are interpreted and used in the constant search for a coordinated response to the physical and social reality of the lake fisheries. This reality, which offers the possibilities of abundant protein or continuously overfished stocks, also creates an incentive for finding ways to effectively manage the fishery.

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