Lowy Institute Paper 27

the Mekong

RIVER UNDER THREAT

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GREATER MEKONG SUBREGION

Executive summary

Until the 1980s the Mekong River flowed freely for 4,900 kilometres from its source in Tibet to the coast of Vietnam. The world's 12th longest river, and eighth or 10th largest, in terms of volume discharged, passes through or by China, Burma (Myanmar), Laos, Thailand, Cambodia and Vietnam. It is Southeast Asia's longest river, but 44 % of its course is in China, a fact of capital importance for its ecology and its governance. Until 2003 navigation of the Mekong beyond Phnom Penh was limited by the great barrier of the Khone Falls, just above the Lao-Cambodian border, and restricted in Laos and China by repeated rapids and obstacles.

Since the 1980s the character of the river has been steadily transformed by China's dam-building program in Yunnan province. Three hydroelectric dams are already in operation and two more very large dams are under construction and due for completion in 2012 and 2017. Plans exist for at least two further dams, and by 2030 there could be a 'cascade' of seven dams in Yunnan. Even before that date and with five dams commissioned China will be able to regulate the flow of the river, reducing the floods of the wet season and raising the level of the river during the dry. In building its dams, China has acted without consulting its downstream neighbours, but until now the effects of the dams so far built have been limited.

Until recently, there have been no firm plans for the construction of dams on the mainstream of the Mekong below China. This situation

has changed over the past three years. Memoranda of Understanding have been signed for 11 proposed dams, which are being backed by private capital or Chinese state-backed firms. Government secrecy in both Cambodia and Laos means that it is difficult to judge which, if any, of these proposed dams will actually come into being. Attention and concern have focused on two sites: Don Sahong at the Khone Falls in southern Laos and Sambor in northeastern Cambodia. If built these dams would block the fish migrations that are essential to insure the food supplies of Laos and Cambodia.

Following a major program to clear obstacles from the Mekong early in the present decade a regular navigation service exists between southern Yunnan and the northern Thai river port of Chiang Saen. It is not clear whether the Chinese still wish to develop navigation further down the river, as was previously their plan. To date, the effect of the navigation clearances has been limited.

The Mekong plays a vital role in the countries of the Lower Mekong Basin (LMB): Laos, Thailand, Cambodia and Vietnam. (Burma is not within the basin). Despite the environmental costs of China's completed dams and the river clearances to aid navigation being limited so far, this will change once China has five dams in operation. And the costs exacted by those dams will be magnified if the proposed mainstream dams below China are built, particularly at Don Sahong and Sambor.

In all four LMB countries the Mekong is a source of irrigation. In Vietnam's Mekong Delta the annual pattern of flood and retreat insure that this region contributes over 50 % of agriculture's contribution to the country's GDP. For all four LMB countries the Mekong and its associated systems, particularly Cambodia's Great Lake (Tonle Sap), are a bountiful source of fish, with the annual value of the catch conservatively valued at US$2 billion. More than 70 % of the Cambodian population's annual animal protein comes from the river's fish. Eighty per cent of the Mekong's fish species are migratory, some travelling many hundreds of kilometres between spawning and reaching adulthood. Overall, eight out of 10 persons living in the LMB depend on the river for sustenance, either in terms of wild fish captured in the river or through both large and small-scale agriculture and horticulture.

Even if no dams are built on the mainstream below China, the cascade to which it is committed will ultimately have serious effects on the functioning of the Mekong once the dams are used to control the river's flow. This will be the case because the cascade will:

- alter the hydrology of the river and so the current 'flood pulse', the regular rise and fall of the river on an annual basis which plays an essential part in the timing of spawning and the migration pattern. This will be particularly important in relation to the Tonle Sap in Cambodia, but will have an effect throughout the river's course;

- block the flow of sediment down the river which plays a vital part both in depositing nutrients on the agricultural regions flooded by the river and also as a trigger for fish migration — at present well over 50 % of the river's sediment comes from China;

- at least initially cause problems by restricting the amount of flooding that takes place most importantly in Cambodia and Vietnam; and

- lead to the erosion of river banks.

So China's dam-building plans are worrying enough, but the proposed new mainstream dams would pose even more serious concerns. Those built at sites higher upstream would cause the least damage to fish stocks, but if, as currently seems possible, the most likely dams to be built would be at Don Sahong and Sambor the costs to fish stocks could be very serious. This is because unanimous expert opinion judges that there are no ways to mitigate the blocking of fish migration that would occur if these dams are constructed. None of the suggested possible forms of mitigation — fish ladders, fish lifts, and alternative fish-passages — are feasible for the species of fish in the Mekong and the very large biomass that is involved in their migratory pattern. Fish ladders were tried and failed at the Pak Mun dam on one of the

Mekong's tributaries in Thailand in the 1990s.

Why are the governments of Laos and Cambodia contemplating the construction of dams that seem certain to have a devastating effect on their populations' food security? The answers are complex and include some of the following (a) a lack of knowledge at some levels of government (b) a readiness to disregard available information on the basis that it may be inaccurate (c) a belief or conviction that fishing is 'old-fashioned' whereas the production of hydroelectricity is 'modern'. In Cambodia's case, and in particular in relation to the proposed dam at Sambor, the fact that a Chinese firm is seeking to construct the dam raises the possibility that Prime Minister Hun Sen is unready to offend the country that has become Cambodia's largest aid donor and Cambodia's 'most trusted friend'. In Laos, the proposal for a dam at Don Sahong is very much linked to the interests of the Siphandone family for whom southern Laos is a virtual fief. Of all the proposed dam sites Don Sahong is the most studied in terms of knowledge of fisheries so that it can be safely said that the planned dam would wreak havoc on a migratory system that involves fish moving through the Hou Sahong channel throughout the year.

In the face of the threats posed by both the Chinese dams and those proposed for the downstream stretches of the river, there is no existing body able to mandate or control what individual countries choose to do on their sections of the Mekong. The agreement establishing the Mekong River Commission (MRC) in 1996 does not include China or Burma, and though the latter's absence is not important the fact that China is not an MRC member underlines the body's weakness. In any event, the MRC members' commitment to maintaining the Mekong's sustainability has not overcome their basic commitment to national self-interest. A prime example of this is the manner in which the Lao Government has proceeded in relation to the proposed Don Sahong dam. For at least two years while the dam was under consideration there was no consultation with Cambodia. Similarly, so far as can be judged, Cambodia's consideration of a possible dam at Sambor has taken place without consultation with either the governments of Laos or Vietnam.

At the moment the best hope is that both the Cambodian and Lao Governments will abandon their plans for Sambor and Don Sahong. If they do not, the future of the Mekong as a great source of food, both through fish and agriculture, is in serious jeopardy. This is all the more so as China continues its dam-building program and as the effects of climate change in the region through which the river flows are pointing to a greatly increased precipitation that is likely to cause major increases in flooding in the future, possibly as early as 2030.

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Chapter 1

Rapid and dramatic change

Less than 30 years ago, the Mekong, one of the world's great rivers and its 12th longest, flowed uninterrupted for some 4,900 kilometres from its source in Tibet to its several mouths in Vietnam's Mekong Delta, where it finally poured into the South China Sea. Rising at a height of 5,100 metres in the Himalayas above the eastern Tibetan plateau its course ran through China, Burma (Myanmar), Laos, Thailand, Cambodia and Vietnam. When it reached the Vietnamese coast the vast quantity of its water that flowed into the sea — 475 billion cubic metres annually — was either the eighth or 10th largest in terms of volume discharged among all the world's rivers.[1] In 1980 not only were there no dams on its course, much of the river could not be used for sizeable, long-distance navigation because of the great barrier of the Khone Falls, located just above the border between Cambodia and Laos, and the repeated rapids and obstacles that marked its course in Laos and China. Indeed, no exaggeration is involved in noting that the Mekong's overall physical configuration in 1980 was remarkably little changed from that existing when it was explored by the French Mekong Expedition that travelled painfully up the river from Vietnam's Mekong Delta to Jinghong in southern Yunnan in 1866 and 1867. This was the first European expedition to explore the Mekong from southern Vietnam into China and to produce an accurate map of its course to that point.[2]

The important changes that had taken place on the course of the river since 1980 and up to 2004 were outlined in the Lowy Institute Paper, *River at Risk: The Mekong and the Water Politics of Southeast Asia*. In that paper particular attention was given to the dams being built by China in Yunnan province, for while the Mekong is often spoken of, correctly, as 'Southeast Asia's longest river', no less that 44% of its course flows through China. This fact underlines China's firmly held view that any actions which it takes in relation to the Mekong within its own borders are not subject to review or sanction by external powers or organisations. Additionally, the paper examined developments on the Mekong's tributaries and the development of navigation between southern Yunnan and northern Thailand that had become possible as the result of a major clearance of obstacles from the river, largely as the result of Chinese sponsorship and actions — the clearance was carried out by Chinese work teams and at Chinese expense. And it discussed issues of governance associated with the river and the Mekong River Commission (MRC), with its membership of Cambodia, Laos, Thailand and Vietnam. As well, the paper gave some account of the Greater Mekong Sub-region (GMS) program. (Formed under the auspices of the Asian Development Bank [ADB] in 1992, the GMS is a loosely structured forum with a membership of Burma, Cambodia, Laos, Thailand and China, in the form of Yunnan and Guangxi provinces. It does not have any regulatory functions).

Since *River at Risk* was published substantial new and potentially damaging developments have taken place, or are in prospect, that could further alter the character of the Mekong in a major, even dramatic, fashion. In brief summary, and since 2004, China has continued its program of dam construction on the upper reaches of the Mekong — the *Lancang Jiang,* or 'Turbulent River', as it is known in China — in Yunnan province. As a result of this ongoing dam-building program in Yunnan, China will be able to regulate the flow pattern of the Mekong in less than 10 years. For with further dams completed beyond the three already constructed, China will have the means to implement its often-repeated plans to 'even out' the flow of the river through the course of the year, raising its level during the dry season and reducing it in the

wet season, a possibility discussed in more detail later in this paper

And now, in sharp contrast to the situation existing in 2004, serious consideration is being given to the construction of dams on the mainstream of the river after it flows out of China. If constructed some, at very least, of these proposed new dams would have the immediate and very concerning consequence of causing a serious disruption to the Mekong's current role as a vast resource for the capture of wild fish. Concurrently, these prospective developments will add to the already existing problems associated with the river's governance. This is an issue that has already led to unresolved tensions among the countries through which the river flows. And it is a prospective development that has again led to critics calling into question the role of the MRC, particularly its Secretariat.

The developments associated with the dams already built or being constructed in China and the proposed dams to be built on the mainstream of the Mekong downstream of China are the principal concerns of the present paper. It seeks to address the question of the extent to which changes, already in train or in prospect, will or could affect the river's ecology and so the manner in which it functions as a remarkable source of fish and an essential feature of the agricultural cycle of the region through which it flows. In doing so the paper outlines the policies that the river's governments have adopted and the relation of these policies to the governance for the Mekong, or lack of it. Taking this restricted focus does not mean that what happens on the river's tributaries is unimportant, but to examine all the projects associated with the tributaries in addition to discussing mainstream developments would lead to a paper of excessive length. (See Appendix 3 for a brief note on tributaries). As for changes associated with navigation, I have already provided some commentary on this issue in a 2007 Lowy Perspectives publication, 'The Water Politics of China and Southeast Asia II: Rivers, Dams, Cargo Boats and the Environment,' See Appendix 2 of this paper for some discussion of navigation and the Mekong.

While the construction of new dams on the Mekong's mainstream below China will represent one major threat, or series of threats, to the manner in which the river functions, it has also become clear that

climate change poses a new challenge to its future ecological health. Until recently concerns about the likely impact of climate change tended to focus on the ongoing reduction in the size of the glaciers from which its springs in the Himalayas and which feed it as the result of snow melt. But while there is no doubt that a diminishment in size of the glaciers feeding the Mekong is taking place, recent research has suggested that a more serious threat to the river's health will come from sea-level changes, particularly as rising levels could begin to inundate large sections of Vietnam's Mekong Delta. To what extent the threat posed by rising sea levels will be affected by another predicted development linked to climate change — greatly increased precipitation leading to more flooding during the wet season — is not yet clearly established.

In discussing the major developments that have already taken place since the publication of *River at Risk*, and the prospective plans for new dams now under consideration, this paper examines issues of critical importance to the future of one of the world's great rivers and to the populations who depend on it for their livelihood and their sustenance. In doing so it relies on and takes account of a burgeoning body of research material that has become available over the past five years. Much of this valuable research is not widely known to a non-specialist audience and to a large extent the modest aim of the present paper is to distil the findings of other, more technically qualified observers. But in doing so it also takes account of a wide range of interviews I have undertaken on a regular basis in the countries through which the Mekong flows since the publication of *River at Risk*.

Chapter 2

The river and its people[3]

Just as the potential effects on the Mekong of the developments already briefly outlined must be understood in terms of the river's fundamental importance to the countries and their populations through which it flows, it is also essential to recognise that individual developments involving the Mekong — such as the construction of a single dam — are not necessarily discrete in their impact but rather can have effects on the whole of the river, to a greater or lesser extent. Or to put the issue more concretely, developments such as the building of dams in China have the capacity to affect the functioning of the river as far away as Vietnam's Mekong Delta by, for instance, blocking the transmission of sediment down the river. This need to think of the river as a whole is a particular concern in relation to any discussion of fish stocks in the Mekong. For remarkable as it may at first seem, developments above the Khone Falls in Laos can impinge directly on developments in Cambodia's Great Lake (Tonle Sap) hundreds of kilometres to the south.

The Lower Mekong Basin

The total drainage area of the Mekong Basin is approximately 795,000 square kilometres, with most of the basin's population living in the Lower Mekong Basin (LMB), the areas draining into the river after it

flows out of China. In the case of Laos and Cambodia no less than 85 % of their national territory lies within the river's basin. The amount of water flowing into the river from the six countries of its basin is far from equal. The generally accepted proportion of runoff from each country is as follows: China 16 % , Burma 2 % , Laos 35 % , Thailand 18 % , Cambodia 11 % and Vietnam 18 % . The disproportionate quantities of runoff is one of the issues contributing to the controversies that have arisen over the river's use. For instance, China is able to argue that the effects of its dam-building program are limited to a degree by the amount of water that flows out of its territory. But the story is more complicated than the statistics just cited suggest. For water from China is of great importance in sustaining dry season flow for the downstream countries, perhaps to a total of 40 % of the river's volume overall. So, in the case or Cambodia's Great Lake (the Tonle Sap), this vitally important contributor to the country's fish diet depends on water flowing from China for 9 % of its total volume. Moreover, for the Mekong as a whole, more than 50 % of the sediment — some estimates are as high as 95 % — carried down the river originates in China.

Downstream of China the importance of the Mekong to four of the countries through or beside which it flows — Laos, Thailand, Cambodia and Vietnam — differs from country to country, though the river plays a vital role in all of them. (The Mekong is of only limited importance to Burma due to the topographical fact that it does not form part of the LMB — northeast Burma is 'tilted away' from the course of the Mekong). The regions making up the LMB have a population of over 60 million, of whom at least a third live in poverty. The Mekong is of importance as a source of irrigation in all four of these countries, but most particularly in Thailand and Vietnam. It is a prime source of fish in both Laos and Cambodia, with no less than 70 % of Cambodia's animal protein consumption dependent on fish coming from the Mekong and its associated systems, particularly the Tonle Sap. But the fish taken out of the river are important in Thailand and Vietnam also.

The annual flooding in the Mekong Delta assures that region's role as the most important contributor to Vietnam's agricultural production, making up more than 50 % of agriculture's component of Vietnam's

GDP. (Agriculture makes up more than 19 % of Vietnam's GDP and accounts for approximately 55 % of the country's labour force). One other statistic underlines the importance of the Mekong to the LMB. Overall, it is estimated that of the populations living in the LMB no less than eight out of 10 persons depend on the Mekong River for subsistence, either in terms of the fish catch taken from the river or in terms of agriculture, both through large-scale agriculture and through river bank cultivation.

Given the importance of the Mekong for the populations of the countries of the LMB, it is worth noting their current and projected demographic trends. Population growth in Cambodia and Laos is particularly high as the result of a post-conflict baby boom that has resulted in an extraordinarily youthful demographic profile. If present trends continue, Cambodia and Laos will double their populations in less than 20 years, to 28 million and 10 million respectively. Population growth in Thailand and Vietnam is much less rapid, with expected increases of 20-30 % over the next 20 years. Taken together, the projected increases suggest that the population of the LMB in 2030 will be well in excess of 100 million. (This figure does not, of course, represent the total population of the four countries which are members of the MRC and which overall will be much larger). So the prospects are for an increasing number of persons depending in some fashion on the Mekong and its many-faceted bounty. Moreover, and particularly in the cases of Cambodia and Laos, every current index suggests that the greatly increased population existing in 20 years time will have a continuing and even growing proportion of people struggling to make a living even if they are not categorised as living in poverty.

Ecology, annual floods and fish

In order to understand why changes to the Mekong's hydrological character are so potentially damaging to its ecological health it is necessary to provide some detail on the manner in which the river currently functions. A vital feature of the Mekong River is the annual pattern of the rise and fall of its water levels in accordance with both

the wet and dry seasons affecting the river in and below China and the runoff that accompanies snow melt in its upper, Chinese, reaches. This natural pattern of flooding and retreat of the Mekong's waters is essential to the river's ecology. Flood waters carry silt that is deposited on the river's banks which, with the advent of the dry season, provides a highly fertile basis for horticulture and agriculture. In the case of the Mekong Delta, the annual pattern of flooding 'rinses' accumulated alkaloids from the soil and plays a major part in ridding rice fields of pests, not least rats, as well as depositing valuable nutrients that are essential to the high yields characteristic of the agriculture, particularly that of rice, in the Delta. Flooding also plays an important role in flushing away the salt water that invades the Delta from the South China Sea into which the river ultimately flows during the dry season. This is of particular concern at a time when there is increasing evidence of salt water penetrating ever more deeply into the Delta.

Of prime importance to discussion of the Mekong is the fact that research has clearly established the extent to which fish breeding cycles in the river are intimately linked to the 'flood pulse' that occurs each year: the flood pulse is 'a scientific concept referring to the cyclical changes between high and low water levels through each year.[4] Research has shown that migratory fish begin their travel in response to flood pulses, which also are triggers for breeding cycles and are an essential link between the river and its floodplains.[5] These research findings underline the need to consider the river as a whole in relation to an analysis of fish stocks and their present and future role as an essential part in the food security of the LMB.

It is estimated that the annual catch of wild fish for all riparian Mekong countries is 2.6 million tonnes, with the bulk of this catch in the LMB.[6] Another 500,000 tonnes are raised through various forms of aquaculture. The average annual value of the catches of wild fish from the Mekong River system is estimated at in excess of US$2 billion, with several experts emphasising to me that the actual figure may well be much higher, so that the published estimate should be regarded as conservative. In Laos alone, the value of wild capture fish from the Mekong and its tributaries is estimated by the WorldFish Center at

between US$66 and US$100 million, with wild fish amounting to 78 % of the country's total fish production.[7]

A high proportion of the 900 fish species indigenous to the freshwater reaches of the Mekong, as opposed to those areas of brackish water where up to another 300 species live, are migratory in character, certainly well over 80 % of the total species. Some of these migratory fish travel many hundreds of kilometres in the course of their migrations, which can involve travel from above the Khone Falls in Laos to the Cambodian Great Lake and back again. There are even reported instances of migration of fish from as far away as the Mekong Delta to above the Khone Falls.

There are three main fish migratory patterns in the Mekong, but in identifying these patterns it should be noted that two of these systems involve overlap, with species present in one system also present in others. Moreover, the patterns of fish spawning within these systems vary from species to species. The three systems are: the Lower Mekong Migration System (LMS); the Middle Mekong Migration System (MMS); and the Upper Mekong Migration System (UMS).[8]

The LMS

The Lower Mekong Migration System stretches from northern Cambodia, just below the Khone Falls, through central Cambodia, including the Tonle Sap, to the Mekong Delta. As already noted, fish spawning in the Mekong river, some as far away as the deep pools in the portion of the Mekong between Stung Treng and Kratie, and even *above* the Khone Falls, are swept into the Tonle Sap as the river rises during the wet season and as the Tonle Sap River reverses its course at Phnom Penh to flow backwards into the lake. As the Mekong River Commission's Technical Paper No. 8 observes, the regions of the Tonle Sap where the fish grow in size, and the flood plain regions of the Mekong in the Vietnam Delta are 'the 'fish factories' of the lower basin.

The MMS

The Middle Mekong Migration System takes in that section of the river from the Khone Falls in the far south of Laos to the point where the Loei River enters the mainstream of the river a little to the west of Nong Khai, the important Thai border town close to the Lao capital of Vientiane on the other side of the Mekong River. As a generalisation, fish migrating in this system move from deep pools which they occupy during the dry season upstream to the Mekong's various tributaries, which they enter to find access to flood plains along the tributaries' courses. A point of vital importance is the fact that some of the fish in this system migrate *over* the Khone Falls, in both the wet and dry seasons. This last fact is of capital importance since it bears on one of the most controversial plans for a new dam on the Mekong at Don Sahong, If built this would be located at the only section of the Khone Falls where there is a passage through which fish migration takes place. There is every reason to judge that a dam built at Don Sahong would also represent a further threat to the already small number of critically endangered Irrawaddy dolphins which live above and below the Khone Falls and which are currently an important reason for tourist activity in that region.

The UMS

This system stretches from the Loei River, in northern Thailand, to the point where the Mekong flows out of China. Whether or not migration continues into China itself cannot be verified because of a lack of data. Two features of this system are of note. The first is the fact that, unlike the LMS and the MMS, the UMS has a discrete character and does not interconnect with the other two migration systems. And the second is that it is in this system where the critically endangered Giant Mekong Catfish (*Pangasianodun gigas*) apparently spawns in steadily decreasing numbers. This gigantic fish that can weigh up to 300 kilograms is regarded as an object of spiritual importance by villagers living along the river and as a vital indicator of the river's health.

Changing fish catches

Although fish catches in the LMB have remained fairly stable over the past 50 years, at least until very recently, it now takes almost twice as many fishers to catch the same quantity of fish as was the case 50 years ago. Additionally, the fish being caught are now smaller than once was the case, which means the value of each catch per person has also fallen. In Cambodia, the country for which the most detailed information is available, fish catches per person have declined from a figure of 350kg in 1940 to less than 200kg in 2003. And there are regular complaints from fishers about the difficulty of catching their desired quantities of fish. Additionally, in relation to fish catches in Cambodia, and to some extent in all the other downstream countries, in conditions of widespread poverty, very high unemployment and a rapidly growing population, fishing is an activity that can be undertaken with a limited amount of equipment to provide subsistence. This adds to the strain being exerted upon finite fish stocks by fishers who can find no other way to sustain themselves.[9]

Fish and Cambodia's Great Lake

Nowhere is the annual pattern of flooding and retreat more obviously apparent and important than in the case of Cambodia's Great Lake, the Tonle Sap. At its lowest level the Great Lake has a surface area of 2,700 square kilometres. At the end of the wet season, after a vast volume of water has flowed up the Tonle Sap River from its confluence with the Mekong at Phnom Penh, and as a result of rainfall over the lake during the rainy season, the surface of the lake increases to 16,000 square kilometres with the depth of the water in the lake attaining as much as nine metres — at low water, large areas of the lake are little more than one metre deep. These great fluctuations in size and depth are accompanied by vital developments in the cycle of fish spawning and growth in the Mekong River system as a whole. During the early part of the wet season migratory fish that have been spawned in the Mekong River, in some cases hundreds of kilometres upstream, are

carried into and grow in the lake. Then, when the lake starts to empty in late October or early November of each year, vast quantities of fish pour out of the lake at a rate of 50,000 fish per minute swimming past a given point.[10]

Environmental changes are already affecting the Tonle Sap. For instance, it is already known that the clearance of tree cover — flooded forests that were partially inundated for up to five months of the year — from the Great Lake's peripheral regions to develop agriculture has already had a negative effect on the productive capacity of the lake. For reduction in the areas of the flooded forests has meant the elimination of areas in which fish previously sheltered as they grew. The fact that this has not so far greatly altered the size of the catch from the Great Lake is a reflection of the point just noted in this paper: fish catches have remained relatively stable as a result of more people being involved in fishing.[11]

Finally, if not exhaustively, in a catalogue of concerns relating to the Great Lake, there have been persistent reports in Phnom Penh to the effect that oil deposits have been discovered either close to or under the bed of the lake. It is apparent that some exploration of the Great Lake region has taken place, but to what effect is not clear. Short of an official announcement, and given the tireless and unreliable character of Phnom Penh's rumour mill, it is not possible to assess what such a discovery would mean in terms of possible future environmental damage.[12]

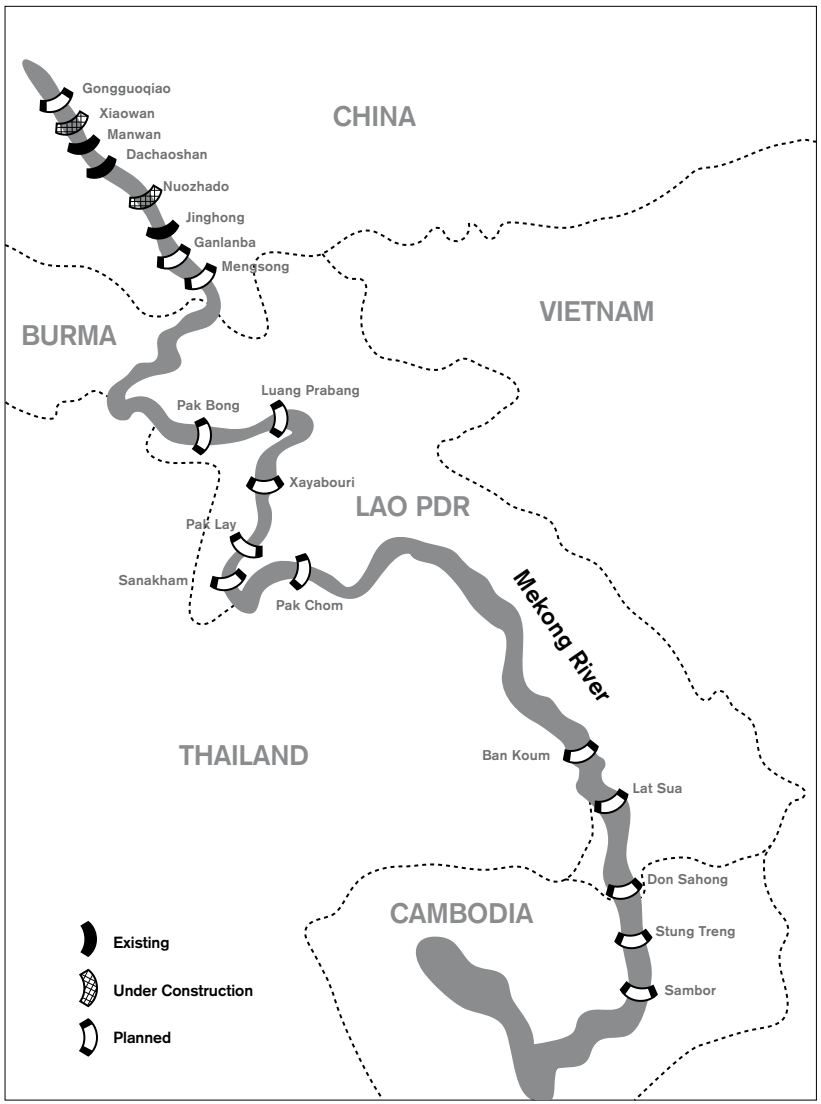
Chapter 3

New dams, new problems

With the background already provided, the paper is now concerned to provide a detailed examination of the changes to the Mekong that are expected to occur, or may do so, over the next two decades.

China

In terms of developments affecting the Mekong's hydrological character or flow pattern, China's dam-building program on the upper reaches of Mekong has moved ahead rapidly from the situation described in *River at Risk*. (See map over page for the location of all completed, under construction and planned dams). The three dams now completed are part of a projected 'cascade' of dams to produce hydroelectricity, principally for consumption in China itself, where development of an industrial base in Yunnan province has a high priority, but also to a lesser extent for sale to countries on China's southern periphery. Following the completion of the dam at Jinghong — it was still under construction when *River at Risk* was published in 2004 — China has three commissioned dams operating on the Mekong in Yunnan, with a total prospective hydroelectric generating capacity of 4,350 MW. These three dams are technically described as 'seasonal reservoirs', a term that reflects the fact that they are dependent on the flow of the river



Hydropower dams:
Completed, under construction and proposed on the Mekong River.

throughout the year.[13]

Meanwhile, work has advanced on the construction of an additional two very large dams, at Xiaowan (4,200 MW) and Nuozhadu (5,500 MW). Construction at Xiaowan was already under way in 2004 and construction commenced at Nuozhadu in 2006. The announced completion dates for these two new dams are 2012 and 2017 respectively, but very recent information indicates that Xiaowan will be completed much earlier than expected. The dam is already impounding water and according to some reports will be generating electricity during 2010.[14] Since both these dams are storage reservoirs, this means that in less than 10 years from now China will be able to control the flow pattern of the river throughout its length in a pattern never previously possible. It will be able to do so by choosing when to discharge or retain the water in the dams' huge ponds (reservoirs). And this will be the case whether or not China decides to add a further three dams to its 'cascade', at Gongguoqiao, Ganlanba and Mensong, as planners have contemplated.

Chinese officials have repeatedly argued that the end result of having constructed its 'cascade' will be beneficial to the countries downstream of its border: Laos, Thailand, Cambodia and Vietnam. In place of the recurrent, and sometimes devastating, floods of the wet season or the periods when drought leads to particularly low water levels they will be able to regulate the Mekong's flow to avoid excess one way or the other throughout the year. Another additional benefit, Chinese officials argue, will be the greater opportunity for year-round navigation on the river, particularly between southern Yunnan and northern Thailand, and possibly further downstream if river clearances are extended beyond Chiang Saen, which is the current limit to navigation from Yunnan. Such an extension was contemplated under the *Agreement on Commercial Navigation on the Mekong-Lancang River*, concluded between China, Burma, Thailand and Laos in April 2000.[15]

Despite China's claims in favour of the desirability of instituting a radical change to the Mekong's flow pattern, there are good reasons to suggest it carries with it a range of negative implications. These include the likelihood that a diminishing of the flood pattern in

Vietnam's Mekong Delta will reverse the beneficial effects currently resulting from flooding; fears that the changes accompanying Chinese manipulation of the river's flow will lead to riverbank erosion; and the very considerable restriction the dams will have on the flow of sediment downstream. But most concerning of all the projected negative implications is the likely substantial alteration to the existing ecology of the river as a whole and of Cambodia's Great Lake in particular for their essential role in the Mekong's contribution to fish stocks throughout the LMB.

Until quite recently there was relatively little detailed research on the extent to which changes to the Great Lake's ecology, as the result of dams constructed upstream on the Mekong, would result in serious consequences to its capacity to provide fish catches equivalent to those currently harvested. This has now changed as the result of research carried out in 2007 by the WorldFish Center in association with the Cambodian National Mekong Committee. This research considered the likely effects of various levels of upstream developments and their consequent effect on the functioning of the Great Lake. It should be noted that the hydrological modelling involved related both to the existing and planned Chinese dams and to the newly proposed mainstream dams on the Mekong below China.

The conclusions of this research are that the construction of dams on the Mekong will have serious negative results in relation to the Great Lake. The range of these effects — baseline (that is a medium degree of construction of dams on the river), intensive and extreme — will depend on the speed with which additional Chinese dams are built and if and when new mainstream dams below China are constructed. Despite the qualifications just noted, the researchers reached a number of key conclusions, as follows, which represent an overall assessment of the probable negative results of what will occur as the result of dams on the Mekong:[16]

> Dams upstream will sharply reduce the input of sediments into the Tonle Sap, adversely affecting the recycling of nutrients and possibly threatening dry-season habitats, especially in areas of high fish productivity.
>
> Delays in the onset of the flood will result in delays in the arrival of oxygen-rich waters.
>
> Upstream developments will expand the edge of the lake during the dry season, destroying some flooded-forest areas if they are permanently submerged *[as the result of higher water levels maintained during the dry season,* my gloss] and reduce it during the flood season.
>
> Dams are the main type of structures having an impact on fisheries production, through their negative impact on fish migrations.
>
> The study found *no examples of positive long-term impacts* of dams on fisheries, *nor any effective mitigation measures* in the Mekong Basin [my emphasis added].
>
> Even a small percentage lost in fisheries will amount to tens of thousands of tonnes and millions of dollars when considering the total production of 2.6 million tonnes each year.

Mainstream dams below China

Plans for dams on the mainstream of the Mekong downstream of China have injected a new and highly controversial element into discussion of the river's future. When *River at Risk* was published in 2004 there were no firm plans to construct dams on the mainstream of the Mekong after the river flows out of China. Such dams had formed part of earlier thinking on developing the Mekong's capacity to generate hydroelectricity, but appeared to have been rejected because of environmental and financial concerns. The history of plans for mainstream dams as developed previously, including in the 1990s, is contained in Appendix 1 to this paper. Of very considerable importance is the fact that a detailed planning report for the possible construction of 12 dams on the Mekong below China and presented to the then Mekong Committee in 1994 made clear that there was a fundamental need for detailed research into the extent to which new dams would

affect fish stocks and fish movements in the river, since at that time no such research existed. In a highly dubious assertion, the report stated, 'Fish will pass downstream through the projects with little difficulty at all seasons'. But then went on to note that:

> Upstream passage past the project sites will be possible only if effective facilities for the species of concern can be devised. Facilities to be provided may comprise fish ladders, fish lifts or locks and water flow arrangements to attract fish to the conveyance devices.[17]

The glaring inadequacy of the assumptions involved here are examined in some detail later in this paper in relation to discussion of possible ways to mitigate the impacts of dams on fish movements.

Starting in 2006 and slowly emerging into wider public discussion through 2007 and into 2009, information has become available that shows there are now a total of 11 sites under consideration for the construction of dams on the Mekong's mainstream: seven sites are being considered in Laos, two in Cambodia and two between Thailand and Laos where the Mekong forms the national boundary between those two countries. No dams are currently projected to be constructed on the Mekong in Vietnam. (It is even possible that an additional two dam sites are under consideration on a section of the river where it flows between Laos and Burma, though citing this possibility depends on the accuracy of information provided to me by a middle-ranking Lao official in mid-May 2009 and is not so far confirmed through documentary evidence).

Although the proposed new dams have been conceived, like those in China to produce hydroelectricity, most are planned to be very different in physical form. Instead of being designed with high dam walls to store large quantities of water, their purpose would be to channel the river's flow through sunken generator turbines installed below *relatively* small dam walls. Their advocates refer to these projected dams as having a 'run-of-river' character, a term that is disputed by knowledgeable critics of these plans. These critics point out that in order to hold back sufficient water to power sunken generators a dam wall of at least 15

metres is required and a dam with such a wall cannot by any stretch of the imagination be described as 'run-of-river'. Or, as one highly credible ecologist expressed the point to me, the term 'run-of-river' is an effort by advocates for these dams, particularly engineers, to give them 'a greenish tinge'.[18] Moreover, one of the designs under consideration for what would be a large dam at Sambor in Cambodia with the capacity to produce 2,600 MW of hydropower would certainly not fit the 'run-of-river' description.

However these projected dams are described, they would all carry with them a major negative risk: the likelihood that such dams would greatly affect the passage and breeding capacities of the Mekong's many migratory fish species. These species, which form such an important part of the diet of the populations living in the LMB, would have to negotiate a passage through the revolving turbines set below the water. As discussed in greater detail later in this paper, various methods to try and mitigate this problem are unlikely to be satisfactorily applicable in the case of the Mekong.

Chapter 4

Plans for dams on the Mekong below China: why now?

The proposed mainstream dams below China are part of a much larger program now in progress that has been described by one well-qualified observer as an 'explosion of hydropower' in the LMB.[19] According to one count, there are no fewer than 77 'live' hydropower projects in Laos alone, that is dams that have been constructed, are under construction, or are being actively considered for construction both on the Mekong's mainstream and its tributaries. It is also a region in which, over the past decade, there has been a dramatic increase in demand for energy, widely estimated as being at a rate of between 10 and 15 % annually in Vietnam and Thailand, with lesser but rising demand in Cambodia and Laos. This projected demand also reflects a concern to find alternative energy sources to fossil fuels in which hydropower appeals as a readily exploited alternative. A number of advocacy NGOs dispute both the level of future projected demand for electricity in the LMB and argue that there are better alternatives to the use of mainstream dams for generating electricity. Some of these alternatives include gas-fired generators and small-scale dams on tributaries of the Mekong in locations where interference with fish movement would be minimised. Whereas there is broad agreement among specialist observers about

matters relating to the Mekong's fisheries, discussion of the issue of future power needs is a highly contested issue. Knowledgeable comment requires a degree of expertise which is beyond the competence of the present writer.[20]

Of great importance, and in contrast to past circumstances, what has happened with the development of plans for new mainstream dams indicates that capital is now available for infrastructure development from commercial sources rather than from international organisations such as the World Bank and the ADB. Previously, it was these latter bodies which were seen as the likely, even only, sources of infrastructure finance. (Whether the availability of commercial finance will be affected by the international credit crisis cannot be estimated at this stage, and possibly the dramatic fall in the price of oil will affect judgments about future actions. It is too early to make a definitive judgment on these questions). Finally, and importantly, the proposals for these mainstream dams have been made with the underlying assumption that China's future capability to regulate the flow of the Mekong will mean that there will be enough water in the river to ensure that there will be sufficient volume to power the turbines located in the dams' structure throughout the year. It is not clear that this effect of the Chinese cascade was in the mind of China's dam builders, but if not it represents a notable unintended consequence.

In addition to the considerations likely to have been involved in the governmental decision to consider building dams on the mainstream of the Mekong just mentioned it seems likely that a range of less tangible factors have been involved. As one well-placed observer put it to me, what has been taking place has been a combination of 'both ignorance and wilful ignorance'. The ignorance he had in mind related to a fundamental lack of knowledge on the part of politicians and officials: these persons simply are unaware of the extent to which research already exists that questions the desirability of building dams on the mainstream of the river because of their likely negative effects. Such ignorance, or put less pejoratively lack of knowledge, would extend to the presumptions, dismissed later in this paper, that technical measures *do* exist that could readily overcome the manner in which dams will prove barriers to fish.

It also seems possible that there have, indeed, been cases of 'wilful ignorance', of politicians and officials who are aware of the dangers associated with the proposed dams but are ready to disregard them. I experienced one such case when a senior Vietnamese figure with long links to the Mekong and its associated institutions dismissed the difficulties associated with mitigation as unfounded examples of obstruction by non-governmental civil society groups. Fish ladders, I was told by this person during a conversation in Hanoi in June 2008, were the answer, despite widely-known evidence to the contrary. Not least, there is the widely reported example of the failure of fish ladders to provide a means for fish to bypass the barrier of the dam built on the Mun River in Thailand, a tributary of the Mekong, in the 1990s.

Perhaps, as has also been suggested to me, there is another consideration in the minds of senior politicians. This is the possibility that the Mekong fisheries are seen as an example of old-style peasant activity little suited to modern life and contrasting negatively with the desirable and modern elements involved in the construction and eventual production of hydroelectricity.[21]

And finally, and necessarily impossible to prove, there is little doubt in the minds of many well-informed observers that the proposed new mainstream dams have attractions to their sponsors, and through them to at least some in the government systems of the countries in which they have been proposed, because of the opportunity for financial benefits which are likely to flow from their construction. For the companies proposing to build the dams the construction process would offer immediate financial rewards. In this regard it is no accident that the firms seeking to become involved in the building of the dams are mostly construction firms rather than energy specialists. For the governments, particularly in Cambodia and Laos where corruption is endemic, decisions to build dams would seem certain to carry with those decisions the opportunity for financial benefit that would not appear on published balance sheets.

Yet when all these points are made, it is important to record the fact that within the administrations of at least some of the MRC countries there are politicians and officials who do indeed recognise the dangers

posed by the proposed mainstream dams. Because of the nature of the systems within which they work they are not able to express these views in a public fashion. This is particularly the case in relation to the proposals for dams within their own countries. These politicians and officials are aware of the dangers dams pose because of the material made available by the MRC Secretariat over the years and in part as a result of some of the more sophisticated assessments undertaken by advocacy NGOs. But they are constrained from expressing their concerns if these conflict with government policy.

Chapter 5

The new dams: sponsors, the environment and the possibilities of mitigation

As the following list makes clear, there is now a wide variety of international interest in the economic exploitation of the Mekong. The sites that are under consideration are listed below[22] (see map page 14).

Pak Beng, Laos
MoU for feasibility study signed August 2007; project sponsors Datang International Power Generating Company (China) and Lao Government; 1230 MW

Luang Prabang, Laos
MoU for feasibility study signed October 2007; project sponsor PV Power Engineering Consulting Joint Stock Company (Vietnam); 1410 MW

Xayabouri, Laos
MoU for feasibility study signed May 2007; project sponsor Ch. Kamchang (Thailand); 1260 MW

Pak Lay, Laos
MoU for feasibility study signed June 2007; project sponsors Sinohydro

and China National Electronics Export and Import Company; 1230 MW

Xanakham, Laos
MoU for feasibility study signed December 2007; project sponsors Datang International (China) and Lao Government

Pak Chom, Thailand/Laos
Feasibility study commissioned in 2007 by the Thai Ministry of Energy, 1482 MW; no details on project sponsor

Ban Koum, Thailand/Laos
Feasibility study commissioned in 2007 by the Thai Ministry of Energy, project sponsors Italian-Thai Development Public Company (Thailand) and Asia Corp Holdings Ltd (Laos); 2050 MW

Lat Sua, Laos
MoU for feasibility study signed in April 2008; project sponsor Charoen Energy and Water Asia Co. Ltd (Thailand) and Lao Government

Don Sahong, Laos
MoU for feasibility study signed March 2006; project sponsor Mega First Corporation Berhad (MFCB) agreement to proceed February 2008. In June 2008 Mega first announced it had concluded an agreement with another Malaysian company to take up a 30% holding in the development of Don Sahong, with the Lao Government taking a 20% share; 360 MW

Stung Treng, Cambodia
MoU reportedly signed with a Russian company; 980 MW

Sambor, Cambodia
MoU signed October 2006 and design options reportedly under consideration; project sponsor China Southern Power Grid (CSGP); 3300 MW or 465 MW.

Environmental issues

In the light of the information already provided on the nature of fish migrations in the Mekong River, there are sound reasons for accepting that there will be potentially serious negative effects on fish catches in the river as the result of the construction of some, or all, of these dams. As noted, a very high proportion, as high as 87%, of the fish species in the river 'for which information is available' are migratory in character, with fish travelling over remarkably long distances.[23] While the MRC Secretariat is continuing to carry out research into the potential effects of mainstream dams on Mekong fisheries, there is already enough information available to reach reasonably certain conclusions about the dangers posed by the proposed new dams. And, as outlined below, there is equally an abundance of evidence to show that there are no satisfactory ways to prevent environmental damage through mitigation of the effects dams will have.

The mitigation chimera

When the issue of finding ways to mitigate the barriers to fish movements posed by dams is discussed, three possible and alternative solutions are proposed: fish ladders, fish lifts and fish passages, with the latter conceived as the construction of routes or 'artificial rivers' by which fish could pass around the obstacle posed by dams. The conclusion of the WorldFish Center working in association with the Cambodian National Mekong Committee and published in 2007 has already been cited: this was that their study had not found 'any effective mitigation measures' that could overcome the barriers to fish movement that would result from dams on the Mekong'. This finding has been reinforced by the conclusions reached by an expert group convened by the MRC Secretariat and published by the Secretariat in the December 2008 issue of *Catch and Culture*.[24] In that issue, issue 17, experts were asked to reach conclusions on five fundamental questions, as follows,

1. What is the importance and nature of fish migration in the Mekong?
2. What will be the impact of barriers to migration on fish and fisheries in the Mekong?
3. Can fish-passage facilities be used to provide effective passage facilities for fish migrating upstream?
4. Can fish-passage facilities be used to provide effective passage for fish migrating downstream?
5. What can be done to compensate for losses in the fisheries yields caused by dams?

The answer given by the experts to the first of these questions confirmed the economic and social importance of fisheries on the Mekong that have already been outlined in this paper: the Mekong and the fisheries it supports are of fundamental economic and social importance for the countries and people of the LMB. In answering the second question the expert panel underlined the fact that dams built on the mainstream of the river, as opposed to its tributaries 'will have a much greater impact than dams built on tributaries, while those located on the middle and lower parts of the LMB will have a greater impact than dams located in the upper part of the basin'.

In responding to questions three and four, the expert panel reached several key conclusions. Given the nature of the fish involved and the manner of their migration, the expert panel expressed its considerable doubts about the possibility of developing 'fish friendly' turbines to deal with the passage of fish swimming downstream. It pointed to the limited information available on such turbines and to the fact that those that have had some success in North America have been used for a limited number of species '(usually salmonid species)'. There are no such species in the Mekong.

In reviewing the three possible forms of fish passages that have been considered — fish ladders, fish lifts and fish passages in the form of diversionary routes or 'artificial rivers' around dams, the panel observed that fish ladders would not be effective for Mekong fish species — this was an unsurprising conclusion given that fish ladders were a notable

failure when built on Thailand's Pak Mun dam in the 1990s. Fish lifts and 'artificial rivers' were also seen as inapplicable to the Mekong, most importantly because of the very large size of the fish moving upstream at any one time. Summarised, the expert panel concluded that:

> the Mekong's fisheries are of critical economic and social importance for the countries and people of the basin … a large part of the benefit is dependent on mainstream fish migration and that mainstream dams will effectively stop much of this migration leading to reduced production, substantial economic cost and social deprivation.

The panel further concluded that:

- existing mitigation technology cannot handle the scale of fish migration on the Mekong mainstream;
- dams in the middle and lower LMB will have the largest impact on fisheries and the largest economic and social costs [for LMB populations]; and
- dams higher in the basin and on tributaries will have relatively less impact on fisheries production.

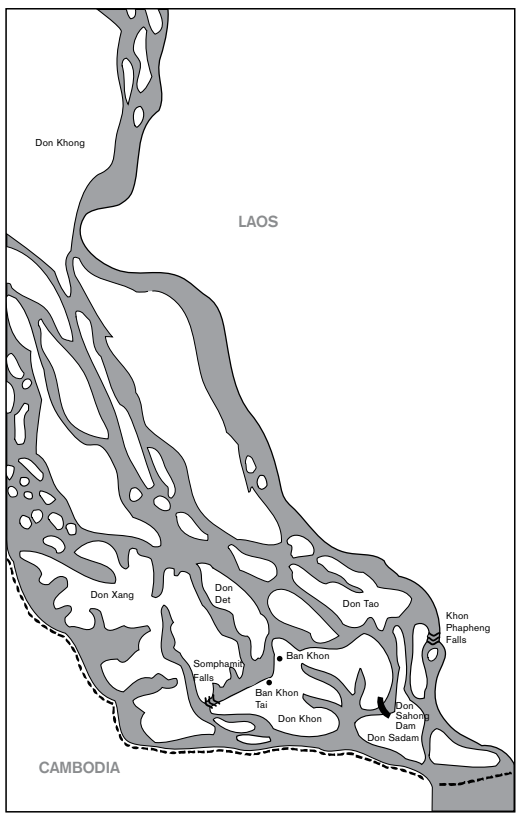
This second and third conclusions cited immediately above are of interest for an approach to the issue of how to minimise the damage caused by the possible future construction of mainstream dams which appears to be developing within the MRC Secretariat, and which is discussed later in this paper.

Don Sahong

The implications of the conclusions just recorded are of particular importance for the proposed dam at Don Sahong, sited on the Khone Falls in southern Laos (see map over page). This is a site where there is already abundant evidence for the negative effects such a construction is likely to cause, since the region has been the subject of detailed research

for many years, making the proposed dam a revealing case study for the issue of dams on the mainstream below China.[25]

The proposed dam at Don Sahong would be located on the Hou Sahong channel on the eastern side of the Khone Falls which stretch across a distance of seven kilometres of the Mekong's mainstream just above the Lao-Cambodian border. Hou Sahong is the only channel used by migratory fish traversing the falls at the time of low water, as well as at later periods of the year. Indeed, according to research carried out by Canadian researcher Ian Baird fish migration over the Khone Falls takes place throughout the year in both directions.



Mekong River showing the proposed Don Sahong dam.

As a result of the research that has been carried out in relation to Don Sahong, specialist observers firmly reject suggestions that it might be possible to overcome the fact of the dam's blocking the passage of fish by providing a fish ladder, or ladders.

Don Sahong as an example of Mekong governance problems

Developments associated with the possible construction of the Don Sahong dam also throw a clear light on the conflicting interests that are now associated with all of these newly prospective dams. For under the terms of Article 7 of the 1995 *Agreement* setting up the Mekong River Commission, the contracting parties agree, 'To make every effort to avoid, minimise and mitigate harmful effects that might occur to the environment … from the development and use of Mekong River Basin …'. In the light of what has happened it is apparent that this provision has not been honoured by Laos in relation to the proposed dam at Don Sahong. So what has happened in relation to the planned dam at Don Sahong provides a telling insight into the problems and tensions associated with the newly proposed mainstream dams, both in terms of the environmental dangers associated with it and the issues of river governance that it raises.

Emphasising the still highly personal nature of politics in Laos despite that country's embrace of a form of collective leadership, the proposed Don Sahong dam is not the first substantial development project to have been slated for an area that is very much a personal fief of the Siphandone family, the family headed by the former President of the Lao PDR, Khamtay Siphandone. In the mid-1990s permission was given to a Malaysian company to develop a large resort linked to the cluster of islands in the Mekong just above the Khone Falls. It was to have a hotel with 2,000 rooms, an 18-hole golf course and two casinos. In association with the resort an airport was to be built capable of receiving Boeing 737 aircraft. These plans in which members of the Siphandone family were closely involved were overtaken by the Asian Financial Crisis beginning in 1997 and have not been revived, not at least in their previously planned form.[26]

But now, with the involvement of Khamtay Siphandone's son, a former governor of Champasak province, and another Malaysian company, Mega First Corporation Berhad, plans are proceeding to construct a dam with an installed generating capacity of between 240 and 360 MW, and which would come into operation in 2013. Essentially, the Don Sahong proposal is a rerun of a dam recommended in the 1994 report on 'run-of-river' dams mentioned earlier. Furthermore, there are suggestions that, just as was contemplated previously, the Siphandone family backing for the Don Sahong dam is part of a wider plan to construct a resort in the Khone Falls region with power for this enterprise being supplied by the Don Sahong dam.[27]

The publicly known history of developments associated with the proposed dam at Don Sahong throws a great deal of light on the attitudes of the Lao Government and the extent to which in its eyes the MRC's role is ever more clearly defined as a 'creature' of the governments which are members of the commission. This means that in practical terms the MRC is unable to play a role that impinges on the national interests of the body's members. Although the MoU for a feasibility study in relation to Don Sahong was signed in February 2006, it was not until the following year that any significant protests against the dam took place as details of the proposal became more widely known. This took the form of a highly critical comment on the proposal made by a group of 34 environmentalists in May 2007 in an open letter to 'Governmental and international agencies responsible for managing and developing the Mekong River'.[28] The letter noted in detail the extent to which the proposed dam would 'ultimately … have a hugely negative effect on fisheries-based livelihoods in all four countries' — that is, Cambodia, Laos, Thailand and Vietnam — and stated that the 'proposed dam is probably the worst possible place to site a 240 MW project since it is the point of maximum concentration of fish migration in the river that supports the world's largest freshwater fishery'.

Subsequent discussion of and protests about the proposed Don Sahong dam and other proposed mainstream dams from the middle of 2007 have to be traced largely through media reports and information gained personally in the course of visits to Laos and Cambodia in 2008

and 2009. While it is possible the following account omits some details of what has occurred, the essential character of the developments that have occurred is reasonably clear.[29]

In the latter half of 2007 the Cambodian National Mekong Committee sent an official letter to Laos protesting against the proposed Don Sahong dam to which, according to National Mekong Committee Vice-Chairman, Sin Niny, there was no reply.[30] Then, in November 2007, at a closed meeting of the MRC and the organisation's donors held in Siem Reap, the Cambodian delegation again protested at the decision to build a dam at Don Sahong and the proposed Lao dams more generally.[31] Around the same time a group of NGO's urged the MRC Secretariat to take some form of action to review the Don Sahong proposal. It is known that the MRC Secretariat produced an assessment partly in the light of the concerns expressed by NGOs and in the light of the critical views expressed by Cambodia, which it gave to the Lao Government.

The assessment is widely known to have commented very critically on the proposed dam at Don Sahong, but it has never been released publicly.[32] In this regard various media reports have quoted MRC Secretariat employees speaking 'off the record' and confirming that the report presented to the Lao Government did indeed take a highly critical view of the Don Sahong proposal. According to one media report, confirmed to me in personal conversations, specialist fishery experts within the MRC expressed deep concern about the Don Sahong project, with one quoted as stating 'it does not make any sense'.[33] This further accords with the range of information that I have been able to acquire in both Laos and Cambodia on a non-attributable basis. It is my further understanding that the Lao Government simply ignored this report prepared by the MRC Secretariat and went on in February 2008 to sign a Project Development Agreement with Mega First to proceed with further survey work at Don Sahong.

It was against this background that the Cambodian Prime Minister, Hun Sen, visited Vientiane at the end of March 2008, reportedly with the intention of discussing Don Sahong with the Lao Government**.** Whatever the details of these discussions, which have not been aired publicly, a well-informed Cambodian source has told me that the

Cambodian National Mekong Committee was subsequently told not to engage in public criticism of the Don Sahong dam proposal.[34] Then, in June 2008, a further agreement was concluded between the Lao Government and Mega First in relation to commercial aspects of the Don Sahong project, which resulted in the Lao Government agreeing to take a 20 % share in the project. In the same month the Lao Government informed the MRC of its plans for the project and seven others on the Mekong or its tributaries.[35]

Other proposed mainstream dams below China

Relatively little information is currently available in relation to the current state of developments for most of the other projected dams on the Mekong's mainstream after it flows out of China. In Cambodia, where two dam proposals are under consideration, greatest media attention has focused on the site at Sambor, a little to the north of Kratie in Cambodia's northeast. This was a site originally chosen for investigation in the 1950s and which was the subject of substantial survey work by a team from the Australian Snowy Mountains Hydroelectric Authority in the early 1960s before deteriorating security conditions led to the team's work being suspended. Sambor was again identified as a desirable site for a dam in the 1994 report prepared for the then Mekong Committee, at which stage a dam with a capability of producing 3,300 MW was proposed.[36]

While various civil society NGOs, including within Cambodia itself, have expressed opposition to the construction of a dam at Sambor the final intentions of the Cambodian Government remain uncertain. As already noted, the government signed a Memorandum of Understanding with a Chinese firm in 2006 for a dam that would produce 2,600 MW, and which would necessarily be large in size and built across the whole of the Mekong's course. If constructed, this dam would be smaller than the dam proposed for Sambor in the 1994 report to the Mekong Committee. When this report was presented it noted that construction of the dam at Sambor would lead to the displacement and resettlement of more than 5,000 people.[37] There have also been suggestions that a

much smaller dam be built with a capability of producing 465 MW.[38]

Information gained on a personal basis as recently as mid-2009 suggests that no final government decision has so far been taken to build a large dam and that consideration is still being given to a smaller dam that would not be constructed across the whole of the river — this would be possible since a large island sits in the course of the Mekong. Of some interest is the information, also received on a personal basis, that the Cambodian National Mekong Committee has been told that it will not play a role in relation to the dam proposed for Sambor and that discussions relating to this dam between Cambodia and the China Southern Power Grid company are being handled by the Ministry of Industry, Mines and Energy.

If a final decision is taken to build a dam at Sambor, even if it is for the smaller option, this will be in the face of very substantial evidence of the likely negative effects that this would have on fish stocks in the Mekong. Even if the Mekong was only partially blocked as the result of a dam's construction, this would affect some of the most important migratory routes above and below the Sambor rapids. Indeed, according to a report completed as long ago as 2002, a dam at Sambor would 'cut, or significantly impair, migration corridors'.[39] A paper prepared for the MRC the following year was even more negative, noting in relation to the possibility of a dam being constructed at Sambor, 'Any dam on the Mekong mainstream in this part of Cambodia could be disastrous for fisheries, but this site [Sambor] is the worst possible location …'.[40]

As for the proposed dam at Stung Treng, which the Cambodian Government announced only in September 2008, the status of this project remains unclear beyond the knowledge of a Memorandum of Understanding having been signed at a date before the announcement was made.

Efforts to obtain definitive information relating to the dams proposed in Laos have been unsuccessful beyond the published material already recorded and an indication I received at ministerial level in Vientiane in May 2009 that all issues linked to the environment are being carefully studied.

Chapter 6

Policies, motivations and disjunctions between statements and actions

For the most part, the governments of the MRC members have remained silent about their longer-term intentions so far as the mainstream dams within their own territories are concerned. Certainly, they have not matched their entry into agreements for the possible construction of the dams with public statements about the likely effects that the new dams could have. To a considerable extent this reflects their judgment that the issues involved have not excited great interest for the majority of their populations. For despite the energetic lobbying of various civil society groups, most particularly in Thailand, but to a much lesser extent in both Cambodia and Vietnam, it appears that there is no broad groundswell of public opinion against the prospect of construction of the mainstream dams.

In making this judgment I am not discounting the fact that there is a solid core of dedicated opponents to the dams, particularly but not exclusively, within Thailand, a core which is supported by foreign academics and NGOs. Neither do I disregard the protests that have been mounted in communities living beside the river in Thailand. But just as it is correct to note that nothing comparable has yet taken place in the other three MRC countries, so is it the case that even in Thailand

concern for the Mekong's future does not dominate political debate. In part this is a reflection of what one Thai academic observer referred to, in discussion with me in May 2009, as the fact that for most of his compatriots 'the Mekong is a long way away', and this observation applies particularly to those who live in Bangkok.

To the extent that the issue of the Mekong surfaces in the Thai metropolitan press it is almost always in relation to China and that country's dams, which are blamed for both droughts and floods.[41] It would be misleading, however, to suggest that the Mekong receives steady media coverage. Somewhat surprisingly, to his observation just recorded the Thai academic joined the additional comment that this lack of interest can even be found among officials whose areas of responsibility include territory bordering the Mekong itself. As for the more general issue of governance of the river as a whole, another Thai academic observer made the telling comment that the 'Mekong belongs to everyone, and so to no one'.

Nevertheless, it is of interest that the current Thai Prime Minister, Abhisit Vejjajiva, should have given an undertaking to a Thai NGO group, the Save the Mekong Coalition, on 19 June 2009, that 'he will take up the issue of dam construction on the Mekong River at the bilateral, regional and international level with the Mekong River Commission, with Thailand's fellow ASEAN members, or with ASEAN's dialogue partners'. But in giving this undertaking he cautioned that, 'the Thai Government alone cannot make a decision to agree of disagree with the construction of any particular dam on the Mekong River as the Mekong is an international river belonging to many countries ….'.[42] The extent to which the Thai prime minister's undertaking will be translated into action will depend to a considerable extent on the readiness of the Thai Electricity Generating Authority (EGAT) to play a positive role so far as Mekong dams are concerned. At the same time it seems reasonable to note that the current state of political instability in Thailand continues to risk having consideration of Mekong issues at governmental level relegated to the back of the filing cabinet.

Interviews with Vietnamese officials in June 2009 did little to clarify their government's position in relation to the proposed mainstream

dams below China, other than to make clear their awareness of the planned developments and a recognition of the importance of the Mekong to Vietnam's prosperity. While indicating their awareness of the planned dams, various officials stated that to the extent the dams posed problems for Vietnam these would have to be resolved through discussions with their MRC colleagues. Moreover, officials indicated to me that it was out of the question that Vietnam should endeavour to tell those MRC colleagues what to do. As to the possibility that fish stocks might be reduced because of the mainstream dams, this was met with the observation that Vietnam could overcome such a development if it occurred through expanded aquaculture. In all discussions the issue to which officials returned was the prospect of increased salination occurring in the Mekong Delta as the result of increased sea levels. There was muted criticism of China's dam-building program, but this too was accompanied by an expression of hope that problems could eventually be solved through consultation.

As a very recent official statement at a Ministry of Foreign Affairs press briefing shows, the Vietnamese Government is holding its cards close to its chest. Asked at a press conference held in Hanoi on 9 July 2009 for an opinion 'about the construction of hydropower dams in the upstream Mekong River,' the Ministry of Foreign Affairs spokesman said in reply, 'Mekong is an international river, therefore, all activities should take into account the interests of basin countries, protecting environment, water resources, and people living along the river'.[43] Only three days later, and in the course of a visit to Hanoi by the Thai Prime Minister, Abhisit Vejjajiva, to Hanoi, he and his Vietnamese counterpart, Nguyen Tan Dung, issued a joint statement that essentially repeated the position of the Foreign Affairs spokesman. The two prime ministers undertook 'to work with each other and other countries in the Mekong basin to tap and protect water resources of the Mekong River in order to protect legitimate and long-term rights of all downstream and upstream countries for the sake of common sustainable development in the sub-region'.[44] How this pledge might be translated into policy action is not clear, particularly as has been argued by more than one observer the Vietnamese Government's view of the Mekong is very much couched

in terms of national self-interest, a fact that leads it to have little expectation of achieving its goals through the MRC.[45]

Yet despite the caution shown by officials it is significant that the Vietnamese press, which operates under strict government control, has begun to carry feature articles relating to the planned new dams in Laos and Cambodia. Largely concerned with reporting events outside Vietnam, such as the petition organised by the Thai NGO Foundation for Ecological Recovery, but carrying reports of concern expressed by local NGO representatives, articles in both the English-language *Viet Nam News* and *Thanh Nhien*, and in the Vietnamese-language edition of *Thanh Nhien*, have drawn attention to Vietnam's position at the end of the Mekong and the vulnerability of those living in its delta.[46] The fact of this material being published is an indication of government concern at a time when it seems likely that a decision on how to proceed has not yet been reached at politburo level.

In many ways the Cambodian case is the most interesting of all the MRC countries, despite the silence of government leaders and their apparent disregard of the negative aspects of the proposed dams on the Mekong. In the early years of the present decade Prime Minister Hun Sen was forthright in his argument that the construction of dams upstream of Cambodia and the growing use of the Mekong for navigation posed threats to Cambodia's interests. Speaking at a symposium in Phnom Penh in February 2003, for instance, he said:

> … I draw participants' attention to a vital issue regarding the flow regime of the Mekong River. Given that the change of flow regime is a critical factor in the annual floods that sustain the region's fisheries, traditional livelihoods and biodiversity, the upstream countries' projects in the Mekong River, namely the continued dam construction and commercial navigation plan, have become a major concern for downstream countries including Cambodia. The possible impacts that many have foreseen are: the Tonle Sap could dry up, ending the famous river fishing industry and causing widespread flooding, and eventually the home of endangered fish would be destroyed.[47]

The terms of this clear statement about dams and the linked vulnerability of the Tonle Sap have not, so far as I have been able to discover, been repeated by the Cambodian prime minister in subsequent years. Given that at the time it was made there were no firm plans for mainstream dams below China, it is clear that he was at the time referring to the Chinese dams on the Mekong in Yunnan. It seems reasonable to conclude that, with the warming of relations between Cambodia and China which had already begun at the time of Hun Sen's speech, he has concluded that criticism of China's dam-building program was inappropriate in the light of China's aid largesse to Cambodia, which has included the construction of a dam for hydropower at Kamchay in Kampot province as well as other infrastructure projects.[48] Indeed, a readiness to avoid criticising China's dam-building program is a feature of government public policy in all of the MRC countries, though this is a prohibition not always avoided in private conversations, even in the case of senior officials, always providing they do not expect to be quoted by name.

Despite its current apparent acquiescence in relation to the possibility of dams being built on the mainstream of the Mekong, the Cambodian Government continues to stress the importance of the Tonle Sap to its population and economy. It has set up a new body, the Tonle Sap Basin Authority, to oversee and control activities in the lake's basin following the enactment of a decree in 2007. Speaking of this decision, Senior Minister Tao Seng Hour who now chairs the new authority said, 'The Tonle Sap Basin is the heart of our culture and heritage, which is why we must conserve, manage and develop it properly'. The disjunction between this view and the possible construction of dams at Sambor and Stung Treng, with their attendant negative effects on the Tonle Sap, is clear.[49]

Chapter 7

Climate change

Retreating glaciers and increased sea levels

While, for the moment, the principal concern relating to the Mekong's ecological health has centred on the proposed new mainstream dams and China's capacity to regulate the flow of the Mekong, issues associated with climate change are certain to be important in the medium to longer term. One issue that has received considerable attention is the fact that glaciers in the Himalayas are diminishing in size, so contributing less snow melt runoff to many large rivers, including the Mekong as a result of climate change. Although much of the research that has been devoted to this phenomenon relates to the glaciers which feed major rivers flowing into the Indian subcontinent, it is clear that glaciers important to the rivers flowing from the Himalayan plateau into China are also already affected by rising temperatures. And importance has been placed on the finding that global warming is having a marked effect on the ablation zone (or wastage zone) of glaciers; that is the region that contributes to snow melt and which now is thinning much more rapidly and failing to freeze at the same rate as previously in the autumn period.

The glaciers located on the Qinghai-Tibet plateau which feed the Mekong during periods of snow melt are steadily retreating, due to

increased temperatures and an accompanying lower rate of precipitation. In the light of this evidence some estimates suggest that they could disappear entirely by 2035. This estimate may be excessively pessimistic but the fact of the glaciers' declining size cannot be disputed. Indeed, Professor Syed Iqbal Hasnain, chairperson of the Working Group on Himalayan Glaciology, probably the best-known scientist working in the field of glacier retreat, has been quoted as stating that Himalayan glaciers will be gone in 20-30 years.[50] Certainly, concern about the seriousness of the issue is shared by Chinese scientists working at the Chinese Academy of Sciences who in 2006 reported that the speed with which glaciers were retreating had accelerated and that, in the case of those feeding the Mekong the amount of retreat was of the order of 8 % per year.[51] In the short term this means that initially more water will be released into rivers.

What may be less clear is the effect of the retreat of the glaciers that feed the Mekong will have in the longer term. Research carried out by Australia's CSIRO in conjunction with the MRC has concluded that even after the glaciers in the Himalayas disappear this will have relatively little effect on the amount of water flowing down the Mekong because overall precipitation in all catchment areas of the river will have increased as the result of global warming. Indeed, the findings of the CSIRO scientists point to a very different problem — greatly increased flooding in the Mekong Basin as the result of climate change.[52]

Many of the CSIRO findings are a cause for alarm, since the increases which their modelling predicts would see, for instance, the increase in the frequency of extreme floods on an annual basis at Kratie in Cambodia rising from a current expectation of 5 % to 76 % by 2030. This very substantial rise in expected precipitation would, under the CSIRO modelling, have effects through the LMB, including at the Tonle Sap, where the amount of water flowing into the lake would increase greatly and the level of the lake would remain at higher levels for longer periods than is currently the case.

There are already concerns that salt water encroachments into the Mekong Delta have increased markedly in recent years. The extent to which this has occurred as the result of a combination of sea levels

rising, as a consequence of global warning, or through a decrease in the flow pattern of the Mekong River is not clear. Much of the evidence currently available is anecdotal, focusing on such claimed developments as the earlier arrival of salt-affected water at locations such as Phuoc Long in the Delta in December, at the very beginning of the dry season, rather than in May, just before the wet season begins. Yet Dr Nguyen Huu Chiem at the Delta's Can Tho University has characterised the situation as 'the most urgent issue we face'. And a United Nations Human Development Report released in November 2007, *Fighting climate change: human solidarity in a divided world*, said of the Mekong Delta that forecasts of sea waters rising by 33 cm by 2050 were 'particularly grim for this region. In 20 years an estimated 45 % of the Delta will be exposed to sea water and crop damage through flooding. Rice crops are expected to shrink by 9 per cent. By 2050, much of the Delta will be completely inundated for most of the year'.[53] A more recent study by the ADB ranks Vietnam as 'among the top five countries most affected by rising sea levels'.[54]

Chapter 8

Governance issues

The range of developments outlined in this paper pose new and difficult issues for the governance of the Mekong and the future role to be played by the MRC, under the *Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin* concluded in April 1995. Ever since its re-establishment in its present form as a successor to the Mekong Committee (the Committee for the Coordination of Investigations of the Lower Mekong Basin), inaugurated in 1957, the MRC has been subjected to repeated criticism, particularly from advocacy NGOs, for not playing a more active role in relation to the environmental health of the Mekong. This criticism has often failed to discriminate between the various elements that constitute the MRC: the Council, the Joint Committee, and the Secretariat. Put simply, the Council, composed of senior (ministerial) representatives from the four member countries sets policies; the Joint Committee is responsible for implementing the policies set down by the Council; and the Secretariat 'renders technical and administrative services to the Council and Joint Committee'.[55]

That there are basic problems with the current arrangements is abundantly clear in relation to developments associated with plans for a dam at Don Sahong, as noted earlier in the paper. As that case has made clear, the question of when one member country of the MRC

should notify others of its intentions is not clearly established under the present *Agreement.* Indeed, as one thoughtful observer commented to me in May 2009, 'you can wait until it is time to place the last concrete block in place on the dam you are building before it is necessary to let others know what you are doing'.

As noted in *River at Risk*, all too often criticism of the MRC either presumes that it is a body with mandatory powers over the river as a whole, or at least that section of the river flowing through the territories of the MRC's members, or that its most visible entity, the Secretariat, currently located in Vientiane, is in a position to assume such powers. As the Director of the Australian Mekong Resource Centre, Professor Philip Hirsch, has written, 'civil society groups have tended to go straight to the MRC Secretariat or its donors … with grievances or other communications'.[56]

A recent example of misguided criticism of the MRC Secretariat took place following the heavy flooding in Laos and northern Thailand in August 2008. Responding to suggestions from NGOs that the reason for the floods was unreported releases of water from Chinese dams, the MRC put out a press statement on 15 August, denying this was the case and stating that the flooding was due to extraordinarily heavy rains over Laos and northern Thailand.[57] This statement was first criticised by NGOs as an improper defence of China, and then later held up as an example of how, contrary to the Secretariat's claim to be divorced from taking political positions, it was in fact doing exactly that.[58] For observers not *parti pris*, the Secretariat's contribution in this case seemed both sensible and unexceptional. It certainly did not deserve to be characterised as a political action, and it did not, of course, reflect an effort to mandate action against any member of the Commission.

In many ways the MRC suffers from the same weaknesses as the much larger ASEAN, to the extent that national interests ultimately triumph over concerns for policies that might be implemented in relation to the river as a whole. And, of course, it is additionally handicapped by the fact that China is not a member of the organisation. (The absence of Burma is much less important, given the significance of the Mekong to that country, though its absence does have some importance in

relation to navigation issues). Although Chapter III of the Mekong River *Agreement* binds the signatories to 'co-operation' (Objectives and Principles of Cooperation, Article 1) and to 'make every effort to avoid, minimise and mitigate harmful effects' to the river (Article 7), nothing in the *Agreement* provides for the signatories, either separately or in combination, let alone the MRC as an organisation, to *impose* decisions on individual members, or any group of its members.

And it is particularly wrong-headed to level criticism against the MRC's Secretariat, which does excellent research work in relation to the Mekong and which has provided invaluable and detailed commentary on the dangers of constructing dams on the mainstream of the river, as detailed in this paper. This research, it is worth noting, forms the basis for much of the criticism of possible mainstream dams that has come from advocacy NGOs. But since neither the Secretariat nor its Chief Executive Officer can under the terms of the MRC's agreement tell individual members, or the four national members meeting as the Council, what actions they should take this makes the position of the Chief Executive Officer particularly difficult. On the one hand the CEO cannot direct the Council of the Joint Secretariat to act in particular ways. But on the other he has to inform those who are his political masters of the findings of research within the Secretariat. It is reasonable to note that in the case of one previous Chief Executive Officer his efforts to give the secretariat what, in effect, was a political role led to his ultimate departure from his position. It is apparent that the present incumbent, Jeremy Bird, is aware of the delicacy of his position and his public statements have been notable for their readiness to avoid direct controversy while acknowledging the interests of civil society groups as well as those of the MRC members.

This was apparent In the September 2008 'Regional Multi-Stakeholder Consultation on the MRC Hydropower Programme' in Vientiane, which the MRC convened and which was attended by government representatives, members of international organisations, including the World Bank and the ADB, and NGOs. In his opening address for this consultation Jeremy Bird, defined the meeting's aims as follows:

> Our aim at this Regional Consultation is primarily to draw on the experience of all of you to help us define how the MRC can play a constructive role in the field of hydropower development, and to design a programme that fulfils such a role.[59]

In his lengthy address, the MRC CEO emphasised the desirability of consultation, but did not deal with the particular issue of developments that had already taken place, as is the case in particular with the proposed Don Sahong dam. Much of his address reads as making a case that efforts should be made to minimise problems — as for instance with his discussion of the possible installation of 'fish friendly' turbines — as addressing the question of whether mainstream dams should be built or not. Not surprisingly critics of the mainstream dams were not persuaded that the Vientiane meeting had addressed their concerns and this led, in turn, to their convening a conference in Bangkok to address mainstream dam issues further in November 2008.

In very recent times the limitations on the MRC Secretariat's freedom of action and the fact that the constitution of the MRC does not provide for the organisation to act as a supranational body have increasingly come to be recognised, with the result that there is an increasing understanding that criticism of the Secretariat is misplaced. And there is an accompanying understanding that if change is ever to occur it will be as the result of different approaches by the governments that are members of the MRC. The Australian Mekong Resource Centre has been particularly helpful in bringing the issues involved in Mekong governance to a wider pubic, with thoughts on how the present situation might be changed.[60] It is striking, too, that one of the most active Thai NGOs, Foundation for Ecological Recovery, has recently mounted its campaign against the construction of mainstream dams with a clear recognition that lobbying, if it is ever to be successful will have to be in terms of persuading *governments*, and not the MRC as it is currently constituted to change their views on how to deal with the Mekong.[61]

One final point needs to be made in relation to governance issues. Over recent years there has been a steady progress to what has been

called the 'riparianisation' of the MRC Secretariat, a process of filling senior positions with nationals from the countries which belong to the Commission in place of the expatriates who previously occupied most of them. It is widely accepted that this process will extend to the appointment of the next CEO when the current CEO's contract expires in approximately 18 months' time. Without being able to predict what the outcome of such a development might be, such a change in the direction of the Secretariat will raise interesting questions about the interplay of national and broader, basin-wide interests affecting the Mekong.

Chapter 9

What could happen, and what can be done?

Whether it will ever be possible to square the circle by finding a way to transform the MRC into a body that can oversee the governance of the Mekong River in a way that is acceptable to all riparian countries seems highly unlikely. Not least is this so because there currently is little reason to think that China will change its opposition to membership. And there are few reasons to think that any of the existing members are ready to surrender their attachment to making decisions in their national self-interest. When there was no prospect of dams being built on the mainstream of the Mekong this attachment to national self-interest among the MRC members was not of such immediate consequence, but this is no longer the case. And while it is important not to approach the current circumstances from the point of view of a catastrophist, there is no doubt that the problems that will flow from the construction of dams, such as the proposals for Don Sahong and Sambor, are serious indeed and carry with them the threat of major damage to food security, most notably in Laos and Cambodia, but to a lesser extent in both Thailand and Vietnam. Even if these two most critically important prospective dams are not built the environmental costs of other possible dams will be a matter for concern.

Four years ago a well-informed Vietnamese scientific commentator on Mekong matters suggested to me that it would only be when matters

reached a point of crisis that the member governments of the MRC would put national interests aside in favour of a management regime that looked beyond their own sectional concerns. It will be a tragedy if this pessimistic prediction should come to pass. But the gravity of this observer's comments underline the fact that over the next 10 to 20 years the countries of the LMB face major challenges as the functioning of the Mekong changes, even without any of the proposed mainstream dams being built. If China carries out its announced intention to regulate the flow of the river this is bound to have negative effects on Cambodia's Tonle Sap, even if they cannot be precisely quantified. And the prospect of increased flooding as a result of climate change injects a new and worrying element into the concern into assessments of the Mekong's future. And both these future possibilities carry risks to the region's food security

With the solid body of evidence already available that makes clear the dangers associated with plans to build new dams on the mainstream of the river below China, the task confronting the MRC Secretariat and its CEO is daunting. While I have argued earlier in this paper that there is currently no broadly spread public concern about the future of the Mekong in the member countries of the MRC, with Thailand notable for the very active level of its advocacy NGOs, there is certainly a large enough body of opinion and advocacy stimulated by NGOs to make the role of the MRC and its Secretariat extremely difficult. Although we are still waiting for the release of the Secretariat's findings on the implications of the proposed new mainstream dams, the evidence against them, as recorded in this paper, is already there. Since we can expect that the promised report (paper) will be basically negative in character, how will this be presented by the Secretariat's CEO to the MRC Council, and so to the governments of the MRC countries? Whether this report will have any effect in the short term is, at least, an open question.

It is not within the CEO's competence to tell the governments which sponsor the MRC what to do, yet to release a report that glosses over the evidence that has already been published and is negative in tone so far as the mainstream dams are concerned cannot be an option. Because this is so, a possible route for the CEO to follow would be to table a report that is clear in its indication of the grave problems posed by

the proposed mainstream dams, but which suggests that if some dams must be built to meet the demands of providing hydropower then these should be restricted to dams built in the Upper Migratory System of the river, perhaps to a total of five dams. As outlined earlier in this paper, implementing such a decision would still lead to negative results in terms of the maintenance of fish stocks in the UMS and would almost certainly ensure the destruction of the iconic giant catfish.

In relation both to the proposed new mainstream dams and China's determination to continue construction of its cascade of dams, there is, regrettably, little current reason to judge that much can be achieved by state actors external to the Mekong region at this stage. Countries such as Australia, where it is my understanding that there is a clear appreciation of current and future problems through AusAID's involvement in funding MRC activities, are unlikely to be able to persuade the MRC governments to abandon their plans, however desirable this might be.[62] Nevertheless, given that the issues involved are so important there is reason to argue that Australia, and other interested countries, should seek to persuade the MRC member countries of the desirability of abandoning the most environmentally damaging of the proposed dams, even in the face of a likely negative response. For if Don Sahong and Sambor are built as proposed the cost in terms of a loss of food security will pose problems, not just for the MRC countries but for the international community more generally. A substantial loss of a basic part of the national diet in Cambodia and Laos would bring calls to the international community to deal with what would be a major crisis. As for China, both in terms of past developments and contemporary policies there is little reason to think there is any possibility of changing its plans for its section of the Mekong. This is particularly so as China's demand for electricity continues to grow at a voracious pace.

Against this pessimistic view perhaps the best that can be hoped for is the possibility that once serious consequences begin to become apparent advice can be offered to mitigate the worst effects of the developments taking place. Where once it was appropriate to write of risks, when assessing the Mekong's future it is now time to write of fundamental threats to the river's current and vital role in all of the countries of the Lower Mekong Basin.

Appendices

1. A historical note on proposals for mainstream dams below China

In 1956, and so before the original Mekong Committee (Committee for the Coordination of Investigations of the Lower Mekong Basin) was established the following year, the Economic Commission for Asia and the Far East (ECAFE) commissioned a report that was completed in 1957 and which suggested consideration be given to constructing three mainstream dams in Laos: at Pa Mong near Vientiane, at the Khemmerat Rapids near Savannakhet, and at the Khone Falls in the far south of the country, and one in Cambodia, at the Sambor Rapids just above the provincial town of Kratie. Additionally consideration was given to the construction of a dam to control of the flow of the water passing in and out of Cambodia's Great Lake, the Tonle Sap. Of note is the fact that the dam contemplated at the Pa Mong site would have resulted in the displacement of a large number of people — in some estimates up to 250,000 people — while the dam considered for the region around the Khemmerat Rapids would have inundated the important Lao provincial town of Savannakhet.

Then, in 1957 and separately from the ECAFE report, the Mekong Committee commissioned a retired US Army Corps of Engineers officer, Lieutenant-General Raymond A. Wheeler, to undertake a survey of possible dam sites on the mainstream of the Mekong. When he

completed his report, in 1958, his recommendations partially matched the proposals contained in the ECAFE report, as he suggested Pa Mong and Sambor as sites particularly worthy of serious investigation.

In the light of the Wheeler Report, the Mekong Committee moved in 1960 to begin survey work at the sites for the proposed dams at Pa Mong and Sambor, with the latter involving Australian engineers from the Snowy Mountains Hydroelectric Authority. It is apparent that at this stage very little thought was given to the negative environmental and social effects of large dams. This was the era of the decisions to build the Aswan High Dam in Egypt and Kaptai Dam in the Chittagong Hill Tracts of Bangladesh. The fact that dam construction would mean the large-scale displacement of population and have negative effects on fish catches was deemed less important than the positive benefits that were expected to flow from the dams' construction. In the case of Pa Mong these were listed as the cheap generation of electricity, the reduction of flooding and the provision of irrigation to the water-starved region of northeastern Thailand. Similarly, the dam at Sambor was planned to provide cheap electricity, lessen flooding downstream of the dam and improve navigation of the Mekong, which was severely restricted above Kratie by repeated rapids.

In the event, neither the planned dam at Pa Mong nor that at Sambor was built as deteriorating security, as a result of the expanding Vietnam War, made proceeding with their construction impossible. Despite the international character of the Mekong Committee there is no evidence that much if any thought was given at this time to how the Mekong might be managed once the dams planned for Pa Mong and Sambor were completed. And so, with the abandonment of survey work in the 1960s, it was not until the 1990s that there was renewed consideration of the possibility of building dams on the mainstream of the Mekong below China.

After the communist victories in Cambodia, Laos and Vietnam in 1975 the Mekong Committee continued to exist in an attenuated form as the Interim Mekong Committee, with Thailand as its only member and with a secretariat still based in Bangkok. In 1991 as the prospects for peace in the regions bordering the Mekong became more positive

the Interim Committee proposed that a study should take place 'to determine the extent to which it might be possible to build viable hydroelectric dams in the Lower Mekong Basin'. This time there was a recognition that consideration of the possibility of building dams should take place with the need to take into account the fact that 'large social and environmental effects are unacceptable' and that the scale of developments would have to be 'deliberately constrained to avoid or to minimise impacts'.[63] The authors of the study, which was financed by the United Nations Development Program and the French Government in 1992 and 1993, stated that they had focused on the possibility of constructing dams that could generate electricity by 'using the day to day water flows naturally available. Such projects are referred to as "run-river-projects"'.[64] As already noted in this paper, such a use of the term 'run-of-river' for dams that would of necessity have to be of a minimum height of 15 metres is fundamentally misleading.

The lead contractor for the study of the possibility of these run-of-river dams was the Compagnie Nationale du Rhône, a French state-owned company, in association with Acres International Limited of Canada, assisted by a team from the Mekong Secretariat. The completed report was presented to the Interim Mekong Committee in December 1994, but it did not lead to any action being taken by the successor Mekong River Commission, which was inaugurated in 1995. This was principally because its completion was followed quite shortly after by the onset of the Asian Financial Crisis

Importantly, the issue of what consequences building dams on the Mekong would have for fish stocks was only briefly explored in Chapter 5 of the 1994 report, with the suggestion put forward that fish would be able to 'pass downstream with little difficulty at all seasons'. But recognition was given to the prospect that passage of fish upstream 'will only be possible if effective facilities for the species of concern can be devised'. These 'facilities' the report indicated 'may comprise fish ladders, fish lifts or locks and water flow arrangements to attract fish to conveyance devices'.[65]

2. Navigation

Until very recently, the Mekong had not been used for large-scale navigation above Phnom Penh. This is a result of its morphology, with much of the river 'punctuated' by rapids and major obstacles in the river bed. It has only been in very recent times that work has been undertaken to overcome the barriers to navigation in the section of the river running between southern Yunnan and northern Thailand. As detailed in the Lowy Institute Perspectives paper, 'The Water Politics of China and Southeast Asia II: Rivers, Dams, Cargo Boats and the Environment', (May 2007), the number of vessels carrying cargo between southern Yunnan and northern Thailand, and in reverse, has increased since 2004, but exact figures are not available. An estimate made in 2006 of the value of trade between Yunnan and northern Thailand put Thai imports at US$36 million, with exports to China at US$115 million. Although the balance of trade appears firmly in Thailand's favour, the carriage of cargo is overwhelmingly in Chinese bottoms.

While the area of the Mekong between the far south of Yunnan and northern Thailand has not been a major contributor to the overall wild fish catch taken from the Mekong, the combined effect of the construction of the Chinese dam at Jinghong and the development of navigation between Jinghong and Chiang Saen has had a clear and negative effect on fish catches. This is an issue that has largely been absent from discussion apart from Thai NGOs, such as the Southeast Asia River Network (now Living Rivers Siam), which has charted a major decline in fish catches from the Mekong over the past five years.

Little has so far been published on the extent to which China still holds hopes of extending its navigation reach beyond Chiang Saen in northern Thailand, which would require massive further clearance of river reefs and other obstacles. In theory, at least, the capability China will have to 'even out' the Mekong's flow makes the idea of extending its navigation reach much more feasible, once a clearance program has taken place. Even without such a development, it is notable that as a result of the navigation that now takes place between southern Yunnan and northern Thailand there has been a substantial increase in both

the Chinese presence and influence in Chiang Rai province, an issue examined in 'The Water Politics of China and Southeast Asia II'.

3. Tributaries

Little in this paper has been said about the Mekong's many tributaries, but this does not mean that these are without problems, both in environmental terms and in relation to the political difficulties that have emerged because some tributaries rise in one country and then flow into the Mekong in another. Some elements of this problem were addressed in *River at Risk* and these continue to the present. While not exploring these in the present paper it is worth noting that one of the most controversial developments on a Mekong tributary, the Nam Theun 2 dam, which was discussed in *River at Risk* has now been largely completed, has made trial transmission of electricity to Thailand and will go into production at the end of 2009.[66] It remains a subject of controversy, though, in the words of the prominent advocacy NGO, International Rivers, 'not the worst dam in the world'.

Notes

[1] Details in M. Osborne, *The Mekong: turbulent past, uncertain future*. Updated ed., Sydney, 2006, pp 17-19.

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[15] *River at risk*, pp 25-30, and *The water politics of China and Southeast Asia II*, pp 13-19. Among the very recent Chinese statements denying that dams in Yunnan could have any negative effects was the presentation made by Dr Chen Guanfu, of Hydro China Corporation, at the Regional Multi-Stakeholder Consultation on the MRC Hydropower Programme conference held under MRC auspices in Vientiane in September 2008. Reported by Probe International, 29 October 2008.

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[19] Dr John Dore, speaking at an Australian Mekong Resource Centre seminar. University of Sydney, 29 August 2008.

[20] For a highly critical view of the proposed expansion of hydroelectricity projects in Laos, see, *Power surge: the impacts of rapid dam development in Laos*. Berkeley, California, International Rivers, September 2008. A similarly critical view may be found in C. Middleton, J. Garcia and T. Foran, Old and new hydropower players in the Mekong Region: agendas and strategies; F. Molle, T. Foran and Mira Kakonen, *Contested waterscapes in the Mekong Region: hydropower, livelihoods and governance*. London and Sterling, Virginia, 2009, pp 23-54.

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35 *Power surge*, International Rivers, p 81.

36 Mekong Secretariat, *Mekong mainstream run-of-river hydropower*, pp 7-5 and passim.

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38 There are major problems of transparency in relation to information about the Cambodian Government's intentions so far as a dam at Sambor is concerned. Speaking at the MRC-sponsored conference on hydropower in

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39 Poulsen, et al., *Fish migrations*, p 56.

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41 *River at risk*, p viii, where reference was made to Thai reactions to the low water levels of the Mekong during the 2003-2004 dry season. There were similar protests involving allegations directed at the Chinese dams in relation to floods in August 2008, see for instance, http://www.prachatai.com/english/node/755. See, also, Geoffrey Gunn and Brian McCartan, Chinese dams and the Great Mekong floods of 2008. *Japan Focus*, 31 August 2008. It is of interest that when discussing Mekong issues with a senior Thai official in Bangkok in May 2009 he chose to speak of China's dams as 'those damned dams'.

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