

Contextualising fisheries policy in the Lower Mekong Basin

Simon R. Bush

Development policies for fishery resources within the Mekong River Basin are increasingly divided between aquaculture and capture fisheries. The modern production orientation of aquaculture has been adopted by government and NGOs and justified by the rhetoric of poverty alleviation and rural development. In contrast, capture fisheries has been subjugated as an activity that reaffirms the dependency of the rural poor on natural resources. This paper critically analyses the division between aquaculture and capture fisheries in Cambodia, Thailand and Lao PDR by tracing the emergence and influence of ‘development narratives’ used to justify contemporary policy and practice.

Introduction

The Lower Mekong River Basin has emerged as one of the most contested natural resource frontiers in Southeast Asia as resource-dependent communities, sovereign riparian governments and the international community all assert their interest.¹ The mix of actors is further complicated by the regionalisation of the Basin’s resources through regional market integration and the ratification of the 1995 Mekong Agreement, which set the agenda for the trans-boundary management of resources through the Mekong River Commission (MRC). In this complex and polarised environment, policy must negotiate a complex mix of national development imperatives, the agendas of intergovernmental arrangements, and support from international donors and non-government organisations. Instead of being based on transparent governance processes, natural resource policy often emerges from long-established and ongoing interactions between various state and non-state organisations, which formulate and institute specific policy discourses based on historical

Simon Bush is an Assistant Professor in the Environment Policy Group at Wageningen University, the Netherlands. Correspondence in connection with this paper should be addressed to: simon.bush@wur.nl. I am grateful to Phil Hirsch, Caroline Garaway, Gert Spaargaren and Derek Johnson for the helpful discussion and critical comments on a string of earlier drafts. Two anonymous reviewers also provided useful insights and criticisms from which the paper has benefited. I would also like to thank the Australian Mekong Resource Centre at the University of Sydney for publishing an earlier version in their working paper series. Finally, I am grateful to Sonsai Kosy, Duangchith Litdamlong, Bounthien Somthaboun, Simon Funge-Smith, Pedro Bueno, Ian Baird, Nick Innes-Taylor and Roger Mollot for their support and assistance in carrying out the research throughout the region.

¹ Philip Hirsch, ‘Water governance reform and catchment management in the Mekong region’, *Journal of Environment Development*, 15 (2006): 184–201.

narratives of what should be done, why, how and by whom, without necessarily reflecting the interests of the people and resources in question.²

While much scholarship has focused on the evolution of water management within river basin development, less attention has been given to the management of living aquatic resources: including both capture fisheries, the hunting and collection of aquatic organisms, and aquaculture, the artificial propagation and / or rearing of aquatic organisms.³ By providing first a brief overview of Thailand and Cambodia, and then a more in-depth case study of the Lao People's Democratic Republic (Lao PDR), this paper questions how certain agendas drive the transfer of knowledge across spatial and temporal scales, asking what influence historical narratives of living aquatic resource use and management have over contemporary fisheries policy and practice. Following on from the growing critical interest on the role of fish farming in national development (outlined below), the paper examines how and why aquaculture has emerged as a dominant discourse within living aquatic resources development and what implications this has for the effective and equitable management of natural resources and the people dependent on them.

Agrarian studies in Southeast Asia have focused on the political economy of state, NGO and civil society policy and action, emphasising impacts on local communities and environments (including natural resources). Central questions have focused on who controls both agricultural and natural resource policy agendas, as well as identifying who benefits and who bears the costs from its implementation. While attention has been largely given to contemporary conflict, a number of new critiques have emerged that emphasise the historical nature of environmental politics, with particular attention to the governance of knowledge and policy.⁴ The more coherent approach to critical environmental politics emphasises the relationship between governance and history to question how interactions between multiple actors, operating at multiple spatial and temporal scales, construct the underlying assumptions and representations of environment and development discourses that drive both policy and action purporting sustainable and equitable solutions. As Bryant *et al.* emphasise, such enquiry focuses on how scientists, bureaucrats, elites and resource users 'understand, interpret and act on ideas and concepts ... [and] how these constructions of knowledge mesh with individual and group interests, and how such perceptions change over time'.⁵ Research that addresses historically embedded policy, by placing greater attention on the agendas driving the transfer of knowledge across spatial and

2 Karl Zimmerer and Thomas Basset, *Political ecology: An Integrative approach to geography and environment-development studies* (New York: The Guilford Press, 2003); B. Ratner, 'The Politics of regional governance in the Mekong River Basin', *Global Change*, 15, 1 (2003): 59–76.

3 Refer to Donald Worster, *Rivers of empire: Water, aridity, and the growth of the American west* (New York: Pantheon, 1985); Erik Swyngedouw, *Social power and the urbanisation of water: Flows of power* (Oxford: Oxford University Press, 2004). A good analysis of the conflict over large dams and development is given by Patrick McCully, *Silenced rivers: The Ecology and politics of large dams* (London: Zed Books, 1996).

4 Zimmerer and Basset, *Political ecology*; Paul Robbins, *Political ecology: A Critical introduction* (Oxford: Blackwell, 2004).

5 Raymond L. Bryant, Jonathan Rigg and Philip Stott, 'Introduction: Forest transformations and political ecology in Southeast Asia', *Global Ecology and Biogeography Letters* 3, no. 4 / 6 (1993), pp. 101–11.

temporal scales, enables closer scrutiny of whether and how contemporary problems can be adequately resolved.

An historical analysis of policy formulation, tracing the emergence of natural resource governance, enables a more substantive investigation of contemporary state and non-state control and conflict over the environment, by analysing the dynamics between changing political regimes, their associated rhetoric, and the opposition of customary and formal knowledge systems in managing and controlling agrarian populations.⁶ The challenge is to understand how historical narratives of environment and development emerge, in whose interest they are maintained, and to what extent they influence local resources and human ecologies.⁷

Historically based narratives are stories that justify contemporary policies formulated under a large degree of uncertainty, complexity or polarisation, emerging from the contestation of different knowledges, interests and values.⁸ Analysing these narratives involves questioning which assumptions and representations of development and environment inform contemporary policy and action. In doing so, we can better understand the dynamics between state and non-state regimes, their associated rhetoric and their treatment of both customary and formal knowledge systems in managing natural resources.⁹ Central to this critique is the role of value-based agency, which selectively draws upon specific global knowledge that informs a pre-determined political stance. As the agency of individuals and groups is greater in countries with weaker governance, the intersection of value-based perceptions of environmental degradation and expert knowledge become key factors to understanding how policies are formed. Combining analysis of both policy and historical narratives therefore draws critical attention to hegemonic discourses over society / environment interaction, emphasising how knowledge surrounding environmental degradation is 'co-produced' by a combination of scientific and socially mediated interests. In short, by asking who manages whose environment and in whose interest?¹⁰

By tracing the history of inland fisheries development in the Lower Mekong Basin countries of Cambodia, Thailand and Lao PDR, this paper investigates the influence of different actors in promoting capture fisheries and aquaculture in policy and practice. The next section outlines the key trends of fisheries development in the Basin and the position of aquaculture and inland fisheries in current debates. The third section then explores how and why different accounts of capture fisheries and aquaculture have gained prominence over time, based on the (often limited) knowledge, beliefs and

6 Raymond L. Bryant, *The Political ecology of forestry in Burma, 1824–1994* (University of Hawai'i Press; Honolulu and Delhi: Oxford University Press, 1997).

7 Michael Williams, 'The Relations of environmental history and historical geography', *Journal of Historical Geography*, 20, 1(1994): pp. 3–21; James Fairhead and Melissa Leach, 'False forest history, complicit social analysis: Rethinking some west African environmental narratives', *World Development*, 23, 6 (1995): 1023–35; James Fairhead and Melissa Leach, *Reframing deforestation: Global analyses and local realities with studies in west Africa* (New York: Routledge, 1998).

8 Emery Roe, *Narrative policy analysis: Theory and practice* (Durham and London: Duke University Press, 1994).

9 Bryant, *The Political ecology of forestry in Burma, 1824–1994*.

10 Tim Forsyth, *Critical political ecology* (London: Routledge, 2003); Philip Stott and Sian Sullivan, 'Introduction', in *Political ecology: Science, myth and power*, ed. Philip Stott and Sian Sullivan (London: Arnold, 2000).

interests of different actors on a range of spatial and temporal scales in Thailand and Cambodia. The fourth section then investigates the case of the Lao PDR, the only land-locked country in the Mekong Basin, tracing the historical and contemporary role of the state, international NGOs and rural communities in the development of both capture fisheries and aquaculture. Finally, comparisons are made between Thailand, Cambodia and Laos, and conclusions drawn as to the specific influence of historical and contemporary narratives and discourses on the formulation of policy.

Inland fisheries management and development

Inland fisheries are estimated to make up only 10 per cent of total world capture fishery production, yet are generally recognised as providing an important source of income and protein for poor rural communities in the global South.¹¹ In the Mekong River Basin, covering some 611,000 square kilometres across China, Burma, Lao PDR, Thailand, Cambodia and Vietnam, the inland fishery is an imperative resource for both nutrition and income, with production estimated at up to 3.2 million tonnes per year or 56.6 kg per person per year.¹² 'Fisheries' in the Basin are not a homogenous activity but rather comprise strategies ranging from intensive and artisanal forms of fish farming and capture fisheries practised by commercial, subsistence and semi-subsistence communities. Small-scale rural aquaculture – the farming of aquatic organisms for household consumption and / or income – is practised in all of the riparian countries, accounting for some 8 per cent of total fisheries production.¹³ Despite efforts to domesticate native Mekong species, most of the aquaculture production involves exotic species of fish, which are largely traded and consumed locally. Inland capture fisheries in the Basin are particularly diverse, including a range of specialised gear used in a variety of riverine and flood plain habitats in both lowland and upland areas, targeting a large proportion of the 1,100 identified fish species, and providing a primary source of protein and income for rural communities in all six of the riparian countries.¹⁴

As inland fishery resources face unprecedented pressure from over exploitation and environmental change, there has been a cumulative decline in the volume of the total catch and the average size of the fish.¹⁵ Although the importance of the resource is

11 FAO, 'The State of world fisheries and aquaculture', ed. R. Welcomme and T. Petr (Rome: Food and Agriculture Organisation of the United Nations, 2004). Proceedings of the Second International Symposium on the management of large rivers for fisheries: vol. 1 (Bangkok: FAO Regional Office for Asia and the Pacific, RAP Publication 2004 / 16, 2003).

12 Kent G. Hortle and Simon R. Bush, 'Consumption in the Lower Mekong Basin as a measure of fish yield', in *New approaches for the improvement of inland capture fishery statistics in the Mekong Basin*, ed. T. Clayton, pp. 76–82; *ad hoc* expert consultation held in Udon Thani, Thailand, 2–5 Sept. 2002 (Food and Agriculture Organisation of the United Nations RAP Publication 2003 / 01, 2003).

13 N. van Zalinge, P. Degen, C. Pongsri, S. Nuov, J. G. Jensen, N. van Hao and X. Choulamany, 'The Mekong River System', Contribution to the Second International Symposium on the management of large rivers for fisheries, Phnom Penh, 11–14 Feb. 2003.

14 Estimates of fish species range from 900 to 1,800. A conservative estimate is 1,100; *ibid*. There are currently no accurate estimates of the number of other aquatic animal species that include molluscs, amphibians, arthropods and crustaceans.

15 J. D. Allan, R. Abell, Z. Hogan, C. Revenga, B. Taylor, R. L. Welcomme and K. O. Winemiller, 'Overfishing in inland waters', *BioScience*, 55, 12 (2006): 1041–51.

increasingly recognised in government policy, it is continually misrepresented and marginalised by competing water development agendas.¹⁶ At the global level, only passing mention was given to inland fisheries in two of the most recent global environment and development fora: the World Summit on Sustainable Development in Johannesburg in 2002 and the World Water Forum in Kyoto 2003.¹⁷ Instead, debate remains focused on the contribution fisheries make to rural livelihoods, and whether being a ‘fisher’ dependent on these resources, is a condition of poverty or an opportunity for more sustainable and equitable development.¹⁸

Whatever problems capture fisheries have posed for policy-makers, it appears aquaculture has offered an answer by bridging the shortage of fish supply to poorer people, thereby providing an alternative for over-exploited stocks and a measurable solution to an otherwise complicated resource management dilemma.¹⁹ On a wider scale, aquaculture builds directly on the ‘global fisheries crisis’, which suggests that there is an imminent crisis of world supply as fish stocks decline, with protagonists arguing that aquaculture is the only realistic alternative for providing sufficient protein and income for the world’s burgeoning population.²⁰ While aquaculture in inland areas shows potential for meeting some of the demands of food and income security, its specific contribution to poor rural communities is increasingly questioned. Just as green revolution technologies have come under fire for their social and environmental impact, so too has the so-called ‘blue revolution’ in aquaculture, as a technocratic solution for eradicating poverty that does not reflect the interests or needs of those who require the protein most. As Philip Kelly argues from his work on coastal areas in the Philippines, ‘the discourses of development that underpin aquaculture as a development strategy are flawed, since they neglect the impacts of fish farming on the local resource base and those social groups dependent upon it’. He adds that without reflecting on the social and environmental turmoil inherent in the developmental history of aquaculture, it becomes a ‘common-sensical and irrefutable positive solution to underdevelopment’.²¹

16 D. Coates, *Inland capture fishery statistics of Southeast Asia: Current status and information needs* (Bangkok: Asia-Pacific Fishery Commission, 2002), p. 113.

17 Report of the World Summit on Sustainable Development, Johannesburg, South Africa, 26 Aug.–4 Sept. 2002 (New York: United Nations, 2002); WWF, ‘The 3rd World Water Forum: Final Report’, 16–23 Mar. 2003 (Kyoto, Shiga and Osaka, 2003).

18 For a good analysis of this debate, refer to Christophe Béné, ‘When fishery rhymes with poverty: A First step beyond the old paradigm on poverty in small-scale fisheries’, *World Development*, 31 (2003): 949–75.

19 P. Edwards, ‘Towards increased impact of rural aquaculture’, APFIC *ad hoc* working group of experts on rural aquaculture, FAO Regional Office for Asia and the Pacific (RAP) Bangkok, Thailand, 1999; D. Lewis, ‘Rethinking aquaculture for resource-poor farmers: Perspectives from Bangladesh’, *Food Policy*, 22 (1997): 533–46; K. Ruddle, ‘The Impacts of aquaculture development on socioeconomic environments in developing countries: Toward a paradigm for assessment’, *Environment and aquaculture in developing countries*, ICLARM Conference Proceedings. 31, ed. R. S. V. Pullin, H. Rosenthal and J. L. Maclean, 1993.

20 This is reiterated in nearly all policy documents related to global food consumption and fisheries forecasts, e.g. Christopher L. Delgado *et al.*, *Fish to 2020: Supply and demand in changing global markets* (Washington: IFPRI, 2003); *The State of world fisheries and aquaculture* (Rome: Food and Agriculture Organisation of the United Nations, 2004).

21 Philip F. Kelly, ‘Blue revolution or red herring? Fish farming and development discourse in the Philippines’, *Asia Pacific Viewpoint*, 37, 1 (1996): 39–57. For other critiques, refer to A. K. Deb, ‘Fake blue revolution: Environmental and socio-economic impacts of shrimp culture in the coastal areas of

Understanding how living aquatic resources have been polarised into aquaculture and capture fisheries requires an investigation of the modern history of policy and management, taking into consideration both state and non-state accounts of the importance and role of these resources for meeting the livelihood needs of the Basin's largely rural population. A better explanation of the sociopolitical dynamics of aquaculture provides much needed context to understanding how contemporary policy and management is formulated, and helps to identify what implications aquaculture holds for Southeast Asia and beyond.

Historical narratives of fisheries

The first European records of fisheries within the Mekong Basin are from a series of exploratory missions to the region during the nineteenth century, including representatives of the French Foreign Ministry responsible for the Mekong Expedition (1866–68) – Louie De Carne, Francis Garnier and Paul-Marie Néis – and Englishmen such as James McCarthy, the self-titled director-general of the Siamese Government Surveys from 1881 to 1893. Their published accounts include numerous references to the biology and ecology of the inland fisheries of Mekong River and its tributaries, raising several questions which remain central to both state and internationally funded scientific efforts today.²² Although self-evident to most rural communities in the Basin, these early accounts highlight both the importance of the resource for rural livelihoods and the lack of knowledge about the capture fisheries over the last 150 years. From a common, albeit colonial recognition that the fishery was an imperative and highly valuable resource for the people of the Mekong Basin, there has been considerable divergence in national policy and management strategies. Notwithstanding the lack of local accounts of Mekong fisheries, policy and management have emerged as negotiated processes through both national regimes and international organisations. The most detailed accounts of inland fisheries development have been in Thailand and Cambodia, with colonial, post-colonial and international administrations providing written accounts from which modern fisheries development and management interventions can be understood today.

Thailand

It was not until 50 years after the first European expedition along the Mekong that there was a distinct shift to project-driven fisheries management and development in the riparian countries. In 1925, Hugh McCormick Smith, the first advisor to the Royal Department of Fisheries (DOF) in Thailand, provided recommendations for the future development of fisheries in the northeast of the country, noting the importance of

Bangladesh', *Ocean and Coastal Management*, 41 (1998): 63–88; J. H. Primavera, 'Socio-economic impacts of shrimp culture', *Aquaculture Research*, 28 (1997): 815–27; Neil W. Adger, 'Exploring income inequality in rural, coastal Viet Nam', *Journal of Development Studies*, 35 (1999): 96–119.

²² For further details, refer to S. R. Bush, "'Give a man a fish...': Contextualising living aquatic resources development in the Lower Mekong Basin', Sydney, Australian Mekong Resource Centre, Working Paper, 2003, no. 8.

aquatic animals and their role in the future welfare of Siam.²³ Providing a somewhat balanced set of recommendations, his report consisted of plans for both the improvement of fish farming and stocking in inland areas, as well as the establishment of freshwater and marine conservation strategies.

Smith perceived the importance of maintaining access to aquatic resources by fishermen, especially in lakes and swamps, which he referred to as the 'fountainhead' of inland fishery resources. Contrary to earlier accounts by McCarthy, De Carne and Garnier in Laos and Cambodia, Smith argued that in Thailand:

no important fishing ground and in no important organised fishery has there ever been any adequate protection afforded the fish, and in most cases there has been no protection whatever ... instead the practice has always been to secure the maximum destruction, without any regard for the fundamental requirements of nature and the elementary principles of conservation.²⁴

His hope was to promote state intervention in fishery conservation and management to mitigate the growing control of 'government-created monopolists' — most likely Chinese entrepreneurs granted exclusive fishing concessions over water bodies, who by the 1930s owned as much as 90 per cent of the fishing.²⁵ In a direct plea to policy, Smith recommended curtailing the interests of monopolists in favour of 'the great agricultural community'.²⁶ Translating this policy into action, Smith advocated measures that would reduce pressure on the fisheries, such as: stocking natural waterways; the withdrawal of fishing rights in spawning habitats; the installation of fish ladders; and the prohibition of damaging fishing gear.

Based on the North American activity of 'seeding the seas' with hatchery reared fingerlings, Smith also advocated the role of aquaculture as a means of 'replenishing, maintaining, or increasing the supply of fish and other useful animals'.²⁷ He argued, like many leading American fishery managers at the time, that artificial propagation provided a supplementary activity to the enforcement of protective measures over capture fisheries. Smith held a strong belief that aquaculture was the future of state intervention in fisheries, arguing '[the] more extensive and effective artificial propagation becomes, the less necessity will there be for the curtailment of commercial fishing; and therein lies a strong argument for the practice'.²⁸ Although balanced with a

23 Hugh McCormick Smith, 'A Review of the resources and fisheries of Siam, with plans and recommendations for their administration, conservation and development' (Bangkok: Ministry of Lands and Agriculture, Kingdom of Siam, 1925).

24 The fallacy of open access in inland fisheries has been clearly refuted in more recent works on community management systems dating back hundreds of years. Nevertheless, a background to the fishing lot system in Cambodia is given by Niklas van Zalinge, Nao Thuok and Touch-Seang Tana, 'Where there is water there is fish? Fisheries issues in the Lower Mekong Basin from a Cambodian perspective' (Phnom Penh: Mekong River Commission, 1998); Smith, *Resources and fisheries of Siam*, p. 48.

25 L.Yu, 'Twin loyalties in Siam', *Pacific Affairs*, 9, 2 (1935):191–200.

26 H. M. Smith, 'A Review of the aquatic resources and fisheries of Siam, with plans and recommendations for their administration, conservation and development' (Bangkok: Ministry of Lands and Agriculture, 1925; reprinted by SEAFDEC Secretariat Special Publication, no. 4, 1983), p. 48.

27 *Ibid.*, p. 55.

28 *Ibid.*, p. 57.

programme of capture fisheries management, the recommendations he made for aquaculture were more rigorously adopted by the DOF and provided the basis for fisheries development in Thailand, much of which remains in practice today.

Like many other agricultural technologies in Thailand, the beginnings of aquaculture are also attributed to His Majesty King Bhumiphol's work in the Chitralada compound of the Dusit palace in Bangkok. One of the kings' earliest experiments in the early 1950s was raising Tilapia (*Oreochromis mossambica*) in his swimming pool and then disseminating to the public through the DOF. In 1965, Prince Akihito of Japan presented the king with another Tilapia species (*Oreochromis niloticus*), which is now widely produced in commercial aquaculture. Royal involvement in fish breeding has continued through public stocking of waterways which, like all Royal intervention in Thailand, has added considerable weight to aquaculture as an irrefutable activity in rural development.

By the 1960s, a number of state development interventions had been instigated most notably through the work of the FAO. The DOF continued the expansion of both marine and inland freshwater fisheries with a particular focus on aquaculture. Inland fisheries development was continued through research on artificial propagation and stocking of reservoirs throughout the country, including the Mekong watershed in the northeast. In the FAO country report for 1965, Arthur W. Witt Jr stated that there was no need for further investment in inland fisheries stations and that attention should rather be given to mitigating the impacts of water management and development projects on fish migration. In particular, he noted the need to better facilitate the movement of freshwater prawns (*Macrobrachium rosenbergii*) over fixed barriers, especially at the Chaiart Dam, where it was recommended that a 'prawn ladder' be constructed to repopulate the waters above the dam. He also gave greater attention to capture fishery regulation (such as banning electro-fishing practices), stocking regimes in reservoirs and the identification of natural water bodies for stocking.²⁹

The influence of the external advisors in Thailand was more pronounced during the late 1960s and into the 1970s with the influx of advisors from USAID. In collaboration with USAID, the DOF focused on the extension of aquaculture as part of a wider national security programme. Of particular note during this time was the aquaculture school at Auburn University in Alabama under Professor H. S. Swingle, who led a series of programmes in Thailand through the 1950s, 1960s and 1970s. In 1970, the University opened The International Centre for Aquaculture organised within the Department of Fisheries and Allied Aquacultures and, with added funding from USAID, further developed teaching and research based on their tropical experiences. Around the same time, the Inland Fisheries Program, also supported by USAID, conducted the first survey programme of inland fisheries in the country led by Swingle. This was shortly followed by the establishment of the aquaculture-focused

29 FAO / UN, *Report to the government of Thailand on the development of programs of inland fishery investigation, management and training*, based on the work of A. W. Witt, Jr, Food and Agricultural Organisation of the United Nations (FAO), Technical Assistant (TA), Inland Fisheries Biologist. Rep. FAO / United Nations Development Programme (UNDP) (Ta), (Ta2199), (Bangkok, 1966), <http://www.fao.org/docrep/005/47266E/47266E00.htm> (last accessed on 1 Oct. 2007).

Village Fisheries Demonstration Programme (VFP) in Udon Thani, addressing rural development in sensitive border regions adjacent to Laos and Cambodia.³⁰

A major blow for inland capture fisheries in the northeast was the outbreak of ulcerative disease syndrome (UDS) in the late 1970s, which decimated native stocks, including Snakehead (*Channa spp.*) and Walking Catfish (*Clarius macrocephalus*). This had far-reaching effects on a rural population dependent on fish for food and in response to the need for nutrition, is generally believed to have increased government and NGO interest in aquaculture. Interest in aquaculture gained momentum through nascent forms of integrated fish husbandry developed by the Asian Institute of Technology (AIT) in Bangkok and the International Centre for Living Aquatic Resources Management (later the WorldFish Centre). Drawing on the technical assistance of these institutes, the Thai DOF had 20 freshwater fish hatcheries operating by the mid-1980s, having shifted its attention to capacity building of farmers through rural extension with the assistance of the National Inland Fisheries Institute (NIFI) and the Aqua Outreach Programme at AIT.³¹ UK government funds were used to fund aquaculture directly through AIT with the direct cooperation of the Institute of Aquaculture at Stirling University in Scotland. During the 1990s, the aquaculture programme was contracted to the Institute following their successes with shrimp in Southeast Asia. Their interest subsequently shifted to the development of various strains of Tilapia, including the development of the fast growing mono-sex variety which is now prevalent in small-scale rural aquaculture systems across Southeast Asia.

In the 1990s and 2000s, the Thai DOF has continued to significantly raise the production levels of fish in the northeast of the country. Much of the policy remains unchanged, except for the added focus on rearing and releasing native species into the mainstream Mekong and reservoirs. As capture fisheries continue to face pressure from water development projects in all but the Songkhram River basin, the focus remains on aquaculture as opposed to capture fisheries management. Reflecting on the recommendations of both Smith and Witt, it appears that policy and action geared towards production through aquaculture has persisted despite the continued recommendations for responsible capture fisheries management. Fingerling production has remained a central measure of success for the DOF and, in line with the strong irrigation and hydro-power lobby in the government, provided a complimentary policy

30 J. R. Coull, 'Will a blue revolution follow the green revolution?', *Area* 25, 4 (1993): 350–57; J. T. Bowen, 'A History of fish culture as related to the development of fishery programs', in *A Century of fisheries in North America*, ed. Norman G. Benson (Washington, DC: American Fisheries Society, 1970), pp. 71–93; N. C. Parker, 'History, status, and future of aquaculture in the United States', *CRC Critical Reviews in Aquatic Sciences* 1, 1 (1989): 97–109; Early training concentrated on raising baitfish in small water bodies during the 1930s, catfish in the 1940s and warm water species such as channel catfish in the 1960s.

31 Montree Muangboon, 'Collecting Clarius Fry from natural waters' (Bangkok: National Inland Fisheries Institute, 1981); for AIT and ICLARM's activities, refer to P. Edwards, R. S. V. Pullin and J. A. Gartner, 'Research and education for the development of integrated crop-livestock-fish farming systems in the tropics', *ICLARM Stud. Rev.*, 16 (1988): 53; FAO. 'Facilities of the Regional Aquaculture Lead Centre in Thailand' (Bangkok: Network of Aquaculture Centres in Asia, 1982); <http://www.fao.org/docrep/field/003/AC256E/AC256E00.htm> (last accessed on 13 Dec. 2007).

agenda for the promotion of reservoir fisheries, a policy that appears to have subverted any call for the management or rehabilitation of capture fisheries.

Cambodia

It is widely argued that Cambodia has the richest history of inland capture fisheries in Southeast Asia as illustrated in the bas reliefs at the temples of Angkor, built on the edge of Tonle Sap in the eleventh century.³² The dependence of Khmer and migrant Vietnamese fishers has been long influenced by state intervention which has included, in recent years, a shift to aquaculture as a means of increasing the volume and value of fishery production.

Formalisation of state intervention in the country's fisheries began during the reign of King Norodom (1859–97), when concessions were set up for collecting tax on the fishery from mainly Chinese traders and investors who had purchased exclusive rights to access the inland fishing grounds. The concessionaires then divided their fishing grounds into a series of sub-contractors who in turn leased access, and also often boats and gear, to farmers. There was little management of the fishing activities in these areas, with farmers forced to extract enough fish to pay off their leases, selling to Chinese traders who operated in both domestic and Thai markets.³³

Under the French Protectorate, local authorities were able to maintain considerable control over the inland fisheries of Cambodia by formalising a series of licence- and access-based concessions to the Tonle Sap floodplain and riverine fisheries. In 1908, a French fishing law set out a series of large, medium and small concessions through which the royal treasury received taxes from fishermen to access grounds. Building on the existing system of privilege and patronage to access fishery resources, the French Protectorate increased taxes by 17 per cent in the first year, and by 1910 taxes from the fishery made up one-ninth of the administration's annual budget.³⁴ Large-scale fishery comprised a lot system covering the most productive parts of the floodplain for which exclusive concessions were granted for two to four years. Medium- and small-scale fisheries were essentially open access licences, allowing fishing gear of a certain size to be used in all areas except fishing lots.

The concession system lasted until the Khmer Rouge regime took power in 1975, after which fishing operations all but ceased. From 1979 to 1989, fishing activities were resumed through a series of socialist modelled fishing cooperatives, labelled 'solidarity groups' (*Krom Samaki*), under the Vietnamese People's Republic. To re-establish control and taxation on the fishery resources, the government reintroduced the fishing lot system in 1992, licensing small and medium fisheries and auctioning the large-scale concessions to entrepreneurs at values ranging from US\$2,000 to US\$20,000 —

32 L. Deap, P. Degen and N. van Zalinge, 'Fishing gear of the Cambodian Mekong' (Phnom Penh: Inland Fisheries Research and Development Institute of Cambodia, 2003).

33 Refer to P. Degen and T. Nao, 'Historical, cultural and legal perspectives on the Fishing Lot System in Cambodia', in M. Ahmed and P. Hirsch, *Common property in the Mekong: Issues of sustainability and subsistence*, *ICLARM Stud. Rev.* 26 (2000): 49–60. The trade of smoked fish from Tonle Sap to Thailand is noted by Smith, 'A Review of the resources and fisheries of Siam', p. 49.

34 This figure is compared to the one-eighth contribution of rice to the administration's annual budget. For more details, refer to Degen and Nao, 'Historical, cultural and legal perspectives on the Fishing Lot System in Cambodia', pp. 49–60.

depending on the area's size and location. By 1998, the revenue from lot auctions in Tonle Sap totalled around US\$1.9 million, representing 65 per cent of the total fees collected from fisheries.³⁵

The system of lots was policed strictly by concession holders with a great deal of pressure to extract a high enough income from their allocated areas in the restricted time available. The competition over claims on resources became more severe as commercial interests grew with the opening of the economy to regional markets and the increasing demand for fertile agricultural land. Around 80–90 per cent of the shoreline of Tonle Sap was controlled through concessions, and with some 14 per cent of the country's population directly dependent on fisheries, claims over the resource intensified.³⁶ The rate of conflict, between fishermen, lot owners, employees, and also police and military, all staking their claim to the resources reached critically high levels including confiscation of gear, displacement and shooting deaths.³⁷ By the end of 1999, the situation had become so severe that the fisheries in the country were widely perceived to be in a state of anarchy. In 2000, Prime Minister Hun Sen met with officials in Siem Reap province to discuss the problems that fishermen encountered in accessing fishery resources and, impressed with the difficulties these fishermen faced, announced the release of an initial 84,000 ha of fishing lot areas and then a subsequent 540,000 ha (representing 56 per cent of the former lot area) to community control.³⁸

Although the formal changes to fisheries access have led to greater access to rural communities, the existing informal patronage or power-based arrangements, which have survived over the various regime and legislative changes, have been maintained. In many cases, open-access fisheries were controlled through informal concessions, with political leaders and military commanders selling exclusive rights to fishing grounds in return for protection. The post-harvest sector has also seen a high degree of social and political control with informal concessions over road and transport infrastructure and heads of governments controlling the processing facilities.³⁹ As concluded by Resurreccion, it remains doubtful as to whether the community fishery reforms will be able to dismantle the often complex networks of control.⁴⁰ Although the DOF maintains formal authority over the fishery, including lot owners and community fisheries groups, the long and extensive history of power-based fishing access has meant that the governance of the resource is maintained as much through informal rights, rules and patronage as it is by the rule of law. In practice, concession holders

35 Figures from Ministry of Environment 1998 cited by T. T. De Lopez, 'Natural resource exploitation in Cambodia: An Examination of use, appropriation, and exclusion', *Journal of Environment Development*, 11, 4 (2002): 355–79.

36 Ibid.; M. Ahmed, H. Navy, L. Vuthy and M. Tiongco, *Socioeconomic assessment of freshwater capture fisheries of Cambodia: Report on a household survey* (Phnom Penh: Mekong River Commission, 1998).

37 B. P. Resurreccion, 'Rules, roles and rights: Gender, participation and community fisheries management in Cambodia's Tonle Sap Region', *International Journal of Water Resources Development*, 22, 3 (2006): 433.

38 B. Ratner, 'Community management by decree? Lessons from Cambodia's fisheries reform', *Society and Natural Resources* 19, 1 (2006): 79–86.

39 C. Yim and B. McKenney, 'Fish exports from the Great Lake to Thailand: An Analysis of trade constraints, governance, and the climate for growth', Phnom Penh, CDRI Working Paper 27, 2003.

40 Resurreccion, 'Rules, roles and rights', 433–47.

maintaining patronage and privilege over fishing areas and fishing communities operate with little regard to either social or environmental laws, rules and regulations.

Subsequent changes included the establishment of a community fisheries office within the DOF and the involvement of a large number of international development projects, including FAO community fisheries projects that demarcated the fishery and provided fishermen with adequate skills for management. Khmer NGOs have also emerged, assisting fishing communities to organise management of the fishery and also to oppose developments that impact their access and livelihoods. However, due to the strongly embedded nature of resource access based on patronage and ‘informal’ control, their influence has not been significant.

With further indications that the reforms to fishery governance have done little to abate the decline of fisheries, the government has turned to aquaculture as means of meeting the market demand for high-value species and the nutritional needs of the expanding rural population.⁴¹ Since the further opening up of Cambodia in the 1990s, interest in aquaculture has grown steadily in both the commercial sector, producing *Channa striata* and *Pangasius hypophthalmus* in cages on Tonle Sap (accounting for 23 and 71 per cent of total aquaculture production respectively), and the government sector, promoting pond culture of herbivorous species as a means of increasing income and nutrition to rural communities.⁴² Cage culture is thought to have a lengthy history on Tonle Sap with families in floating communities catching fingerlings and raising them to maturity in bamboo cages. Today, cage culture exists both as wild fingerling ‘grow-out’, conducted by small-scale households, and as artificially spawned, intensive commercial-scale production controlled by wealthy entrepreneurs.⁴³ In recent years, production has faced a series of controversies with *P. hypophthalmus* and *P. bocourti* fingerlings sourced from wild sources and sold to producers in Vietnam. While much of this trade has ceased, new threats have been identified from the use of ‘trash fish’ — small ‘low-value’ species or juveniles. In an attempt to stop over-fishing of these smaller fish, which make up a large proportion of the Khmer diet, the government banned the smaller-scale household cage-culture of *C. striata* in 2004. However, it remains unclear how successful these reforms have been.

Small-scale rural aquaculture is thought to have begun in the 1960s through development assistance provided by USAID but was never as successful as their programmes in northeast Thailand because of the relative abundance of the capture fishery.⁴⁴ Facing decline in capture fisheries and in order to meet the development objectives of the Agriculture Development Plan (1999–2010), the government has emphasised the need for promoting small-scale aquaculture in partnership with NGOs in remote provinces such as Ratanakiri, Modolkiri and Preah Veah. The late 1990s and early 2000s also saw the AIT Aqua-outreach programme operating in the southeastern

41 This reasoning is reiterated in a series of fisheries policy documents: N. So and T. Nao, *Cambodia Aquaculture Sector Review (1984–1999)* and *Outline of aquaculture development plan (2000–2020)*, (Phnom Penh: Department of Fisheries, Ministry of Agriculture, Forestry and Fisheries, 1999).

42 Ibid.

43 M. J. Phillips, *Fresh water aquaculture in the Lower Mekong Basin* (Phnom Penh, MRC Technical Paper no. 7, 2002); Mekong River Commission, p. 62.

44 N. So and T. Nao, *Cambodia aquaculture sector review (1984–1999)* and *Outline of aquaculture development plan (2000–2020)*.

provinces of Takeo, Svay Rieng and Kampong Speu with a view to building on their success in northeast Thailand. In addition, the MRC Aquaculture of Indigenous Mekong Species programme also operated in the plain of reeds areas in Takeo and Svay Rieng, focusing on spawning and nursing technologies.

Activities carried out under aquaculture in Cambodia have been redefined and reconsidered through a broader lens of rice-field fisheries, trap-pond systems and cage culture.⁴⁵ All three systems blur the lines between capture fisheries and culture fisheries and all are cited by both advocates of aquaculture and capture fisheries as evidence for either more complex use of capture fishery resources, or an advance away from dependency on natural resources towards enclosed production systems. Despite this, there remains considerable interest in the development of aquaculture throughout the country, most notably in the postharvest sector meeting market standards for exporting *P. hypothalamus* and *C. striata* to both Vietnam and Thailand.

The only aquaculture extension project that remains in the country is the Japan International Cooperation Agency (JICA)-funded 'Supporting Freshwater Aquaculture to Support Impoverished Farmers' programme which began in early 2005. The project is based on the assumption that fisheries are 'limited to the Mekong River and the Tonle Sap Lake area' and that there are 'frequent supply shortages, leading to malnutrition, particularly in farming villages'.⁴⁶ Many areas of Cambodia do suffer from drought and low fish supply but such technically oriented projects, drawing from more regional, technology-based rhetoric of aquaculture production, somewhat simplify the complex struggles over fisheries control and management that have characterised the long history of management and conflict over the country's inland fisheries.

Fisheries and aquaculture in Lao PDR

Much like Thailand and Cambodia, Lao PDR has a predominantly semi-subsistence based population, which has been the focus of intense activity by international development agencies since the 1950s. As the only landlocked country in mainland Southeast Asia, Laos has a complex history of external political and economic influence from its four largest neighbours: Thailand, Cambodia, China and Vietnam. The attention from the international community began with the arrival of USAID in the 1950s and continued through donors and NGOs. Within the modern formulation of the 'Greater Mekong Subregion', Laos has emerged as a 'cross-roads' state, with multiple political and economic agendas strongly influencing the direction of development within the country.⁴⁷ The following investigates how both the socialist politics of the state and international technical assistance have influenced fisheries

45 Phillips, *Fresh water aquaculture in the Lower Mekong Basin*; R. Gregory and H. Guttman *The Ricefield catch and rural food security*, ed. P. Edwards, D. C. Little and H. Demaine, *Rural aquaculture* (Oxon and New York: CABI Publishing, 2002), pp. 1–14.

46 See <http://www.jica.go.jp/english/global/fish/cambodia.html> (last accessed on 5 Oct. 2007).

47 Philip Hirsch, 'Globalisation, regionalisation and local voices: The Asian Development Bank and rescaled politics of environment in the Mekong Region', *Singapore Journal of Tropical Geography*, 22 (2001): 237–51.

policy by outlining the intersection of development discourses and agendas between the Lao government, international technical assistance and rural communities.

Internal influences: Socialist development policy

From the time the Lao People's Revolutionary Party (LPRP) took power in 1975, they implemented an action plan for 'progress toward socialism' based on heavy industry and, what they termed 'collective mastery'. This was explicitly outlined in both the Fourth Resolution of the LPRP and the Fourth Congress of the Vietnamese communist party during which a new socialist mode of production based on scientific production was heralded as the keystone of agricultural development. Initially, government policies reflected this philosophy by suppressing supplemental household livelihood activities but, by 1979 collectivisation had failed due to what Evans lists as a lack of incentives to farmers, attachment to traditional lifestyle, a lack of understanding of reward systems and a lack of material support from the government.⁴⁸ With the continued failure of 'self-sufficiency' policies, the government focused on external assistance to generate investment in the agriculture sector at a time when hydropower and forestry were the highest income earners.

The Lao government has consistently tried to address the dual agenda of balancing the wealth of natural resources with the modernisation of the agricultural sector in pursuit of self-sufficiency. At the Third Congress of the LPRP in 1982, the then party general-secretary, Kaysone Phomvihane, reiterated the need for the country to move from a subsistence-based to an industrialised socialist economy, marking the beginning of development planning in the country. Economic reform policy emerged in 1986, in line with many of the socialist countries within the now defunct Council for Mutual Economic Assistance (COMECOM), and with it a new emphasis on export trade and the deregulation of pricing controls and production targets. Self-sufficiency remained a central tenet of the government's agenda in order to address the fundamental 'food problem' derived from the continued dependency on natural resources rather than intensive, production-based food security.⁴⁹ Development rhetoric has remained fairly consistent ever since. In the 7th Party Congress and development plan for 2001–05, there was an abandonment of communist economics, a continuation of market reform and a reiteration of Marxist-Leninist principles (again) promoting self-sufficiency. The

48 Grant Evans, *Lao peasants under socialism and post socialism* (Chiangmai: Silkworm Books, 1995); Martin Stuart-Fox, *Buddhist kingdom, Marxist state: The Making of modern Laos, studies in Southeast Asian History*, no. 2 (Bangkok: White Lotus, 1996); Yves Bourdet, 'Rural reforms and agriculture productivity in Laos', *Journal of Developing Areas*, 29 (1995); Randall Ireson, 'Peasant farmers and community norms: Agricultural labor exchange in Laos', *Peasant Studies*, 19 (1992): 67–93; W. E. Worner, *Lao agriculture in transition*, Working Papers in Economics, no. Wp94 / 12 (Sydney: University of Western Sydney, Nepean Department of Economics, 1994).

49 Self-sufficiency and food security remained central tenets of policy within both the first (1981–85) and second (1986–90) five-year plans. The new economic mechanism was part of the second five-year plan (1986–90). Amphay Doré, 'The Three revolutions in Laos', in *Contemporary Laos: Studies in the politics and society of the Lao people's Democratic Republic*, ed. Martin Stuart-Fox (St. Lucia: University of Queensland Press, 1982); Hans U. Luther, 'Socialism in a subsistence economy: The Laotian Way' (Bangkok: Social Research Institute, Chulalongkorn University, 1983); Carlyle A. Thayer, 'Laos in 1982: The Third congress of the Lao People's Revolutionary Party', *Asian Survey*, 13 (1983): 84–93; Worner, *Lao agriculture in transition*.

apparent contradiction within these policy agendas highlights the central power and control of the LPRP over policy. Despite wide recognition that the agricultural sector will continue to grow slowly, if at all, and the continued reliance of subsistence communities on the natural resource base, the government has continued its project of modernisation with little reflection on the ability of the Lao population to realise their ambitions.⁵⁰

Policy within the Ministry of Agriculture and Livestock continues to be based almost exclusively on production-based systems such as forestry, livestock and crop production despite mounting evidence of the importance of natural resources, such as capture fisheries and non-timber forest products.⁵¹ Capture fishery resources in particular are not well defined in either policy or legislation, which has led to considerable confusion over institutional responsibilities. First, the largely donor-driven push for accession to the Ramsar convention – the international treaty on the conservation and responsible use of wetlands – has until recently been seen as an attempt to push a conservation agenda, removing the right of access for subsistence-based communities and conflicting with the long-standing self-sufficiency goals of the central government. Second, internal power politics between the Department of Forestry and Department of Livestock and Fisheries has divided responsibility for ‘fish protection’ under the forestry law on non-timber forest products and ‘fish production’ under the agricultural law.⁵² The result is a clear division of aquaculture from capture fisheries, and confusion within both domestic and international communities as to what ‘fisheries’ constitute and who is responsible for management.

External influences: International development agencies and NGOs

Instead of drawing on an empirical understanding of fishery resources and rural livelihoods in Laos, NGOs over the last 20 years have drawn on political rhetoric and the information generated through an influential joint FAO / UNDP aquaculture extension project that operated in Laos from 1980 to 2001. The FAO, concerned with global food production, promoted aquaculture over this period under the rhetoric of ‘green revolution’, receiving support from the government for increasing productive capacity of both the state and farmers. The project aims were subsequently institutionalised in government policy and have guided the work of NGOs interested in fisheries for a range of rural development, disaster relief and humanitarian projects

50 Asian Development Bank (ADB), National Statistics Office (NSO) and State Planning Committee (SPC), *Participatory Poverty Assessment Lao PDR* (Vientiane: State Planning Committee, National Statistics Office, Asian Development Bank, 2001); UNDP, *National human development report* (Vientiane: United Nations Development Programme, 2001); Yves Bourdet, ‘Laos in 2001: Political introversion and economic respite’, *Asian Survey*, 42, 1 (2001): 107–14.

51 Samphanh Chanphengxay, P. Latsasima and B. Xaphakdy, ‘Rules, institutions and values: Towards an integrated approach to wetlands governance in Lao PDR’, *Wetlands governance in the Mekong Region*, ed. E. Oh, B. D. Ratner, S. R. Bush, K. Kolandai and T. Too (Penang: WorldFish Center, 2005).

52 ‘Roles and responsibilities of Department of Agriculture MAF Order 1145 / 02’, Ministry of Agriculture and Forestry, 2002; ‘Roles and responsibilities of Department of Forestry’ MAF Order 1147 / 02, Ministry of Agriculture and Forestry, 2002; ‘Roles and responsibilities of Department of Livestock and Fisheries’, MAF Order 1146 / 02, Ministry of Agriculture and Forestry.

ever since. At the same time, water resource conservation, including capture fisheries, became part of a much wider politics of water access and control and, as such, viewed with suspicion by the government.⁵³ The result has been virtually no reflection on the specific impact of aquaculture or, conversely, the importance of capture fisheries. Aquaculture, much as Kelly describes in the Philippines, has emerged as both a commonsensical and irrefutably positive activity for poverty alleviation.⁵⁴

With the support of the post-war orthodoxy of international development buttressed by green revolution technologies, many of the development agencies in Laos have supported agricultural systems including aquaculture. Government plans in 1956 for the development of fishery resources focused exclusively on inland aquaculture, with funding subsequently supplied by USAID and the government of Thailand to hatcheries at Nong Teng in Vientiane, Km 8 at Pakse, Phak Bo in Savannakhet, the provincial centre of Luang Phrabang and Khongsedone in Salavane. However, due to political instability, the work was not completed until after 1965 when a USAID study into the national feasibility of aquaculture further reiterated the importance of developing hatchery centres. This later contract between the Lao and American governments focused on the development of aquaculture capacity, the restoration of the abandoned stations, and the training of Lao personnel in the production of common carp and tilapia. At the same time, the Japanese government focused on the construction of hatcheries at Nong Teng, Pakse and Luang Phrabang, followed by Vietnamese and Chinese government investment in Hua Phane, Xieng Khouang and Oudomxay in the early 1970s. Despite the rapid and costly investment in these hatcheries, they proved ineffective, located too far from farmers and markets, and based on inappropriate techniques for the limited financial resources offered by the central government to keep them operational.⁵⁵

With the end of the revolution and victory to the communist Pathet Lao forces in 1975, there was an abrupt stop to US assistance with the closure of USAID and multilateral budgetary assistance. The new regime sought unilateral and bilateral assistance from socialist block countries such as the then Soviet Union, Hungary, Czechoslovakia and Vietnam. From 1975 to 1982, over US\$400 million non-military aid was delivered to Laos, most of which was programmed after the 1978 Moscow meeting of the Council for Mutual Economic Assistance (CMEA), an organisation consisting of socialist states.⁵⁶ Funding for fisheries was continued through the revolution and subsequent transition to the Interim Mekong Committee (forerunner

53 Chanphengxay *et al.*, 'Rules, institutions and values: Towards an integrated approach to wetlands governance in Lao PDR'.

54 Philip F. Kelly, 'Blue Revolution or Red Herring? Fish farming and development discourse in the Philippines', *Asia Pacific Viewpoint*, 37, 1 (1996): 39–57.

55 Ministère de L'Economie-Nationale, 'Etude Sur L'economie Lao 1967–1972' (Vientiane: Ministère de L'Economie Nationale, Bureau des Etudes Techniques, Royaume du Laos, 1972), USAID, 'Facts of Foreign Aid to Laos' 2nd edn (Vientiane: Embassy of the United States of America, USAID Mission to Laos, 1973).

56 Funds from the Asian Development Bank (ADB), International Monetary fund (IMF), World Bank (WB) and United Nations (UN) continued to some degree through the initial transition. For accounts of this economic transition, see Nayan Chanda, 'Economic changes in Laos, 1975–1980' and T. M. Burley, 'Foreign aid to the Lao People's Democratic Republic', in *Contemporary Laos: Studies in the politics and society of the Lao People's Democratic Republic*, ed. Martin Stuart-Fox (St. Lucia, Queensland: University of Queensland Press, 1982).

to the MRC) under the United Nations Economic and Social Commission for Asia-Pacific (UN-ESCAP). In 1977, UN-ESCAP instigated a project to once again rehabilitate the Nong Teng fish station in Vientiane with funding from the government of the Netherlands. This project also introduced silver carp (*Hypophthalmichthys molitrix*), big head carp (*Aristichthys nobilis*) and grass carp (*Ctenopharyngodon idella*) from Thailand, and later in 1979, despite a severe drought, successfully bred the Indian carp, Rohu (*Labeo rohita*) and mrigal (*Cirrhinus cirrhosus*). Following this success, the Interim Mekong Committee, again with funding from the government of the Netherlands, built a pilot farm for the production of fingerlings to supply to farmers in Vientiane province from 1978 to 1980.⁵⁷

In 1980, the Interim Mekong Committee once more developed fish stations in Pakse, Savannakhet and Luang Phrabang. This plan was taken up by a joint project between the FAO and UNDP, so initiating their involvement in aquaculture development in Laos that lasted until 2001. The first two phases were predominantly concerned with increasing seed production and the technical capacity of the hatcheries. The third phase focused on upgrading existing aquaculture facilities by using 'model farms' as a means of disseminating the technologies, and the final phase built on the model farmer programme aimed at developing an extension network for *Puntius goniotus* and *Cirrhinus microlepis* culture.

Although their direct involvement in fisheries has ceased in Laos, the FAO / UNDP project set the agenda for the government and many NGOs over the 1990s and into the 2000s. Expertise within the government has focused almost exclusively on the experiences of government staff trained in aquaculture through UN funds. As international NGOs take their lead from government policy, they too largely confined their fisheries' work to that of government agencies and institutes, further reifying the dominance of aquaculture as the fisheries' agenda in the country.

The only organisations working to improve the management of capture fisheries are the three main international conservation organisations — the Worldwide Fund for Nature (WWF), the World Conservation Union (IUCN) and the World Conservation Society (WCS). Most of the activities of these organisations have been framed under the title of 'wetlands', which as described above, has been viewed with much suspicion by the government as it is associated with conserving resources by prohibiting access of both state and local interests. While efforts have been made to redefine wetlands in the context of Laos, the activities of the conservation organisations have largely focused on research and the establishment of community conservation areas. Despite setting a clear agenda, their work is continually confronted, as one project officer reports, with government counterparts requesting aquaculture training and extension. In his words:

a lot of these guys know that their efforts in training farmers in small-scale aquaculture are largely unsuccessful. At a meeting last year to discuss fisheries co-management, one of the government guys in the room expressed indignation that we were not simply telling farmers to release fish and providing them with fingerling. When I expressed my concern over the success of that approach, he was overheard as saying that he knew it

57 M. V. Gupta, B. Saphakdy and L. Khamsivilay, *Review of aquaculture support to Lao PDR during 1975–2000* (Living Aquatic Resources Research Center, LAO PDR, 2000).

didn't work but it basically made them look good to be seen giving fingerling to poor farmers.⁵⁸

Rural communities

With the increasing use of 'participatory development' tools by government and international organisations, rural communities have had a growing opportunity to nominate development activities. The wants and needs which emerge reflected the interests, values and agendas of individuals and groups within these communities. What emerges is a rather complicated layer of community discourses and narratives to which both the state and NGOs try to respond with extension services. However, when the stated interests and the material benefits of an activity differ, it is necessary to delve further by asking: What role do different narratives and discourses play in ensuring development activities come to a community? To what extent are these development narratives based on received development rhetoric? And, to what extent are they limited to those of privilege and power within communities?

Despite the dominance of aquaculture in policy and planning, rural communities remain firmly dependent on capture fisheries in Laos.⁵⁹ Furthermore, it is evident that the majority of rural households are not able to adopt aquaculture due to a lack of land, the high costs of pond construction, or a lack of technical knowledge and inputs such as fingerlings and feed.⁶⁰ A survey of 24 households in Savannakhet province in 2003 shows total average consumption of fish and other aquatic animals at 96.9 kg per person per year, of which aquaculture fish contributed 15.1 kg per person per year, and fish and other aquatic animals from the wild contributed the rest (Table 1).⁶¹ Yet, at least outwardly, farmers remain extremely supportive of aquaculture as a means of improving their livelihoods, feeding into the development rhetoric of the government and development NGOs. This poses an interesting question: why, despite a seemingly lower contribution, do farmers often identify aquaculture as a major development need over the management of capture fisheries?

58 Personal communication, 2007.

59 This is reiterated in a number of studies including Caroline J. Garaway, 'Fish, fishing and the rural poor. A Case study of the household importance of small scale fisheries in the Lao PDR', *Aquatic Resources, Culture and Development*, 1, 2 (2005); Eric Meusch *et al.*, 'The Role and nutritional value of aquatic resources in the livelihoods of rural people: A Participatory assessment in Attapeu province, Lao PDR' (Bangkok: Food and Agricultural Organization of the United Nations, Regional office for Asia and the Pacific, RAP publication 2003 / 11); Bruce Shoemaker, Ian G. Baird and Monsiri Baird, *The People and their river: A Survey of river-based livelihoods in the Xe Bong Fai river basin in Central LAO PDR* (Lao PDR / Canada Fund for local initiatives, 2001).

60 These constraints are repeated in nearly all documents on aquaculture development in Lao PDR. For example, Peter Edwards and Geoff Allan, 'Review on feeds and feeding for inland aquaculture in Mekong region countries' (ACIAR, 2001); Douangchith Litdamlong, Eric Meusch and Nick Innes-Taylor, 'Promoting by building the capacity of local institutions: Developing fish seed supply networks in the Lao PDR', in *Rural Aquaculture*, ed. Peter Edwards and Harvey Demaine (New York: CABI Publishing, 2002); Aloun Phonvisay, 'The Study of fish trade from the Siphandone fishery, Champassak Province 2002' (Vientiane: LARReC, 2002).

61 For a detailed account of this survey, refer to Simon R. Bush, 'A Political ecology of living aquatic resources management and development in the Lao PDR' (Ph.D. diss., University of Sydney, 2004); <http://ses.library.usyd.edu.au/handle/2123/975> (last accessed on 13 Dec. 2007).

Table 1:

A consumption survey in six villages in Savannakhet province, Lao PDR

District	Outhomphone		Chumphone		Khantabouli		Average for all villages
Village	Ahung Nyay	Nong Kham Het	Phone Muang	Kadan	Gnang Soung	Keng Hin Soung	
Kg./person/yr.							
Capture fish	17.6	22	19	40.7	12.5	24.6	22.7
Culture	6	25.9	0.8	25.2	10.5	22	15.1
Processed fish	3.5	16.9	3.4	33.5	4.1	7	11.4
Other aquatic animals	33.2	52.8	23.1	91.5	11.2	56.7	44.8
Import	4.8	3.2	0	0	1.1	8.7	3
Total fish and other aquatic animals	65.1	120.8	46.3	190.9	39.4	119	97

One of the most common responses to what communities 'need' is the construction of ponds: 'We want to raise fish but have no money or land to build ponds.'⁶² With the cost of construction as high as 10,000 *baht* (US\$225), only those receiving remittances from family overseas invest in fish ponds.⁶³ Farmers with land adjacent to road construction are able to bribe tractor drivers to take dirt from their plots to use in aggregate, but with little expertise in the dimensions of suitable fish ponds, these are often too deep and not suitable for aquaculture. Once a fish pond has been built and stocked, there is often little financial return for the investment with fish mainly used for supplementing household nutrition or filling their social obligations as gifts.

For farmers in drier areas, aquaculture development offers a way of supplementing the often limited water resources during the dry season, with many farmers nominating ponds and irrigation systems which can be stocked with exotic species. In an extreme case, one farmer even went as far as to suggest the government should 'build a canal from the Mekong River to the village to increase dry season rice and also provide habitat for fish'.⁶⁴ Likewise, the construction of fish ponds does not necessarily mean that a family will adopt fish husbandry. Many ponds are constructed close to houses and used as water reservoirs, with farmers reporting, 'We have no water in the dry season ... [therefore] we need to build reservoirs to use for household water and

62 Interview, June 2002.

63 The average per capita income is estimated at around US\$460. However, it is widely recognised to be significantly lower than this for the 80% of the population dependent on agriculture. See World Bank website: <http://go.worldbank.org/WZC7Y7W810> (last accessed on 13 Dec. 2007).

64 Interview, June 2002.

livestock.⁶⁵ Despite the outward requests for fish ponds, the objectives of farmers are often obscured by a greater need for water. Aquaculture may provide a means of attracting the attention of the government, but fish farming may only be part of a much wider portfolio of uses for fish ponds.

Farmers who requested assistance with basic fish husbandry techniques openly stated that they had little experience with fish farming and had failed in their attempts. As one farmer described, 'Stocking rates in the pond are too high and the fish die. But we don't know if this is the problem or not.'⁶⁶ To assist them, farmers often argued that the Department of Livestock and Fisheries (DLF) should provide more training for aquaculture. Indeed, based on the activities of the FAO / UNDP and AIT projects, the DLF is the major source of fingerlings, as well as feeding, spawning and nursing techniques in the country. Yet with only an estimated 4 per cent of families currently owning a fish pond, it appears large-scale training programmes have not been overly successful in communities near to provincial and district centres, and any further investment in aquaculture training remains prohibitive for many DLF offices.⁶⁷

Improving water resources, by increasing the area and volume of water in the dry season, is used by farmers as a way of emphasising the need for improving habitat for capture fisheries. As one farmer noted, 'We will improve our water resources, increase the area of our water resources, and create conservation areas. This will increase the water in the dry season so fish will be saved during this time of the year.'⁶⁸ 'Improvement' or 'enhancement' of water resources through irrigation weirs and damming small streams as a means of improving the abundance of native fish is also closely associated with technical interventions associated with aquaculture. Indeed, most of the irrigation schemes are noted as providing resources which can be subsequently stocked with exotic fish, again supplied through the DLF. But unlike aquaculture, which is focused on private household use, irrigation schemes are community based and often collectively funded, increasing fish supply to poorer households.⁶⁹

Capture fisheries are problematised to a lesser extent, emphasising 'governance based' interventions including: managing access of fishermen and communities to fishing grounds and regulating the use of destructive fishing gear. Similar to many communities in Laos, there are a range of community-based rules and regulations that govern who can fish an assortment of lakes, rivers and streams. Respondents noted that they wish to restrict the access of nearby or adjacent communities to their main fishing grounds. For example, one community leader argued that the community wants 'to make the [other village] agree to only fish from 6 a.m. to 5 p.m.' while others noted that 'The fishing technologies used by fishermen has caused a decline in the number of

65 Ibid.

66 Interview, July 2002.

67 This estimate of fish pond owners is based on the surveyed number of 1,653 households with fish ponds across the three districts of Khantabouli, Outhomphone and Chumphone which collectively have 40,113 households based on 2002 figures from the Ministry of Communications, Transport, Post and Construction.

68 Interview, June 2002.

69 Garaway, 'Fish, fishing and the rural poor', pp.131–45.

fish caught', emphasising the need to ban and enforce village and state regulation over illegal fishing gear.⁷⁰

Community level development narratives provide 'enabling assumptions' that give meaning to actions or policies, but these are mainly limited to aquaculture. For both state and non-state development workers, the most commonly heard narratives are almost exclusively related to the expansion of water resources, either through fish ponds or through irrigation. Development NGOs are well suited to respond to such requests through, for example, micro-credit, technical assistance for nursing, and direct assistance with pond construction and small-scale irrigation schemes. In contrast, narratives of capture fisheries focus on management by one or many communities using communal water resources: the need for improved access rules to water bodies, better conflict management over competition for resources with other communities, and more effective regulation and enforcement over illegal fishing gear. In summary, given that both the state and non-state organisations are guided by the wider global and national rhetoric of production, such as increasing deficits in the demand of fish and poverty alleviation, it is technically driven aquaculture that often prevails rather than the management, conservation-oriented capture fisheries management activities.

Tracing a gradual imbalance

Modern day fisheries policy and management in the Mekong River Basin has been moulded over the twentieth century by the values and agendas of state and international organisations. As a result, the inland fisheries of Thailand, Cambodia and Laos have had relatively divergent management and development trajectories, tempered by political regime, aid dependency and international research which appear to have led to a gradual imbalance in fisheries management and development towards the promotion of aquaculture.

Early policy recommendations from international organisations in Thailand did highlight the importance of inland capture fisheries, and their importance for rural Thai livelihoods. In accordance with the practices being developed in Europe and the United States during the early and mid-twentieth century, both Smith and Witt provided the road map for the development of the fisheries of Thailand, promoting a balanced approach to mitigating a deficit in nutrition to the rural population. Evidence for their recommendations is 'anecdotal' at best, yet strikingly they both advocate a balance of capture fisheries management, stock enhancement and aquaculture.⁷¹

The boom in fisheries development after the Second World War emerged as part of a much wider development programme based on the nascent paradigm of modernisation, through the 'green revolution' and situated within the wider agendas of security prior to the Cold War. It was clear that any advisors to the region would be required to offer technologically based advice to increase the production of agricultural

70 Interviews with farmers in two villages of Savannakhet province during field visits in 2003, refer to S. R. Bush, 'A Political ecology of living aquatic resources management and development in the Lao PDR'.

71 H. M. Smith, 'A Review of the aquatic resources and fisheries of Siam, with plans and recommendations for their administration, conservation and development', p. 90; FAO / UN, *Report to the government of Thailand on the development of programs of inland fishery investigation, management and training*.

areas. In conjunction with water development plans, that were subsequently developed through the Thai government and Mekong Committee, capture fisheries were regarded as little more than a peripheral interest to anthropologists and taxonomists.⁷² Against this wider development backdrop, the recommendations given by Smith and Witt were used selectively to promote stocking and aquaculture. Subsequent strategies by the government and international organisations never established a strong inland capture fishery discourse within Thailand but instead have set a clear agenda for aquaculture development.

In northeast Thailand, aquaculture has become a highly successful activity providing both income and nutrition to a population now well accustomed to market production. However, success in aquaculture also has to be viewed in terms of the impact of fish disease and the fragmentation of river basins through water management projects, both of which decimated native stocks. Awareness of the capture fisheries in the northeast has only recently emerged through regional initiatives to mitigate the decline of flagship species such as the giant mekong catfish *Pangasiodon gigas*. Ironically Thailand's expertise in artificial spawning, built up through the replacement of degraded riverine fisheries with reservoir fisheries, is now applied to the other Mekong countries as a means of slowing or reversing the decline.⁷³

Cambodia is more dependent on capture fisheries and although aquaculture remains relatively sidelined, it persists within policy, driven largely by internal politics of resource control and the external agendas of development agencies. Conflict over access to fisheries has remained of central concern to the government and, since the community fishery reforms, also to the international community. The somewhat violent history of natural resource control and extraction in Cambodia has meant that capturing and extracting maximum income from natural resources, including capture fisheries, remains central within a society which, for the most part, has few remaining local management and ownership institutions. Within this context of relative scarcity, aquaculture has emerged as a policy closely tied to capture fisheries in terms of both fingerlings and feed. The more commercial production on Tonle Sap means that aquaculture is promoted as an entrepreneurial production system increasingly dominated by elites. Pond culture for rural poverty, as promoted by AIT and JICA, is well placed to respond to the government policy goals. Nevertheless, in response to the abundance of capture fisheries AIT amended its activities to aquatic resources management, most notably through rice-fish culture. Aquaculture in Cambodia is not likely to become a viable alternative to capture fisheries as it has in Thailand, and given the power-based control and management of fishery resources, it is unlikely that it will become a viable source of protein for the rural poor.

In Lao PDR, the modern history of fisheries development is set within the convergent histories of external development assistance and socialist development rhetoric. Unlike Cambodia, capture fisheries in Laos have not been formally included in national revenue, nor have they been recognised as resources of greater importance

72 A. Davidson, *Fish and fish dishes of Laos* (Vientiane: Imprimerie Nationale, 1975); T. M. Fraser, 'Fishermen of the Middle Mekong', *Anthropologica*, 16 (1974): 177–204.

73 The MRC Fisheries Technical Symposium agreed to support a network to spawn giant Mekong species in Ho Chi Minh City, 2–3 Nov. 2006.

to the mainly agrarian population. The emphasis given to aquaculture by the royal administration was carried over into the socialist regime, both guided by their desire to modernise the agricultural sector and alleviate rural poverty.

The aid and technical dependency of the Lao government has made the country particularly reliant on external assistance in a range of sectors including fisheries. With little evidence on which to base their decisions, except for the few French and USAID reports, the state-controlled hatcheries were built and external assistance sought to increase the capacity of both government staff and farmers. The government's development plans and the development agendas of the international agencies have essentially coevolved since the LPRP took power, with knowledge and information on the fishery heavily weighted to aquaculture. The more recent involvement of the FAO, AIT and JICA has all built on this information base to ensure that most fishery documents in the country are focused on aquaculture rather than on capture fisheries.

Policy and management decisions are predominantly based on the existing base of knowledge covering aquaculture, leaving almost no room for alternative activities to be fostered which promote the management of capture fisheries. Even today, the notion of capture fisheries is marginalised within conservation, with relevant government departments acquiescing to the development projects that bring in capital intensive activities, rather than the more people-focused programmes of community-based natural resource management. With capture fisheries management marginalised in debates surrounding conservation, there is little space for alternatives to an aquaculture-dominated fisheries agenda to emerge. Furthermore, contemporary policy over water development plays a significant role in determining how fisheries policy is developed. As is seen in Thailand, aquaculture is emerging in response to a declining fishing industry resulting largely in the control of waterways. As water resources are used for hydropower production, capture fisheries are set to further decline and, as explicitly expressed in the plans of many of these projects, aquaculture is promoted as an alternative source of income and nutrition.

National narratives of aquaculture and capture fisheries are also reflected in local discourses on development and modernisation. NGOs often base their decisions to support aquaculture development on evidence from the surveyed 'needs' of rural communities, but while communities give almost universal support to aquaculture there is little evidence of a commensurate level of material benefit. The seemingly contradictory nature of their support exists at the nexus of historical narrative and modernist interests and aspirations.

Conclusion

Development narratives surrounding aquaculture have emerged as hegemonic in living aquatic resources policy and management in the Mekong Basin. In the absence of empirical information, policy-makers have increasingly relied on the received wisdom of both state rhetoric and international best practice to develop national management and development strategies over fisheries which, at the same time, has both reduced the complexity and uncertainty over resource management and provided a production-based solution to income and food security. The policy that emerges reflects the complex, historically-based interaction of multiple state and non-state interests that,

over time, supersedes the contemporary practices and imperatives of their targeted constituency.

Tracing who controls the agenda over environment and natural resources in the context of national development agendas allows us to understand how contemporary policy and action is embedded within the complex histories of state, donor, scientific and societal interaction. In the absence of strong empirical evidence, the 'co-evolution' of politics and practice, that underlines the development of fisheries in Cambodia, Thailand and Lao PDR, requires a more subtle interpretation of the values, interests and agendas of both contemporary and historical actors. It is here that the three countries provide an interesting comparison. Northeast Thailand is most dependent on aquaculture, having relatively limited capture fishery resources remaining and a well-developed infrastructure and market economy. In contrast, Cambodia remains dependent on capture fisheries to which access was only recently granted to the broader population and it remains to be seen whether aquaculture will emerge as a viable development strategy especially when seen within the wider context of control and access to the people such policies seek to address. In Laos, there is a less clear division. The country's population remains dependent on an important, albeit less visible, capture fishery, and there is little evidence after 50 years of development that it offers any further hope for alleviating poverty or providing a wholesale solution to nutrition and income needs of the rural population. For Laos, the threat is that the lack of contingent understanding of fisheries' use in many inland areas has possibly suppressed alternative approaches to poverty alleviation through responsible fisheries management.

The case study of fisheries development in Lao PDR shows just how embedded contemporary policy discourses are within the complex modern history of development politics. The dominance of internal politics of the LPRP has brought a strong production focus to support self-sufficiency, which directly supports aquaculture. The external priorities of international NGOs – most notably poverty alleviation, rural development and conservation – must be reconciled with the government production orientation. Because very little information exists, development organisations cannot draw on historical accounts or 'data' which would justify support for capture fisheries management. The lack of information means that both state and non-state actors draw on international best practice and the rhetoric of the global fisheries crisis and aquaculture as a solution to underdevelopment. 'Fisheries' policy is therefore negotiated through a combination of internal political changes, current development orthodoxies of NGOs, and also the history of aquaculture development in the donor countries of Europe and North America. Within this scaled interaction of development agendas, communities are not passive recipients, but instead draw on a combination of state and non-state rhetoric to attract projects. Local politics and agendas therefore operate within a wider web of historical narratives used to justifying development agendas that do not seemingly reflect the reality of the majority of resource users. The disjuncture between outward narratives of individual and community aspirations creates an important layer of local politics that further complicates the justification for an effective line of policy and action.

The historical context of living aquatic resources in the Mekong Basin highlights the complex nature of power relations between state and non-state actors as well as the

tensions of science and political agendas expressed through the increasingly imbalanced narratives of 'capture fisheries' and 'aquaculture'. Put into historical context, the development narratives used to justify contemporary development and environment policy can be seen within the wider critique of modernisation without development, which places food security as a problem of technology transfer rather than a problem of responsible natural resource management.

Further research is needed to determine how state and local development agendas can better reflect the contingent circumstances of aquaculture production, the importance of capture fishery resources, and the politics surrounding international best practice as a basis for policy. Research should also identify how government and non-government agencies can better reflect on environmental histories and incorporate them within contemporary policy and planning, giving greater attention to context-specific sources of knowledge that reflect current practices and imperatives, instead of matching the rhetoric of modernisation and development from the global north.