

Adaptation and survival, or conflict and division: different reactions to a changing common property resource institution in a South Indian fishery¹

Abstract

Community adaptation to environmental and social change has often been a catalyst for evolution in common property resource (CPR) institutions. With increasing fragility of many traditional forms of natural resource management, understanding how communities are further reacting to, and evolving with, change in common property resources and the institutions that govern them, is vital if appropriate management support is to be established. Ultimately, our ability to evolve with change predetermines our ability to cope with change and fosters greater socio-ecological resilience. Similar arguments are being echoed throughout debates on the human-environment interface. As we face imminent global environmental change, important questions are being asked as to how we can cope and adapt to live with change – and what might restrict that capability.

Using a case study of traditional fisheries management in South India, this paper documents a changing CPR management institution and the reactions of the local fishing society to those changes. The Padu system, a traditional common property resource institution, has defined fishing access rights in coastal communities throughout South India and Sri Lanka over many generations. Despite a substantial geographical reach, relatively little is understood about how the Padu system is changing under multiple pressures; even less is understood about how affected fishing societies are surviving the change. Pulicat lake, India's second largest coastal lagoon and an important artisanal fishery, provides a useful setting in which to explore changes in the Padu system, which, still governed by local people, represents the dominant form of fisheries management in the lake.

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1. Introduction

Community adaptation to environmental, economic and social change has often been a catalyst for collective action and evolution in common property resource (CPR) institutions (McCay & Acheson 1987, Ostrom 1990, Dolsak and Ostrom 2003). Over the decades, research has produced a rich collection of case studies where common property institutions have countered the assumptions of the commons dilemma and succeeded in sustainable resource use (McKay & Acheson 1987, Pinkerton 1989, McGoodwin 1990, Ostrom 1990, Agrawal 2002). This has produced a common understanding amongst academics that local institutions can play a crucial role in natural resource management. In line with this important recognition, further research on the characteristics of common property institutions is progressing our understanding of the attributes that are necessary for sustainable commons management, and the policy support required to maintain their function (Ostrom 1990, Ostrom et al 2002, Agrawal 2002). These advances in common property research have contributed to some major shifts in how we design and deliver natural resource management; perhaps most notably, the shift towards co-management of resources (Pinkerton 1989), where the state can recognise and legitimise informal local-level management systems (Pomeroy et al 1996, Pomeroy and Berkes 1997).

However, the world in which we live is fast changing. Our growing recognition of the importance of local institutions to sustainable resource management is too often succeeded by a plethora of case studies depicting erosion and disintegration of CPR institutions and initiatives. Scholars of common property are engaged in a race against time to understand the complex drivers and impacts of change in CPR institutions, and to advise policy accordingly, before many institutions are permanently lost from our repertoire of resource management capabilities. Whether our understanding can keep up with this pace of change is arguably a key determinant for our ability to learn, and benefit, from local institutions in the quest for sustainable use of common property resources.

The conference sub-theme that is addressed by this paper, explores the “effects of state intervention and globalization on the commons and on the destiny of indigenous and other local peoples”. To be sure, the commons literature is rife with examples of state interventions that have led to the demise of local institutions and collective action. Berkes’s (2002) summary of some of the mechanisms by which the state has threatened the viability of local institutions include: “centralization of decision-making; shifts in systems of knowledge; colonization; nationalization of resources; increased participation in national and international markets, and national-level development projects.” (Berkes 2002:296). However, understanding the multiple and inter-related drivers and impacts of globalisation and state intervention in CPR institutions is a complex challenge. As Berkes importantly points out, “the designation of impacts as “negative” or “positive” is a value judgment. For example, impacts of modernisation and economic development on local institutions may be seen as negative by some and positive by others” (Berkes 2002:298).

Using a case study of traditional fisheries management in South India, this paper documents a changing CPR institution known as the Padu system and the response of society to those changes. The Padu system has defined fishing access rights in coastal communities throughout South India and Sri Lanka over many generations. Pulicat lake, India’s second largest coastal lagoon and an important artisanal fishery, provides the setting in which to explore changes in the Padu system,

which, still governed by local people, represents the dominant form of fisheries management in the lake.

The main argument of this paper is that an understanding of the impacts of state intervention on the commons must be matched with insight into how communities are further reacting to, and evolving with, changes in institutions and common property resources. Understanding social and ecological capacity (and incapacity) to adapt and cope with change in the commons is crucial with increasing fragility of many traditional forms of natural resource management. Such arguments are championed in academic debates on building socio-ecological resilience in the face of natural and social resource change (Berkes et al 2003), particularly in the context of climate change and the risk to natural resource dependent communities in developing countries (Adger 2003, Adger et al 2003). Socio-ecological resilience, defined as “the capacity to buffer change, learn and develop”, is frequently used as a framework to understand “how to sustain and enhance adaptive capacity in a complex world of rapid transformations” (Folke et al 2002). These debates are particularly useful in framing the complex relationships between change and responses to change in the Padu system of Pulicat lake. Evidence presented in this paper suggests that global market forces accompanied with change in the state fisheries policy, have influenced not only the stability of the Padu operation, but also the ways in which people fishing within the system are able to adapt to change. Research findings illustrate different levels of adaptive capacity in different sectors of the Pulicat fishing society, and it is this which enables a deeper insight into some of the barriers to resilience in the Padu system as a whole.

The paper starts with a description of the Padu system as it operates at Pulicat lake, and its dual role in conflict reduction and sustainable fishing practice. The Padu system at Pulicat lake is caste and gear specific, and historically, Padu has included only the traditional fishing caste ‘*Pattinaver*’ communities. The third part of the paper illustrates how the Padu system is changing. Changes in state fisheries policies and global markets for prawn export, have affected both fishing behavior, and the breakdown of caste specificity as a determinant to accessing superior fishing grounds. In Pulicat lake, traditional *Pattinaver* fishers fight vehemently to defend their birth-rights to the Padu system, whilst non-traditional fishing castes, which are often lower in the caste hierarchy, fight to win Padu rights and gain the higher economic and social status that Padu membership can bestow. The fourth part of this paper discusses how people are responding to the increasing instability of the Padu system, and the different reactions shown by traditional and non traditional fishers. The paper concludes with some thoughts for management, and a discussion on the future outlook for the Padu system.

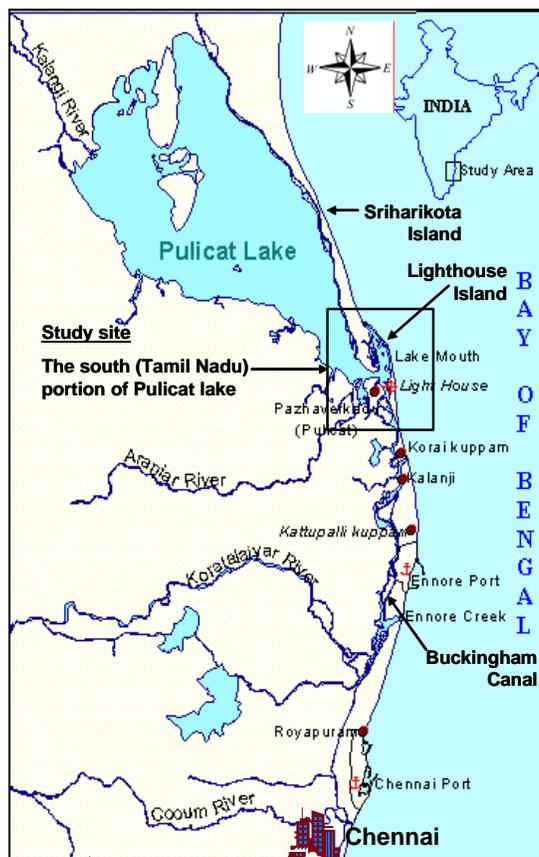
2. Pulicat lake and the Padu system

Pulicat lake, the setting for this account of institutional change, is India’s second largest coastal lagoon. Situated in South-East India, on the state border between Tamil Nadu and Andhra Pradesh, the lake provides livelihoods to approximately 30,000 full time fishers, most of whom reside in the 52 fishing villages which border the lake edge (Sanjeevaraj 1993, IOM 2002). Out of the 52 fishing villages, around 40 are located in south of the lagoon in the state of Tamil Nadu (Sivasubramanian 1987, Mathew 1991). This distribution of fishing communities is

primarily due to the location of rich and all year-round fishing grounds². Coulthard (2006) presents evidence that suggests that Pulicat lake, as with many other lagoons around the world suffers a highly variable fish productivity, which is dependent upon many factors including, monsoon rain and fresh water input and mixing with ocean waters. According to local historical accounts the lagoon periodically shifts between high and low productivity, to which the fishing communities must adapt (Coulthard 2006).

A strong degree of livelihood and caste homogeneity is inherent within most villages surrounding Pulicat lake. The term ‘fishing village’ quite accurately depicts a village, which is inhabited largely by members of the same ‘fishing caste’ who are engaged in high levels of fishing activity. Similar village homogeneity has been documented throughout the Tamil Nadu coastline and Bavinck (2001) argues that this gives fishing villages a greater degree of social cohesion than is found in most Indian villages. Bavinck (2001) further argues that single-caste villages are perhaps more focused in achieving collective action for joint interests, an argument also developed by Rajagopal (2001) in his study of caste and the effectiveness of institutions involved in water irrigation in South India. Thus it is perhaps unsurprising that a strong CPR institution has evolved in the Pulicat lake fishery, in which, caste plays a decisive role.

Fig. 1 Location of Pulicat lake, Tamil Nadu, South India.



² The northern parts of Pulicat Lake usually dry out in the summer months due to a lack of fresh water input and poor mixing with the sea: the lagoon’s connection with the sea is at its most southern point.

The purpose of Padu

The informal ‘Padu’ fishing system operating in Pulicat lake is a verbal agreement of traditional fishing rights largely dominated by the Pattinaver caste, which is the traditional fishing caste in Tamil Nadu. In Tamil, the term ‘Padu’ means ‘fishing place’ and the Padu system is the way in which both fishing spaces (Padus), and fishing equipment are regulated in the lagoon. Mathew (1991) defines the Padu system at Pulicat as:

“A traditional system of granting entitlements to eligible members of a particular community for undertaking specified fishing activities in certain designated fishing grounds in the lagoon”

(Mathew 1991:5).

Traditionally, the Padu system at Pulicat is caste specific, location specific, fishing gear and species specific (*see Table 1*), and it has existed for many generations as the traditional law of the lake. It is not written down, nor is it formally recognised by any state institution, and yet, it seems that from an early age, every fisherman at Pulicat lake understands how the system operates, knows with great accuracy the location of each Padu boundary, and (usually) strictly adheres to its legislation. Villages arrange the Padu rights amongst themselves within the village Panchayat (non-state village councils); the only state intervention being that of a government-based peace committee³ or police system if inter-village fighting breaks out.

The Padu system is founded upon the specific fishing grounds or ‘Padus’, where eligible fishermen can place their stake nets for prawn catching. The allocation of Padu grounds is done through an annual meeting when lots are drawn by the village Panchayat for each fishing unit (a single boat with 3 men). During these meetings, the list of ‘padu’ fishing units is updated: new fishermen (those having reached the Talekettu criteria (*see below*)) are added and deceased fishermen are removed. Each fishing unit of the village is allotted a specific place in the rotation of Padu fishing grounds. Using this method, each fishing boat has the opportunity to fish at least once in all the Padu grounds throughout the entire year. Since Padu grounds vary in terms of productivity, this is a fair system, which evenly distributes richer and poorer fishing grounds amongst all *Padu* fishermen. Once Padu grounds have been allocated to a fishing unit from the Padu village, no other fisherman outside the rotational system of Padu can fish.

The Padu system is a monopolisation of the valuable prawn fishery of Pulicat lake. The system restricts access to the most productive prawn fishing grounds and restricts use of the most effective fishing gears (Padu stake nets). Its main function is to evenly distribute the best fishing grounds amongst the *villages* of traditional *Pattinaver fishing caste* (Mathew 1991). As MaCay (1981) argues, “most known cases of indigenous fisheries management hinge upon the management of access to fishing space rather than levels of fishing effort” (as cited in McGoodwin 1994:46) and the establishment of the Padu as a conflict resolution measure (McGoodwin 1994) seems to fit well into this description.

³ Village fighting over Padu rights is common at Pulicat lake and the usual mechanism to solve disputes is through an established ‘Peace committee’ which consists of representatives from the fighting villages, administrative figures from the local government, Gram Panchayat members (State run village councils) and members of the police force.

Table 1 The specifications of the Padu system

Regulation	Operation
Caste specific	Traditionally only the <i>Pattinaver</i> fishing caste is included in the Padu system. However, research found that some Scheduled caste fishing villages have utilised limited Padu fishing rights since as early as 1920. Today, <i>Pattinaver</i> fishers still remain the dominant group within the system and hold the most productive Padu fishing grounds.
Location specific	Regulation of fishing access is through <i>rotational access</i> of specific fishing grounds (<i>Padu</i>) between Padu fishing villages. Each village in the Padu system goes for fishing (as a whole village) on their specific allotted fishing day.
Gear specific	<ul style="list-style-type: none"> • Only eligible ‘Padu fishermen’ are able to use <i>Padu fishing gears</i>, which are <i>stake nets and beach seine</i>. Both are highly efficient at catching large quantities of prawn and fish. • Those without rights must adopt other less efficient ‘<i>Non Padu fishing gears</i>, which include: <i>Cast nets, Gill nets and fishing by hand</i>. Fishing with gears which are unregulated by the Padu system due to their low yields, is locally known as ‘<i>Sirutholil fishing</i>’. <i>Sirutholil</i> is the Tamil expression for ‘small profession’ and is widely regarded as ‘<i>poor man’s fishing</i>’
Species specific	Stake nets in particular are specialized in catching the valuable prawn. The Padu fishermen monopolise the prawn fishery at Pulicat lake.

Talekettu village membership and Pattinaver caste domination

To become eligible for Padu fishing rights and access to Padu fishing grounds, a fisherman must first be a member of the institution of Talekettu (Mathew 1991), a form of village membership based upon gender (only men can participate) and caste (only *Pattinaver* caste can reach Talekettu status). In *Pattinaver* villages, Talekettu membership is bestowed on a male in a village providing he meets three criteria: 1) He is a member of that village 2) he has reached the age of 21 years and 3) he is married. Mathew (1991) adds to this that Talekettu rights are also “dependent on the general level of skills of the candidate and the degree of acceptability by the village” (Mathew 1991:5). The Talekettu involves reaching a certain social position in Pulicat fishing society and membership means becoming part of an ‘elite’ fishing group⁴.

⁴ Stoffle et al (1994) report, in the Dominican Republic, a similar sense of group ‘membership’ as a means of acquiring fishing access rights, which was also associated with greater responsibility and

A problem with Padu - sustainable fishing at the cost of disguised unemployment

Although the Padu system was originally created by a need for equal sharing of fishing grounds to avoid village conflict, sustainable fishing of the lake through the Padu system is a definite consequence (Mathew 1991). Due to the rotational nature of the Padu system, within traditional (Pattinaver) Padu villages fishing effort remains *constant*, and this contributes to the overall sustainability of the fishery. Constant fishing pressure occurs because neither the number of fishing days allotted to a village, nor the size of fishing spaces utilised by Padu villages can be changed once they are established due to the rotation of grounds with other villages. If one village expanded its fishing slot it would disrupt fishing access in a neighbouring village and result in inter-village conflict. This system is upheld *despite growing village populations* and increasing numbers of fishermen; instead of increasing fishing plots, under the Padu system fishermen decrease the amount of fishing per fisherman.

Padu villages control allotted fishing access *within* villages using 2 mechanisms:

1. An increase in the number of fishermen per boat (usually from 2 to 3 people per boat);
2. Division of the whole village into smaller fishing groups. This means that individual fishermen receive a reduced number of Padu fishing days as part of the rotational system that they share with other villages. In populous Padu fishing villages, division into groups has resulted in Padu fishing opportunity arising only 2-3 times a month.

Study of the commons has generated substantial evidence for institutions which counter the commons dilemma depicted in Hardin's 1968 *Tragedy of the Commons*. The Padu system at Pulicat lake has enjoyed legitimacy amongst lagoon fishermen for many decades, and has at the same time, restrained fishing pressure on the lake's prawn fishery. However, the Padu system grows increasingly unstable as the population of 'legitimate' Pattinaver fishermen continues to rise. As described above, the Padu system is upheld despite growing village populations and increasing numbers of fishermen; instead of increasing fishing plots, under the Padu system, fishermen decrease the amount of fishing per fisherman. This problem has been termed by Sivasubramanian (1987) as '*disguised unemployment*' and it throws into doubt the long term sustainability of the Padu system in its current form.

Sivasubramanian (1987) states:

"The Pattinaver community being traditional fishermen, by virtue of their early settlement in Pulicat area and by virtue of possessing key strategic fishing areas in the lake, and because of their larger population, claim supremacy over other communities in the matter of fishing in Pulicat lake. Unlike their marine counter-folk on the marine side, the area of operation for fishing is limited. Accommodating new entrants into the small field is a problem. So they have formed into unions of village to regulate the fishing operation. Hence the Padu system of fishing was evolved. Within villages, as

social obligation in village matters. The increase in status and changes in identity, which accompany Talekettu membership at Pulicat lake may be as desirable as the access to lucrative fishing grounds that Talekettu membership bestows. This matter is touched upon later, but deserves far greater exploration than that available within the scope of this article.

the number of eligible fishermen in the villages increase, they have to share the fishing area allocated to them. With the result more men operate in a smaller area and the under employment (or *disguised unemployment*) is aggravating”

(Sivasubramanian 1987:23)

So far, this paper has described the characteristics of the Padu system as it is currently operated at Pulicat Lake. Ostrom (1990) refers to Shepsle’s (1989) criterion of ‘institutional robustness’ where “rules have been devised and modified over time according to a set of collective choice and constitutional rules” (Ostrom 1990:89). Padu villages have modified their fishing rules and techniques but to their own demise. As village populations increase, the fishery itself remains sustainable through the Padu system, but livelihoods and incomes amongst fishermen are increasingly unsustainable. It is important to recognise the pressures of natural population growth within Pattinaver fishing communities and the destabilisation of the Padu system through disguised unemployment. The unemployment is ‘disguised’ since many fishers are unaware or unwilling to accept village population growth as part of the problem that they now face. The Padu system has dominated fishing and conflict for so long that there is a reluctance to allow the system to evolve: a common fear that the system might collapse and the lake will become a “free for all”.

This hold over the Padu system is quite well illustrated by the well known Pattinaver saying:

“A man will leave his wife, but he will never leave his Padu place”

Ostrom (1990) notes “a sheer perseverance manifested in these resource systems and institutions” and it is this which holds true for the Padu system at Pulicat.

I return to this point again in the conclusion of the paper since the social values attached to the survival of the Padu system are instrumental in shaping a fishers ability to adapt to change.

In the following section, I argue that changes in both state fisheries policy and global markets have directly attributed to a reduced resilience of the Padu system (Berkes et al 2003), a reduction in the ability of the system to evolve and adapt to changes (such as population growth). This is an important point, which requires an integrated understanding of social, economic and environmental change, at the local and global level. The scenario depicts that even though the state has not intruded directly into the Padu system - which has been documented to destabilise so many CRP institutions - indirect impacts to the system undermine the ability for the institution to evolve and its people to adapt to change.

3. A changing Padu system

Presently at Pulicat lake, the laws of the Padu system remain intact and fishers without Padu rights can not (and generally do not) use Padu fishing methods. Today, as in the past, the laws of Padu are enforced by the Pattinaver fishing villages. When enforcement leads to conflict between villages, there is sometimes a limited and temporary intervention by the state through peace committees and the police, although in general, villages quarrels are the responsibility of the village Panchayat. However, the Padu system is changing.

This section discusses research that has identified two major on-going changes in the Padu system, both of which are interrelated and driven by a range of factors. Firstly, despite its traditional use being a reservation only for the Pattinaver fishing caste, the Padu system is now opening up to villages of non Pattinaver caste. The caste specificity of Padu is breaking down and many non-Pattinaver fishing villages have either won legitimate fishing rights, or are currently fighting for Padu status. The second major change in the Padu system has been an increased specialisation to fishing for the lucrative prawn, which as is discussed below, represents a greater incentive to fight for Padu (and better prawn fishing opportunities) and is driven by large political and market forces.

The influence of state fisheries development policy on Pulicat lake

Over the last century, government fisheries development policies have had a powerful impact on the fisheries sector throughout India⁵. The most relevant aspect for Pulicat lake has been the development of species specific exportation markets, in this case the global export market for Prawn, which today represents the lake's main fishery product. Many fishermen argue that fishing in the lake is wholly focussed upon catching the valuable prawn, and most are not interested in fishing for anything else. This has certainly not always been the case and understanding this change and the loss of diversity in fishing catch is crucial to understanding many of the problems fishermen now face.

The Pink Gold Rush

The development of the prawn market in India was a key part of India's blue revolution in the 1960s, which was ventured to develop the fishing sector and compliment India's green revolution in agriculture (Bavinck 2001). In inland and backwater fisheries, such as Pulicat, the fast pace development of India's prawn export market was primarily achieved through new investments in aquaculture (prawn farms), modernisation of nets (mechanisation of crafts was mainly a marine fishing affair), and creating incentives for people to fish prawn. The development of fisheries for export was a national objective and the target species of prawn earned the term the '*Pink Gold Rush*' (Kurien 1978, Bavinck 2000, 2001)⁶.

A key government aim was to create incentives to fish for prawn. As Bavinck (2001) emphasises, "All and sundry who ventured to take risks of entrepreneurship were encouraged" (Bavinck 2001:56). This point in particular has high relevance for the current situation at Pulicat lake, where non traditional fishermen have been actively encouraged by government policy to form cooperatives and start fishing for prawn.

⁵ There exists a rich literature on the impacts of Indian fisheries development on fishing communities. John Kurien has done extensive work spanning several decades in a selection of Indian states: see Kurien 1980, Kurien & Achari 1988 and Kurien 2000. Maarten Bavinck has more recently carried out research on the impacts of state fisheries policy on the marine fishing sector in Tamil Nadu, which includes a complete chapter "The Blue revolution in the Coromandel coast fisheries", depicting the development of Tamil Nadu fisheries policy since the early 1960s (Bavinck 2001 Pp 46-76).

⁶ Bavinck (2001) uses the term the Pink Gold Rush in the context of the shrimp trawler fishery and the dynamics between the marine artisanal and trawler industry in Tamil Nadu. I argue here that the incentives to fish for prawn also reverberated throughout many rural artisanal fisheries, which have seemingly been affected to a lesser extent by the trawling fleets of large cities.

Development of government driven fishermen cooperatives

The government initiative to form fishermen cooperatives provided the main instrument through which change by fisheries development policies could be implemented in fishing society. Loans, subsidies and incentives for fishing modernisation reached Pulicat fishermen through these fishermen societies, of which almost all fishermen are today members. In fact, membership of a cooperative society is prerequisite to the right to participate in government development programmes (Bavinck 2001). However, fishermen status by either caste or occupational tradition was not a requirement to form a fisherman cooperative and all parts of society were actively encouraged to do so. Evidence of this at Pulicat is ample; in non-traditional fishing villages, village elders often explain how they were able to gain a significant amount of government funding for nets through the formation of the government supported groups.

Fishermen cooperatives provided a verified vehicle of access into the fishing sector, and this has acted as a catalyst for non-traditional fishing castes to establish fishing livelihoods at Pulicat lake⁷. Bavinck (2001) describes the unexpected dynamics that have divided Tamil Nadu marine fishing society:

“The policy-makers expected that the new technology would contribute to the social and economic welfare of the artisanal fishermen. However, the blue revolution unleashed new forces and generated new dynamics. The basic problem was the boat (trawler) fishermen exploited the same ecological niche upon which artisanal fishermen depended, and this set a spiral of conflict into motion” (Bavinck 2001:76) On a smaller scale, at Pulicat lake a similar thing seems to have happened. Through actively encouraging the formation of fishermen societies and the accompanying provision of nets and loans, policy makers have opened up the Pulicat lake fishing niche to non-traditional fishermen. Prior to the policy intervention, a fishing livelihood may not have been such an easy option for those outside the traditional fishing hierarchy.

Policy driven fishing gear changes - Modernisation of nets

A key change in fishing technology of Pulicat lake fishers is the replacement of natural fibre fishing nets with synthetic nylon nets, a process ongoing since the 1960s. Greater accessibility to better twine and ready made nets provided by the government has had a dual impact on the way people fish today. Not only were nets made available to non traditional fishing groups through fishermen cooperatives, but also availability of ‘ready-made nets’ could have made changing net type a lot easier. The earlier practice of hand making nets by fishermen was associated with a high degree of personal value over these nets; nets were cared for and once made, the nets were repaired and kept in good condition to be used over many years. An easily accessible source of nets could have changed these traditional practices and opened up

⁷ I refer here to the increase in the number of non traditional fishermen utilising the Pulicat lake fishery. Whilst I believe that formation of fishermen cooperatives did act as a catalyst to non traditional fishermen coming to the lake, it is important to realise that non traditional fishermen have been visiting Pulicat lake for at least the last 100 years (according to village elders), particularly from the agricultural sector during periods of drought and poor agricultural crops yields. The 1950’s formation of fisheries cooperatives has merely escalated this venture, providing a full-time and more permanent angle to fishing encouragement. It did not however introduce non-traditional fishermen to the Pulicat lake fishery.

possibilities for fishermen to change nets, and of course, inclinations would be to change towards using the more productive, profitable and lucrative net of the time – the stake nets used to catch prawn.

Evidence for a reduced diversification in fishing gears at Pulicat can be found in historical documents. In one of the earliest descriptions of the Pulicat lake fishery, Hornell (1924) details a great diversity of nets in use at Pulicat lake, all used for catching fin fish, however, none of which were found in the present study of the lagoon. Today, many Pulicat fishermen agree that the most important and desirable of nets is the stake net, specialised to catch prawn⁸. This supports the argument that fisheries policy implications of the ‘pink gold rush’ have contributed to an increased dependency on the prawn within the fishery of Pulicat lake. The implications of these changes for fishermen at Pulicat as one might imagine are substantial, and the following section discusses some of impacts of change on fishing communities.

Changes in fisher identity – ‘Non traditional’ vs. ‘traditional’ fishermen

In Bavinck’s (2001) description of fisheries development in the marine fishing sector, he argues that artisanal fishermen have been marginalised by rich new-comers to the industry, profiting from the now lucrative business of fishing and export. In the state of Tamil Nadu, anger from the artisanal marine fishermen towards the appropriation of mechanised fishing boats by ‘non traditional fishing entrepreneurs’, mainly from Chennai has resulted in several decades of violent conflict, which peaked in the 1978 Chennai riots (Bavinck 2001).

This feeling of resentment over non-traditional fishermen coming into the fishing sector is an important concept for commons management at Pulicat lake and resounds throughout the state in different situations. At Pulicat lake, there has been no mechanisation of boats operating in the lagoon, but the feelings towards a hereditary right to fish through the Padu system are very close to those documented by Bavinck (2001) in the marine sector. At Pulicat however, the roles are reversed. Whereas in the marine fisheries sector the artisanal fishermen are marginalised and the newly incoming fishermen are wealthy entrepreneurs, in fact it is the opposite situation at Pulicat. New incoming fishermen are generally of poorer and lower caste status; many have agricultural or tribal backgrounds and are seen as an unwelcome encroachment on an established fishing system practiced by a higher fishing caste. This feeling of ‘fishing access’ as a birth right to a particular fishing caste, however, is very much the same in both situations.

The longer term acquisition of Padu fishing rights for non-traditional fishing villages

It is important to distinguish that the acquisition of lake fishing rights by non traditional (non Pattinaver) lake fishing communities is not solely the result of encouragement through formal fisheries policy and developments in the global prawn market. Whilst these factors may have facilitated the process, redistribution of Padu rights can be traced back as far as the beginning of the century. Peace committees under colonial rule may have played a more substantial role in re-defining Padu rights than they do today, although evidence for this has not been solidified by the current

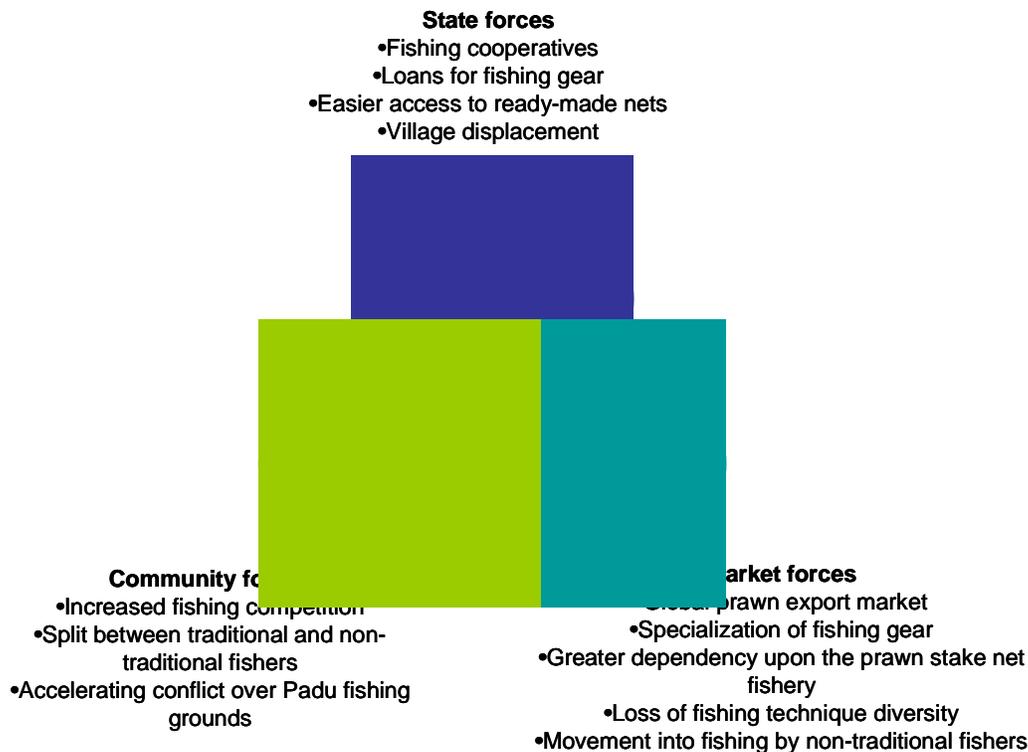
⁸ The exception to this is the large beach seine ‘Badi valai’, which is still used in Pulicat lake to catch prawn and fish, but in far lower numbers compared to the past (Mathew 1991). Due to the large size and catch potential of the beach seine, it is a highly desirable net and in general, only the wealthiest fishing families or large cooperatives can afford to operate the net.

research. Furthermore, the particular success of Scheduled caste fishing villages in acquiring Padu fishing rights in the lake may imply connections with their increasing political status, particularly through positive discrimination for scheduled caste members in local government. The process of winning Padu fishing rights also heavily involves village politics and power. In historical recollections of successful acquisitions of Padu rights, village size, alliances with larger villages, influential village families and links with politicians have all played important roles.

Applying an integrated history of change at Pulicat to today’s fishing society divisions

The paper so far has considered some of the historical events and policy implications in shaping the current situation of the Pulicat lake fishery. The following diagram combines this background knowledge alongside evidence for change within the formal and informal policy systems, using a perspective from the state, market and community sectors.

Fig 2 Overlap between forces of change at Pulicat lake from the state, community and market sectors



State forces

Tamil Nadu state fisheries policy actively encourages the formation of fishermen cooperatives by both traditional and non-traditional fishing groups. Anyone can form a cooperative, providing they have large enough number of group membership. Through fishermen cooperatives, loans and subsidies are available for buying and modernising fishing gear and boats. This means that synthetic ‘ready made’ nets are easily and quickly appropriated.

Market forces

Global developments in the prawn export market have encouraged traditional fishermen at Pulicat lake to focus on catching the increasingly valuable prawn. Easy access to ready made fishing gears facilitates faster specialization of fishing gear to focus on solely catching prawn species. As fisherman at Pulicat often state, Pulicat lake is today dominated by prawn fishing. This in turn has created a neglect of fishing diversity (using other nets) which may have been used in the past by traditional fishers, for example, the decline in the use of fishing gears designed for catching (now less valuable) fin fish, and the fall in Beach seine (Badi valai) use. The resulting high dependency on prawn and stake net fishing has serious consequences for traditional fishers, which are discussed in the next section of the paper.

The high market value of the prawn combined with active encouragement into the livelihood of fishing by state policies, have simultaneously attracted many non-traditional fishers to Pulicat lake.

Community forces

A growing number of fishers in Pulicat lake, who are attracted by the lucrative prawn fishery and encouraged by the state, increase fishing competition in an already heavily utilised resource. Access to the most productive parts of the lake fishery through the Padu system are fought for by non-traditional fishers, and vehemently defended by traditional Padu fishermen. This has created a split between traditional lake fishermen and non-traditional fishers, a conflict between Pattinaver and non Pattinaver caste over fishing rights.

Furthermore, the wealth and accompanying social status gained by Pattinaver communities through the lucrative prawn fishing business witnessed a rapid increase during the 1970s and 1980s. Although Pattinaver wealth is now unstable due to the problems of disguised unemployment and increasingly unpredictable prawn catches, the association between Padu status and opportunity for great wealth has driven the desire for Padu status in non-Pattinaver caste groups. Exclusion from the Padu system and the use of non-Padu fishing gear have become increasingly lower status, and a sign of poor non-traditional fishers. Whilst diversity in fishing techniques is considered key to survival in artisanal fisheries (McGoodwin 1990), the combination of state, market and community change has driven Padu fishermen to a high level of dependency on a specialist fishing strategy.

4. Adapting and coping with a changing Padu system

The introduction to this paper stressed the importance of accompanying an understanding of change in commons institutions with an insight into how people are reacting and in some cases, adapting to those changes. The following section presents evidence to suggest that at Pulicat lake, different fishing societies display different capacities to adapt to change in the Padu system. Both *Traditional* and *non traditional* Padu fishing villages are increasingly poor due to falling fishing income under the Padu restrictions of access (disguised unemployment), and yet there seem to be differences in the ways in which each are able to adapt to this change.

Evidence from two case study villages

The following account focuses on two villages at Pulicat lake: Nadoor Madha kuppam and Dhonirevu. They are used as case studies to illustrate how fishers at Pulicat are adapting to changes in the lake, what barriers exist to making these adaptations, and the role of culture in constructing such barriers.

Village 1 Traditional Padu village - Nadoor Madha kuppam is a large predominantly Christian village⁹ of *Pattinaver* caste (See Table 2) and is the largest 'traditional' Padu fishing village in the southern region of the lake. As a traditional Padu village it has access to the *best fishing grounds* 'or Padus' in the lagoon.

Village 2 Non traditional Padu fishing village - Dhonirevu is a 100% *Scheduled caste*¹⁰ village (see Table 2), which won limited Padu fishing rights in the 1920s after negotiations with local political leaders. It has fishing access to Padu grounds in one of the least productive areas of the lagoon.

Table 2 Case study village statistics

Village	Padu status	No. of families *	Total population *	Religion *	Caste*	No. of padu fishing days per fisherman per year #
Nadoor Madha kuppam	Traditional Padu village	430	1885	Christian 84% Hindu 16%	Pattinaver 84% Scheduled caste 16%	30 (once in 12 days)
Dhonirevu	Non traditional Padu village	120	536	Hindu 100%	Scheduled caste 100%	30 (once in 12 days)

Source: * Tamil Nadu State Fisheries Department Census 2000/ # Coulthard (2006)

Due to forced adaptations to rising village population and the restrictions of fishing grounds under the Padu system, both villages go for fishing only once in 12 days. This gives us a good comparative case study of villages with currently similar fishing access (albeit differing productivity in fishing grounds) but vastly different backgrounds and histories, religion and caste.

The following evidence on village use of fishing gear (A) and on levels of dependency on fishing as a livelihood (B), highlight important differences between villages in their reactions to changes in the Padu system.

⁹ The Christian inhabitants of Nadoor Madha kuppam strongly consider themselves as *Pattinaver* caste, despite the legacy of caste being inherent to the Hindu religion.

¹⁰ *Scheduled Caste* includes within it 'Untouchables' or Dalits (meaning 'depressed') which are considered as the lowest societal position in the caste system. Untouchables were renamed 'Harijan' by Mahatma Gandhi who raised their social status considerable.

A. Evidence 1 Utilisation of different fishing gears

Table 3 Fishing assets in the case study villages

Village	Percentage of households owning share in net type				
	Padu nets		Non Padu nets		
	Stake Nets	Beach seine	Cast net	Gill net	No. of Traps *
Nadoor Madha kuppam	96	10	0	0	30
Dhonirevu	98	0	29	7	1880

Source: Household village survey (Coulthard 2006)/ * SFD Tamil Nadu State Fisheries Department Census (2000)

A major difference of fishing gears owned by the traditional Padu fishing village and the non traditional padu fishing village becomes obvious if we look at nets in terms of *Padu fishing nets* and *non padu fishing nets* - those small scale fishing nets which escape Padu regulation due to their low yields. Both villages have access to Padu grounds, and so ownership of Padu stake nets is high, however, there is a greater diversity of net ownership in Dhonirevu. For example, almost 30% of Dhonirevu inhabitants own non padu cast nets. This is because Dhonirevu fishermen fish use *Sirutholil*, or small scale non padu fishing gears (cast nets, gill nets and crab traps) on non Padu fishing days. This diversity of fishing gear and utilisation of fishing opportunities on non padu fishing days (11 out of 12 days) is essential for providing additional albeit, small income between Padu fishing trips.

Dhonirevu fishermen state;

“How we will manage with fishing once in 12 days. We also use our cast nets and we can get less but at least some prawns for a small income”

The village of Nadoor Madha kuppam in comparison showed no evidence of ownership of small nets, and only 30 traps, which are likely to be used by a minority Scheduled caste population in the village.

Dhonirevu is a village that has adapted to benefit both from Padu fishing once in 12 days, and supplementation of their income through small scale *Sirutholil* on non fishing days. *Sirutholil* is a coping mechanism employed by Dhonirevu fishermen, who find it difficult to cope with incomes from only 32 fishing days per year. A good question is why in lean fishing periods, do the traditional Padu villages also not go for small scale fishing using cast nets? There seems to be a consensus from Traditional Padu fishermen that firstly, it is beneath their status to fish with such small nets, so commonly used by non Pattinaver caste fisherfolk, and secondly, whilst some fishermen would like to go for small scale fishing during ‘low income’ years as are presently being suffered, they are unable to because they must uphold the Padu system.

As one Pattinaver fisherman put it:

“If one of us [a Pattinaver fisherman] went for Sirutholil fishing, we would all follow”

Nadoor Madha kuppam is the largest traditional Padu village in the southern part of the lake. If the villagers started to fish on non padu days, even only using small fishing gears, they risk jeopardising the entire system and this fear that “the lake would become a free for all”, is rife amongst most traditional Padu fishermen. Dhonirevu fishermen are also bound to these Padu rules, although their commitment to maintaining the Padu system is considerably less passionate in comparison to Pattinaver fishers, largely because Dhonirevu do not have to protect the best fishing grounds, themselves only accessing the less productive Padu places. In addition to this, whilst there is an increasing number of people in Nadoor Madha kuppam who might consider using small scale fishing were it not for the Padu system, there is another group within the village, mainly the village leadership and elite who see the use of *Sirutholil fishing* as beneath their status.

My suggestion of the benefits of Sirutholil fishing during one focus group with Pattinaver fishermen received angry replies from fishermen, who felt it is their right to have a productive lake and a sustainable Padu system, rights which should not be compromised by adapting mechanisms used by lower status fishermen, who should not even be fishing.

B. Evidence 2 Dependency on fishing

Evidence regarding the different fishing approaches adopted by each village place Nadoor Madha kuppam in a vulnerable light; when fishing seasons are lean they have no fishing diversification on which to depend. This seems largely due to a combination of suffering a stricter sense of Padu rules ‘entrapping’ the fishermen in traditional padu villages, which is fuelled by an inherent fear of padu breakdown and the loss of the most productive fishing grounds of the lake. Lack of fishing diversification is also related to issues of caste, identity and status; a feeling that using small scale ‘non padu’ fishing gear is beneath the status of a Pattinaver fisherman.

“Diversity is the hallmark of artisanal fishing craft and gear technologies” (Kurien 2001:5.1) and yet, it seems that the traditional Padu villages of Pulicat have lost their ability to diversify, in comparison to the Scheduled caste fishermen of Dhonirevu, who may catch less prawns, but who fish more regularly.

The following evidence argues that the traditional Pattinaver caste fishermen of Nadoor Madha kuppam are even more dependent upon Padu fishing than is suggested by this lack of diversity in fishing. If we look at diversity in livelihoods *external to fishing*, the scheduled caste population of Dhonirevu again shows this same ability to diversify, adapt and seek external income support during lean fishing periods but this time, from non fishing sources.

Historical evidence – external access to resources

Focus group interviews with village elders from Dhonirevu revealed that historically, during lean fishing periods at the lake, fishermen from Dhonirevu often fled the

village to move inland, stay with relatives and in large depend upon support from relatives involved in non-fishing activities, such as agriculture or Chennai based labour. In the present day, non-fishing income and family connections outside the village were cited as a key source of funds or loans during lean fishing seasons:

Qu: How do people manage for income in lean fishing seasons?

Reply: Some people are married with members of outside 'agricultural' villages. If anybody's wife's house is richer or better off, they will help. When the fishing family gets income they may repay the debt but sometimes the family doesn't ask for the repayment - it is in the family.

Focus group meeting Village elders, Dhonirevu 2003

A lack of migration to non fishing areas might also be dependent upon the opportunity to do so. Due to caste traditions, most of the Pattinaver caste fisherfolk marry within their own fishing caste and it seems rare for a fishing family to have relatives not involved in fishing. In Tamil Nadu fishing communities "The unity of caste has led to extensive marriage networks along the coast" (Bavinck 2001b:1). In Dhonirevu, scheduled caste is by tradition a non-fishing culture, and so in theory, marriage into a family of non-fishing background (or dependency) may be more likely. In development studies, social networks within societies are categorised as *social capital*, defined by Putnam (1993) as, "the features of social organisations, such as networks, norms and trust that facilitate actions and cooperation for mutual benefits" (Putnam 1993:35). In Pulicat fishing villages, connections to land based occupations seem to form an important part of resilience to change in the lake's productivity.

Evidence of livelihood diversification external to fishing

Interviews with fishermen were particular useful in highlighting the ability of Dhonirevu villagers to depend on non-fishing sources of income during lean fishing periods.

Examples of livelihood diversification came from the following focus group held in Dhonirevu village 2003:

"When we were earning good income from the lake (during more productive times) my family bought some agricultural land in the nearby village. We automatically get rice grains from this, and we use this for cooking or sell any surplus. The people who don't have lands in their family go hungry"

"These days everyone does a little of everything. In the past we would only do one thing for earning a living...now everybody is doing some other work...Where income comes we must follow it there. We have to change our professions because we don't get enough fishing here these days".

An explanation into this ability to diversify stems from the background of Scheduled caste fishermen. Scheduled caste populations by trade work in a variety of livelihoods, and as a results have a range of skills applicable to adaptability. Pattinaver fishermen on the other hand, are skilled in fishing and may struggle far more to take other work. Scheduled caste or 'Dalit' caste is traditionally not a fishing occupation and results from a household survey (conducted June 2003) showed that out of 84 household heads surveyed, 33% had in the past earned a main income from an occupation different to fishing. Although these fishermen were not currently using non-fishing skills, in theory, these skills could be drawn upon during lean fishing periods and times of poor income. In comparison, a survey of Nadoor Madha kuppam village found no household heads reporting a past occupation other than fishing.

5. Summary of evidence and meanings for management

The village evidence of differing abilities to diversify livelihood strategies suggests that deeper influences than the restriction of the Padu system alone are contributing to the lack of adaptive capacity. Living under a stricter sense of Padu system ruling 'entraps' many Pattinaver fishermen in traditional Padu villages, which is fuelled by an inherent fear of Padu breakdown, and the loss of the most productive fishing grounds of the lake. Lack of diversification in both fishing behaviour and occupation is also related to issues of caste, for example, the illustration that using small scale 'Sirutholil' fishing gear is often considered beneath the status of a Pattinaver fisherman.

The acquisition of many of these coping mechanisms as shown by scheduled caste fishers is a result of a long history of non-fishing livelihoods. As discussed, many of the scheduled caste fishers are relatively new fishers, with a background in other trades, which they can depend upon in lean fishing times. Another aspect is that, because scheduled caste villages in general have access to poorer Padu fishing grounds in comparison to the Pattinaver fishermen, adapting to diversify fishing technique and income sources have become a necessity for survival.

At this stage, it may be considered an obvious management solution to build upon the scheduled caste adaptation strategies and advise Pattinaver fishers to diversify their fishing techniques and seek non-fishing trades as a subsidiary to fishing incomes, a form of income security in an unpredictable lagoon fishery. However, what has emerged from the discussions with Pattinaver fishers is their unwillingness to use small scale fishing gears, such as the lower status 'Sirutholil' nets. This leads to recognition of the role of cultural and social values in the ability to adapt to change. There are good reasons why Pattinaver fishers have not followed suit and diversified to change their fishing ways, and these barriers to adaptation are the focus of the following discussion.

Padu livelihood lock in – a membership for life

The Padu system is increasingly unstable as the population of eligible Padu Pattinaver fishers increases, and yet, loyalty to Padu has been shown to restrict occupational pluralism as a means of surviving change. To understand the deeper implications of belonging to the Padu institution, we have to revisit the village membership system of Talekettu. Talekettu status, which in English translates as 'privileged' (Mathew 1991), is required in order to gain access to Padu fishing rights. The influence of Talekettu status on obtaining occupational pluralism is two fold:

firstly, by the restrictions imposed through fishing under the Padu system, and secondly, through the high social status that accompanies being a Talekettu member; each of these influences is discussed in turn.

Once Talekettu status is bestowed on a village member, he obtains full Padu fishing rights; his name is added to the village Padu list and he joins the rotational system of fishing in the most productive parts of the lake with the lucrative stake net. However, in joining the Padu system, a fisher reduces his ability to earn a living from other means; as it stands today, the Padu system assumes complete dependency on the lake's prawn fishery. "Padu rights are inalienable, cannot be leased out or sold. If a particular group is unable to fish on its allotted day, the Talekettu of its village have the right to operate in that fishing group on that particular day" (Mathew 1991:8). In other words, if you do not use your Padu turn it is lost to another group. If a Padu turn is missed regularly, the fishing unit in question can lose their rights permanently; left or underutilised Padu grounds are reabsorbed and re-shared into the active Padu system. This means that it is not possible for a fisherman to leave the area to find other work, either on a seasonal or part time basis, since a fisherman must be back in the village to fish on his Padu day, or else forfeit his right with a risk to losing it completely¹¹. Overall, Talekettu invokes great immobility in the villages and a heavy livelihood dependency upon the Padu fishing system. It is not only the laws surrounding the use of Padu rights that 'trap' fishermen within the system, issues of caste, status and social expectations of Talekettu prestige also contribute to a reduced ability to diversity livelihoods.

The institution of Talekettu at Pulicat not only provides access to Padu fishing rights, it entails far more status and social power within the community, which are embedded in larger cross-village institutions, as well as at the individual level. The 'Association of Traditional Lake Fishermen of Pulicat' (Pazhavercaud Yeri Meenavar Nattu Padagu Aikya Sangam) is a consortium involving 24 lake-side villages, which was formed after the 1978 conflicts in response to pressures from 'Outsider' fishing (Mathew 1991), an association which encompasses 'all Talekettu who honour the Padu system' (Mathew 1991).

Adaptation and the fostering of resilience to changing CPR institutions

The Padu system may lock people out of the most lucrative parts of the lake's fishery, but it also keeps those operating within it firmly locked in. All Padu fishermen uphold the Padu system, but in doing so, their income is vastly reduced during lean seasons, potentially more than those villages who have adapted to fish using small scale sirutholil fishing. We might ask ourselves why Padu fishermen remain true to the Padu system when it so severely restricts their flexibility to earn an income. Padu is not adhered to through a heroic act of conservationism on behalf of the lagoon, but because of tradition, fear, culture, caste, social status, lack of options, inability to adapt and over dependency on Padu prawn fishing. This, as I have argued

¹¹ Bavinck (2001b) describes a similar notion of village membership in Tamil marine fishing villages called 'varikkaarar', which, like 'Talekettu', is a formal and achieved village membership, strongly linked to the fishing profession and 'territorial rights' (to be distinguished from a simple residency in a village community). The system of Varikkaarars clearly exhibits the same restrictions to adapt to change as Talekettu and the Padu system, through limiting manoeuvrability within the fishing livelihood. As in Padu fishing villages at Pulicat, the marine fishing villages along the Coromandel coast lose their varikkaarar status on leaving the village

here, has been exacerbated by a state driven investment in the prawn fishery, encouraged through the global market for prawn exports.

One must not forget that when fishing times are good Padu fishermen become very wealthy – a good reason to keep within the Padu system. Another key reason as to why the Padu system upholds through the poorer fishing times is a fear that once broken, the lack of Padu would allow the lake fishery to become an open access resource for all. This would worsen the already serious village feuding in the area and the rotational system of sharing would be destroyed, upsetting the balance of fishing days and fishing areas utilised by neighbouring villages, as well as posing a likely risk of rapid over fishing.

Berkes et al (2003) argue that the adaptive capacity of all levels of society is constrained by the resilience of their institutions and the natural systems on which they depend. The greater their resilience, the greater is their ability to absorb shocks and perturbations and adapt to change. Conversely, the less resilient the system, the greater is the vulnerability of institutions and societies to cope and adapt to change (Adger 2000, Berkes et al 2003:14). The restrictions of Padu and the associated caste, cultural and status implications seem to restrict the capacity for fishing society resilience at Pulicat. Berkes et al (2003) argue that a desired form of management through a resilience approach is one which ‘manages for sustainability’:

“In operationalizing this view of resilience, managing for sustainability in socio-economic systems means not pushing the system to its limits but maintaining diversity and variability, leaving some slack and flexibility...It also mean us learning how to maintain and enhance adaptability, and understanding when and where it is possible to intervene in management” (Berkes et al 2003:15).

In many ways, the high value which Pattinaver fishermen bestow to the Padu system has resulted from economic growth of the global prawn export market. As Berkes 2002 points out, there are countless examples in which commercialization of a subsistence resource has resulted in the strengthening of local-level institutions (Berkes 2002:298). However, whilst the Padu system may have gained strength through its deep integration into peoples’ culture and values, the weakness of Padu is its loss of its flexibility; its incapacity to evolve with changes such as lagoon productivity and increasing village population.

“Although common property is no guarantee of prudent ecological practice, one of the ways in which common property institutions are supportive of resilience is through locally adapted practices based on ecological knowledge and understandings (Folke et al 1998)...local-level institutions learn and develop the capacity to respond to environmental feedbacks faster than do centralised agencies. Being on the ‘ground’, they are physically closer to the resources, there is no separation of the user from the manager, and there is more learning-by-doing in accumulating a base of practical ecological knowledge (Berkes & Folke 1998)” (as cited in Davidson-Hunt & Berkes 2003:67).

The case at Pulicat displays a complex interaction of local changes in fishing society, culture and values, which are linked with national and global changes in policy and market.

“Addressing how people respond to periods of change, how society reorganizes following change, is the most neglected and the least understood aspect in conventional resource management and science” (Gunderson and Holling 2002,

Berkes et al 2003). The capacity of the Padu system to adapt to current and future changes at Pulicat lake may well be the deciding chapter in the survival of the fishery.

This challenge is well summarised by Sivasubramanian (1987), who writes:

“They [the Pattinaver Padu fishermen] have been depending on the fishing wealth of the Pulicat lake for several decades. The Padu system of fishing has made them immobile and they do not go in search of employment elsewhere for the fear of losing the Padu...(however) It is this attachment to the fishing occupation that enabled the community to unite together, to settle their fishing dispute amicably and to evolve a system to regulate the fishing operation” (Sivasubramanian 1987:13).

Whilst Padu may act as a limiting force in the development of coping strategies of traditional Padu fishermen, it is nevertheless tightly engrained in fishing society at Pulicat lake. Fishermen at Pulicat lake kill each other over Padu rights and it would be imprudent to attempt to abolish the system. A question thus arises which asks how does management cope with a failing fishing institution which is so embedded in people’s culture? This is the closing topic of the final section of this paper.

6. Conclusion - what future for the Padu system?

Agrawal (2002) argues that although study of the commons has generated a range of variables which can determine successful resource management, there has been a lack of attention as to how the observed effects of these variables depend on the state of the context. “Because existing studies of common are relatively negligent in examining how aspects of the resource system, some aspects of user group membership, and the external social, physical, and institutional environments affect institutional durability and long-term management at the local level, we need new work that considers these questions explicitly” (Agrawal 2002:45). This paper aims to contribute to filling this gap by presenting a common property institution undergoing a state of change, and describing the drivers, impacts and reactions of both the society and the institution. At Pulicat lake, the link between management, policy and the institution of Padu is that understanding Padu gives the manager information on adaptive capacity of people, and where these capacities can be built upon. Berkes et al (2003) argue that to build management for sustainability in social-ecological systems, management must encompass flexibility through resilience and adaptation. At Pulicat lake, we have seen how the traditional Padu system is rigid by nature. Whilst Scheduled caste fishing behaviour shows clear adaptive capacity which can offer direction for management, Pattinaver caste fishermen remain stuck within a rigid and inflexible system.

However, there are costs and benefits of the Padu system, and the importance of Padu to Pattinaver societies is vital to consider in any management of Pulicat lake. In terms of sustaining the lagoon fishery as a natural resource, Padu is extremely effective, but only in the short term, as the adverse effects on fishing societies become increasingly serious. On the other hand, legitimisation of rights for an already mono-occupational and high dependent social group drives Pattinaver Padu fishermen further into risk and vulnerability.

“Relatively few small-scale fishers rely exclusively on fishing for their livelihood. Not only does having economic means other than fishing increase their security, it also effectively reduces their fishing effort....From this perspective we see

how unwise are the management policies that permit only full-time fishers access to fisheries” (McGoodwin 1990:117).

Alcorn et al (2003) argue that,

“Safeguarding resilience requires appropriate management decisions by people using their society’s cultural norms and institutions at different (small and large) scales. Conflict between these scales sometimes leads to clashing management decisions, and subsequently an erosion of resilience. Over time, changes in social and political conditions as well as population sizes, technologies, incentive, and values can also result in this erosion unless societies recognize and respond to negative ecological feedback by modifying their management institutions” (Alcorn et al 2003:299).

The Padu system at Pulicat is certainly suffering from internal pressure from population growth, and external pressure from demands on fishing space; however, the pathways to respond to these pressures and ‘modify’ the institution are restricted to a Pattinaver elite. Alcorn et al (2003) state:

“If the political system is closed to participants who want to modify institutions in response to negative ecological feedback, then, during crises, ecological resilience will diminish until the system flips. Resilience depends on a vibrant political life in which multiple interests participate” (Alcorn et al 2003:300).

The role of a Pattinaver elite and the influence of traditional Padu village leaders at Pulicat do not provide the foundations for a democratic political assessment of the functioning of the Padu system within Padu fishing society. The Padu system grows increasingly fragile, and yet should fisheries management support a traditional institution so rooted in an undemocratic and rigid caste system?

Management solutions for the Padu system suggested by the Tamil Nadu state fisheries department include licensing of Padu rights: “A participatory approach in the implementation of a suitable, modified and scientific ‘Padu’ system, in the place of the traditional one, to restore the conflicting fishing groups to sustain fish production and protect the lake’s ecosystem” (Krishnamurthy & Ramakrishna 2002).

Mathew (1991) advises: “Instead of dismantling the Padu system and replacing it with licensing, it would be preferable to strengthen the weaker links in the traditional system with constructive interventions, as in the case of Kattudel fishery in Sri Lanka where the traditional rights to the fishing ground are formally recognised by the state (Atapattu 1987)” (Mathew 1991:17). Ostrom (1990) argues that the breakdown of traditional management responsibilities at the local village level undermines the viability of common-property arrangements (Ostrom 1990:157, Agrawal and Yadama 1997, Agrawal 2002).

A useful example of the risks posed by undermining the Padu system with state intervention has been documented by Lobe and Berkes (2004), who studied the Padu system in the state of Kerala. The Keralan Padu system received formal recognition by state-wide legislation in 1974, which demanded all fishing to require a state-sanctioned license. This has resulted in the Padu system being divided between two groups – those with official licences gained from the fisheries department and another group, who operate in separate padu areas with no licence. The latter have won rights to ‘illicitly’ fish Padu areas through several decades of arguing their ‘caste-based occupational rights’ as fishers through the municipal courts of Kerala during the 1970s and 1980s (Lobe and Berkes 2004). Interestingly, the authors note

that “Interviews with members of these groups confirm that they did so in order to cash in on profits from the lucrative shrimp fishery” (Lobe and Berkes 2004:275). This legislation has effectively reverted the Padu region to an open access resource and, due to a poorly equipped fisheries department to enforce the licensing legislation, there has been a continuous conflict over access to fishing and licence use (Lobe and Berkes 2004). “This in turn has resulted in the current situation of separate licensed and non licensed padu grounds, which the authors argue may eventually lead to an unsustainable fishery” (Lobe and Berkes 2004:279).

Licensing efforts of the Tamil Nadu Fisheries Department at Pulicat lake have already been attempted and failed in the 1970s, and the current state government seems at a loss to explain why the fishermen remain within the system. Improved understanding of the Padu system, in terms of the status and caste that Padu membership can bestow and the strength of will with which people desire it, places fisheries managers in a more informed position.

Rather than overriding the institution with a state-led system, the power of the Padu system needs to remain with the people of Pulicat lake. Mathew (1991) suggests that management needs to build on the existing structures in place: Padu fishermen should keep to their traditional fishing ground and schemes should be devised which rehabilitate ‘displaced peasants’ and Tribal people to land-based occupations (Mathew 1991). Engaging policy makers with the Padu system would mean that adaptive mechanisms in the community have potential to become a part of management. This can be used to encourage alternative livelihoods, in an informed way of where this is likely to be successful, and where it may not be so useful. Management mechanisms, such as seasonal assistance through either alternative livelihoods, or financial assistance in lean fishing seasons with a focus on planning and saving money during more productive seasons, would certainly be useful at Pulicat. Building on Mathew’s (1991) ideas, learning from the ability of non-traditional fishers to diversify into non-fishing livelihoods may point managers to direct alternative livelihood options to those better able to cope with change, rather than the Pattinaver fishing caste – who largely want only to be left alone to fish a productive lake.

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