

IMPACTS, MITIGATION, RESTORATION

THE NAM THEUN 2 DAM IN LAOS

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Advisory Group to the World Bank

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Executive Summary

The basic documents setting out the plans for handling social and environmental questions on the NT2 project are very high quality. But no plans are without flaws: effective implementation is crucial.

Natural Habitat and Other Environmental Impacts

Each of the requirements of OP 4.04 (the safeguard policy on natural habitats) including that overall benefits substantially outweigh environmental costs and that the loss of the inundated area be offset by the protection of an ecologically similar area, has been met adequately in the case of NT2.

All studies have concluded that NT2 ranks first among the alternatives.

A cost/benefit analysis of environmental and social impacts shows a positive outcome at both the local and global level.

The offset to the inundated area---the Nakai Nam Theun National Biodiversity Conservation Area---is a globally ranked protected area and is more extensive, more biologically diverse and more pristine than the inundation area.

The offset: conserving watershed biodiversity

It is timely for more resources to be devoted to catchment development work alongside the priority conservation work such as patrolling.

Islands of biodiversity cannot survive in a sea of poverty: the WMPA Secretariat and the District Administrations should seek additional funds, internal and external, for priority development work in the watershed and the PIZ(buffer zone) villages.

More needs to be done in terms of apprehending poachers but a good start has been made on enforcement and demarcation operations.

There remain some loose ends:

- GOL undertakings to prohibit mining, logging and any other activities inconsistent with the conservation of the NBCA should now be sheeted home in decrees and/or GOL/Bank agreements.
- The Bank should undertake research on behalf of the GOL on the future economic benefits to be derived from conserving the watershed, ranging from bio-prospecting to carbon sequestration and research and other arrangements.
- Achieving World Heritage status for the NBCA is now a realistic goal.

Inundated: the plateau under water

Impounding the Nam Theun and diverting its waters to the Xe Bang Fai is still a calculated risk. The effect of the plethora of hydrological and other mitigation measures can only be assessed with any certainty when they are operating.

Given the degradation of habitats which will occur the impacts on terrestrial and aquatic biodiversity will be considerable. The potential for conflict between elephants and humans will be enhanced to a degree.

A comparatively small investment at this point by the NTPC on overdue conservation activities would pay dividends later.

Damage limitation: downstream of the dam

Cutting off most of the flow of the Nam Theun into its natural riverbed will have an adverse effect on aquatic plants, fish and other river users. By way of partial mitigation a minimum flow will be released into the Nam Theun in a move to help sustain the riparian environment.

There are two hydrological positives: floods below the Nakai Dam will be reduced or at least attenuated while there will be a useful reduction of flood levels on the Mekong itself.

Inter-basin transfer: downstream of the powerhouse

Inter-basin transfer of waters at the level contemplated adds a significant element of risk to the exercise as does the peaking regime now planned. The IAG's concerns relate not simply to water quality issues and the impact on riverbank gardens and fisheries but to the physical capacity of the downstream river channels to handle the expanded flows.

The company has moved on the design side to allay fears about flooding, erosion, sedimentation and water quality matters. Nevertheless it will be some years before the beds of the rivers have adjusted to the new level of discharge and to the weekly fluctuations. There are potentially serious implications for some riverbank dwellers.

The most recent hydrological study of flooding impacts in the lower XBF claims that even in a worst case scenario the effects are marginal.

Comment:

- At this stage the project has more of the characteristics of an enclave venture than the integrating one sought in OP 4.04. But the broad intent if not the literal requirement of the policy will probably be met.

- There remains an urgent need for environmental capacity building at the national level. This OP requirement is not being met adequately.

Impact on People and Compensation and Restoration

Getting the balance right: development in the watershed

Conservation activities which contribute to development and development activities which underpin conservation need identification. This sensitive work will call for imaginative leadership. The IAG warns against reinventing the wheel---some excellent preparatory work on alternative livelihoods has already been undertaken.

The fledgling WMPA Secretariat has performed well enough in its first few months in office. It has successes in the sectors of patrolling and border demarcation. But the direction and emphasis of its draft budget for the next several years need a second look:

- While a degree of balance in allocations has been achieved the budget is light on funds for village development activities
- There is very little flexibility built into the budget. The IAG suggests inter alia that a contingency provision be set aside in the annual budget of up to 10% of the total.

Social engineering: resettling the plateau dwellers

Premature project fallout should be adequately compensated for.

The IAG's overall assessment is that the resettlement plans as they now stand conform with the Bank's highly prescriptive requirements and are a model of their kind. The pilot village experiment is a useful precedent.

Some aspects of the resettlement exercise are still not finalized in part because the resettlers' rights to some resources still need reaffirmation on the GOL side. This should be done quickly.

Such concern as there is on the resettlement operation derives from the tightness of the schedule to move the remainder of the resettlers before rising waters threaten them. This calls for monitoring.

If the highly vulnerable Vietic-speaking peoples are not to be resettled back in the watershed or in separate villages then they should live in their own hamlets with their own schools.

Risks and opportunities: the Xe Bang Fai regions

Some conflicts remain over the number of villages/people affected by the project in the XBF regions, who will fund the more developmental work to be done and who will implement this. None of these problems is insoluble and all are close to resolution.

The remaining element of doubt over development funds is related to a degree to the fact that it is not yet possible to forecast final costs accurately: the situation and needs of each affected village is different. More than a basic fish-for-fish approach for compensation is called for in some villages on the XBF. To provide a sustainable livelihood will in some villages require electrification for dry season irrigation of high value crops—not necessarily rice—and in a limited number of cases flood control works.

Conclusions

The Nam Theun 2 project will have considerable and to some extent cumulative effects on the physical, biological and human dimensions of three of the four zones involved.

The principal offset from the environmental viewpoint is the conservation of one of the remaining centres of outstanding biodiversity in South East Asia.

This, plus the substantial revenues generated for Laos over several decades and the full exploitation of the turbinated waters for development, justifies the hydrological and human interventions entailed.

The NT2 proposals taken as a whole represent a promising development package for Laos: the net environmental, economic and social benefits substantially outweigh the downside costs.

The array of plans now on the table conforms broadly with the requirements of the relevant World Bank's safeguard policies and are in some respects an advance on them.

They have the potential to help ensure that the poor of Laos are the final beneficiaries of NT2.

Overall project coordination needs to be improved. We endorse the general thrust of the POE's recent recommendation that a mountains-to-the-Mekong approach now be adopted, with regular exchanges of information ensured and an accessible monitoring system set up.

IMPACTS, MITIGATION, AND RESTORATION

THE NAM THEUN 2 DAM IN LAOS

1.0 Introduction

The river flows quietly in the sun at this time in the dry season. The rocks confine the flow so that the rapids animate the water. The tall trees along the river are starting to be culled for the dam diversion tunnel and the workers' camp. The UXO contractors have almost removed the unexploded legacy of decades of war. The scene is still deceptively normal. But at the powerhouse site miles across and down the escarpment the activity level is decibels higher. A vast access tunnel already burrows into the hillside. Across ten hectares of cleared land diggers are hollowing out the station construction site and big trucks are hauling away the rocks and soil. There is no room for doubt that a large enterprise is underway. After years of delay project preparations are manifest on the ground.

This is the year of decision for the Nam Theun 2 dam in Laos PDR. The World Bank is undertaking its final appraisal of the raft of plans and draft agreements on the project and will go to its Executive Board for a decision within two to three months on whether it will support the building of this large dam in one of the least developed countries in South East Asia. So the current assessments of the panels which have been monitoring the handling of various NT2 issues for several years assume more significance than usual.

This fifth report of the International Advisory Group---an independent body set up eight years ago to report to the President of the Bank on its handling of NT2 social and environmental matters in particular---is one in a series assessing in broad terms how the Bank is faring in this latest endeavour to help manage a notoriously sensitive exercise: building a large dam in a developing country in the midst of world class biodiversity, almost as diverse human groups and abject poverty. The IAG is guided to a degree in its judgments by the range of World Bank policy documents known collectively as the Safeguard Policies.

Regrettably a visit by the full IAG team of Dick de Zeeuw(Convenor), Emil Salim and David McDowell was not feasible at this time. Hence this report draws on the latest versions of the seminal planning documents for the project and on the observations made by David McDowell in the course of a two week field visit to Laos in the middle of January 2005. He worked closely with the NT2 Panel of Experts who were in Laos at the same time and is grateful for the wisdom and wide experience of dam building exercises around the globe shared with him by the POE's Lee Talbot and Thayer Scudder.

It is the IAG's collective judgment that the four basic documents setting out the plans for handling social and environmental questions which arise in implementing the project—the watershed management plan(SEMFOP), the Social Development Plan(SDP) incorporating the Resettlement Action Plan(RAP), and the Environmental Assessment and Management Plan(EAMP)—are probably the highest quality such documents produced for a Bank project of this nature. Similarly the draft Concession Agreement setting out the reciprocal obligations of the Government and the Nam Theun Power Company(NTPC) is an innovative and authoritative document which will be widely emulated in future infrastructure projects.

All that said, no plans are without flaws. Any plan is only as effective as it is implemented. And few plans are so prescient that they do not call for inspired adaptation as they evolve. This will be true of the NT2 project plans as it has been of others. The balance of this paper—which should be read together with its predecessors for a comprehensive coverage of the subject—addresses some of the impacts now expected from the Nam Theun venture and the mitigatory, compensatory, restorative and other measures planned to counteract these adverse effects.

2.0 NATURAL HABITAT AND WIDER ENVIRONMENTAL IMPACTS AND MITIGATIONS

Damming a major river system, inundating over 450 square kilometres with the impounded waters, releasing only a small proportion of the waters down the original riverbed, dropping most of the water down a thousand foot escarpment into turbines and releasing the turbinated water into another river basin, amounts to a drastic interference in the hydrology of a small country. The impacts, were they unmitigated, would be substantial and cumulative.

The World Bank's safeguard policy on natural habitats (OP 4.04) makes clear that this would be unacceptable: the Bank does not support projects converting natural habitats unless there is no alternative for the project and its siting, overall benefits can be shown to substantially outweigh environmental costs and there is a mitigating measure planned such as establishing and maintaining an ecologically similar protected area.

Each of these requirements has been met adequately in the case of NT2 in the view of the IAG. Alternative proposals have been studied extensively since an original assessment was brought to our attention in 1997, was updated in 2000 (Hydropower Development Study) and most recently through last year's Power Sector Development Strategy. All examined other power export proposals and asked whether the proposed configuration of the project was optimal. All concluded that **NT2 ranked first among the alternatives.** We concur, particularly now that downstream design modifications have been introduced such as a regulating pond below the powerhouse to enable more controlled releases into the Xe Bang Fai (XBF). A second step forward was the undertaking by the NTPC to restrict flows from the Regulating Dam when the XBF is flooding or threatening to do so. We retain reservations about the detail of the mitigation measures proposed for below the dam and await the imminent Riparian Release Study's findings.

As for overall benefits compared with environmental costs, **a cost/benefit analysis of environmental and social impacts shows a positive outcome at both the local and global level.** We have some problems with aspects of the methodology---there is no estimate made, for example, of the value of retaining the range of ecosystem services performed by an intact watershed. Nor is there an estimate of the value of a major benefit of the project, namely the opportunity to lift productivity along the length of the rivers below the turbines through using the diverted waters to irrigate fields for the more reliable dry season crops. Nevertheless the sums add up to a substantial overall net benefit compared with environmental costs.

As for the OP 4.04 requirement that an equivalent area be set aside as an offset to the area inundated, this has been achieved by the designation by the Lao Government of one of South East Asia's biodiversity hotspots as an explicit offset for the loss of the largely degraded plateau forests and plains. The Nakai Nam Theun National Biodiversity Conservation Area (NNT NBCA) **is a globally ranked protected area. It is both more extensive, more biologically diverse and more pristine than the area to be inundated.**

2.1 The offset: conserving watershed biodiversity

Conserving the watershed has utility at a number of levels. Acting as a **giant sponge and filter** it will even out flows and reduce the incidence of erosion and hence sedimentation into the reservoir. The life of the dam's operation will thus be prolonged and water quality sustained. But protection of this treasure cannot be achieved without difficulty. The massive two volume watershed management plan(SEMFOP) is an impressive compilation of largely very sound proposals for striking the necessary balance between biodiversity conservation and sensitive development activities for the watershed dwellers. This balance lies at the heart of the watershed management strategy; the two activities must be mutually reinforcing to be effective. It has occasionally seemed that the need for this balance is not always accepted by some Lao Ministers. But senior Government leaders assured us recently that they are fully aware both of the need for balance and of the offset factor.

Ministers do have a legitimate concern for the situation of the watershed dwellers. Helping provide viable livelihood alternatives for villagers increasingly precluded from hunting and gathering in the old ways is an urgent task for the Watershed Management and Protection Authority(WMPA) and will become the more so as the level of development benefits going to the resettlers on the plateau below becomes more apparent.

It is **timely for more resources to be devoted to catchment developmental work**, alongside the priority conservation work such as patrolling. The World Bank's own Southern Provinces Rural Electrification Project, for example, may have a useful role to play in undertaking off-grid installations of micro- and mini-hydro operations in the watershed valleys. There are only limited allocations for "bringing bright lights to the bush" in the WMPA's budget yet this is one way of improving the quality of life in the catchment villages without opening them up to roading and the exploitation which almost always follows.

The same considerations apply to the buffer villages around the NBCA. The needs of these so-called Peripheral Impact Zone(PIZ) villages were addressed in our 2004 report. All we would repeat here is the global orthodoxy that **islands of biodiversity cannot survive in a sea of poverty**. There is now available a most useful report(Ground-based Inventory of Human Activity in the PIZ of the NNT NBCA) which spells out the priorities for action. Inevitably enough current budget allocations are inadequate to achieve what needs to be done urgently. **The WMPA Secretariat and the District Administrations should desirably work closely together in seeking additional funds, internal and external, for this work.**

The IAG has addressed in earlier reports the issue of roading access to the NBCA. All we would add here is that although the vision for restricting access in the SEMFOP is unexceptionable the fine print of the text appears to envisage a more flexible approach, with the Khamkerd road to Ban Thameung in the Nam Xot valley and on to Ban Navang in the Nam Mon valley kept open in the interim and some existing 2.5 metre

tracks maintained. The CA notes budgetary provision for 3 metre tracks, which would accommodate four wheel drive vehicles. We adhere to the view that **tracks should be no wider than 2 metres in order to maintain the integrity of the natural resources of the protected area.**

There have been three recent positive developments of environmental significance in and around the watershed which should be recorded. The company(NTPC) agreed, following submissions this month by the Panel of Experts(POE) backed up by an IAG representative, to change its plan to house all 750 workers for the dam site adjacent to the site itself and instead to **house the great majority of them(600 in total) well away from this sensitive wildlife corridor area and bus them into the site.** Secondly, the Governments of Laos and Vietnam have signed a **bilateral agreement to try to halt wildlife trading across their common border** close to the project site. That is most encouraging. Finally, the WMPA Secretariat has moved quickly to **delineate on the ground the border** of over 50% of the NNT protected area and has been **active in patrolling the watershed**, apprehending 27 transgressors, fining them a total of Kip 95 million and confiscating wildlife ranging from pangolin to sun bear to reticulated python to aguilaria wood. Most poachers came from minority villages in the buffer zone. **More needs to be done but this was a good start.** The recommendation on the setting up of **guardian villages** has merit and should be implemented quickly, not least as a means of involving the villagers in the conservation processes.

Finally, there remain some loose ends which need tying off by the GOL and the Bank respectively. On the Government side there is a number of undertakings which have been made over the years which should be sheeted home in decrees and/or GOL/Bank agreements. These include **prohibitions on mining, logging or any other development inconsistent with the conservation of the NNT NBCA.** For its part the Bank might usefully undertake---perhaps with a knowledgeable partner like the World Resources Institute---research on behalf of the GOL on the future economic benefits to be derived from conserving the watershed, ranging from **bioprospecting fees and royalties to carbon sequestration and research and eco-tourism arrangements.** The reality is that standing trees in an intact habitat will be much more valuable to Laos in the years ahead than the one-off returns from logging----but this needs documenting and illustrating in due course for all to see.

A first step toward the above goals would be to **achieve World Heritage status for the NBCA.** This has proved impracticable while the legislative and administrative structures to properly manage the protected area have been under preparation. Now that they are in place an early approach to the World Heritage Bureau at UNESCO Headquarters in Paris is timely.

2.2 Inundated: the plateau under water

Impounding 195 km. of the Nam Theun and diverting 220m³/s from it to the Xe Bang Fai is still a calculated risk. There are few parallels in the tropics for such a venture and the shallowness of the reservoir introduces a further element of risk. Around forty percent of the plateau will be covered by the waters at maximum fill and all forest and grasslands, savannah and wetlands vegetation in this area will be lost. Close to two-thirds of this land cover is already considered degraded. As already noted, **the offset to this loss required under OP 4.04 is protection of the larger and more biologically diverse NBCA.**

Water quality in the reservoir will be affected by the amount of biomass left in place at filling, solar radiation in this shallow water, mixing of the water column, the incidence of aquatic weeds etc.. Mitigation measures include sound catchment management in the NBCA, removal of biomass for a variety of purposes and drawing riparian releases from the warmer more oxygenated upper layers of the water column and aerating it through a cone valve (to the Nam Theun), a weir (to the Nam Kathang) and further aerating devices in the downstream channel (to the Xe Bang Fai). **The cumulative effect of this plethora of mitigation measures can only be assessed with any certainty when they are operating.**

Inevitably given the balance of biomass left in the reservoir there will be higher levels of nutrients in the reservoir in the early years which may, as they did in the case of the Nam Ngum dam, lead to a growth in fish numbers. Possible negative conditions could arise if there are large seasonal fluctuations in water levels and anoxic conditions occur on a greater scale than expected. Some fish species will not adapt to the new circumstances. There are **possible implications here for the livelihood options of the resettlers---see section 3.2 below.**

The impacts on terrestrial biodiversity of the inundation will be considerable, given the destruction or degradation of habitats which will occur. The habitats of the herds of elephants on and around the plateau will be affected and **the potential for conflict between elephants and humans enhanced to a degree.** A World Conservation Society survey team is in the field endeavouring to determine numbers and habits of the elephant herds. The most likely scenario for conflict is when crops are coming up to harvest time. This is an area where prudent forward planning is called for yet NTPC appear to be dragging their feet in funding the range of species programs. They are also drip-feeding rather than providing the agreed substantial tranches of funds to the WMPA in its early years. While one can sympathize to a degree with the company in wishing to minimize its outlays before final decisions on the project are taken, the fact is that large sums are being spent before financial close on ground clearing, camp-building and engineering works. **A comparatively small investment at this point by the NTPC on overdue conservation activities would pay dividends later.**

2.3 Damage limitation: downstream of the dam

It has been accepted from the outset that cutting off most of the flow of the Nam Theun into its natural riverbed will have **an adverse effect on aquatic plants, fish and other river users including the (mercifully few) regular human visitors to the banks.** By way of mitigation the project will release a minimum flow of 2m³/s into the Nam Theun downstream of the dam in a gesture to help sustain the riparian environment.

The results of a belated and more detailed riparian study will be available shortly. One of the matters of interest will be the possible erosive effects on the presumably rare occasions when the storage capacity of the reservoir is exceeded and water is spilled over the dam as a consequence. The EAMP observes that riverbank erosion will not be a major problem as there are considerable lengths of rock zone present. That is reassuring---and accords with our own observation---but we are interested in what "...adaptive management of the riparian release and modifications to the river's morphology..." mean in practice. It is also good that the NTPC has (belatedly) accepted the principle of compensating those villagers who, if only on a periodic basis, fish the downstream Nam Theun. The severely reduced flow will clearly impact heavily on fish stocks.

It should be noted for the record that there are a couple of positive aspects of the reduced flow in the Nam Theun. First, the capacity to manage reservoir flows on most occasions means that **floods below the Nakai Dam will be reduced or at least attenuated.** Secondly, there will even be a useful **reduction of flood levels on the Mekong itself**---the calculation being that flood levels at the XBF/Mekong confluence could be down by around 0.18m. The downside is that **generation of energy by the Theun Hinboun station will be reduced by around 15% once the NT2 use kicks in.**

2.4 Inter-basin transfer: downstream of the powerhouse

Inter-basin transfer of waters at the level contemplated in the NT2 project is regarded as adding a significant element of risk to the exercise. **The switch to a peaking regime adds to the risk by exacerbating the fluctuations in water levels.** The IAG's concerns have not simply related to water quality issues, the impact on riverbank gardens and fisheries---and hence on the livelihoods of the people in the numerous riparian villages---but to the physical capacity of the channels of the Nam Phit, the Nam Kathang and the Xe Bang Fai to handle the vastly expanded flows now to pour into them. **We have also been concerned at the slow reaction time of the NTPC, and the World Bank itself at various stages, in reacting to emerging requirements and changing priorities such as the greater emphasis on poverty alleviation.**

The company has come a long way from its initial view of the project as simply a power-generating exercise. **It has accepted that NT2 is a multi-purpose project.** It has substantially set aside its reservations about having any involvement in the situation of the people below the powerhouse and has agreed, beyond the mitigation and compensation regime, to contribute to restoration programs which are in fact development programs in all but name. The lenders have still to face that last hurdle although they have been parties to a cash grant offer with a cap firmly attached. The company merits commendation for its flexibility and good sense.

It has also moved on the design side to allay fears about flooding (beyond the natural regime), erosion, sedimentation and water quality matters. Among other measures it has moved to ameliorate the increased flow by designing a regulating dam and pond downstream of the power station and has undertaken to stop power generation when flood levels reach an agreed high level.

It is nevertheless clear that erosion will occur both because of the peaking regime and because reservoir water will have a very small sediment load, thus apparently adding to the sediment-carrying capacity of the diverted water and leading to greater erosion of the banks. **It will be some years before the beds of the rivers have adjusted to the new level of discharge and to the weekly fluctuations.** We make this point because it has potentially serious implications for aquatic plants and fish and for those people living along the Xe Bang Fai and its tributaries---see section 3.3 below.

Interestingly, the most recent hydrological study of flooding impacts in the lower XBF claims that **even in a worst case scenario, with a maximum water release at the powerhouse of 315 cumecs, the effects are marginal.** The Snowy Mountains Engineering Company's hydraulic modelling suggests that only 3.5% would be added to the area naturally flooded and that the flood levels on the lower XBF would rise by only 0.2 m. in the worst case situation. But there would be a substantial increase in river channel velocity, averaging 20% in a within-the-banks flood. That would obviously add to erosion. As with other hydrological studies the impacts cannot be calculated with total confidence ahead of time, especially in this era of extreme weather events.

2.5 Comment

We have two final comments on the environmental side, both deriving from requirements in the Natural Habitats OP 4.04. The first is that it would be difficult to contend that the NT2 project is "...designed to integrate into national and regional development the conservation of natural habitats and the maintenance of ecological functions." The reality is that **at this stage at least the project has more of the characteristics of an enclave venture than an integrating one.** Perhaps it is simply a factor of magnitude: the project will be by far the biggest mounted in Laos so it is ground-breaking in more ways than one. If the quality of the work and the level of creativity which has been invested in this venture is reflected and reproduced in future large infrastructure projects in Laos---and elsewhere for that matter---then a new reality will have been forged. That would seem to meet the broad intent if not the literal requirement of OP 4.04. And as decentralization progresses in Laos it is also possible that a greater degree of integration will occur at the provincial level. There are signs that this is beginning to happen already, with the Khammouane authorities in particular starting to assert themselves in the planning and external aid coordination areas.

The second comment relates to the OP requirement that projects include components that develop "...the capacity of national and local institutions for effective environmental planning and management." The Bank has in place a scheme for approaching capacity-building on a nation-wide basis. And UNDP has also taken some useful initiatives in this regard. But the IAG has to reiterate what it said in its last report, which was that the restructuring and downsizing of GOL agencies with responsibilities in the conservation and environment fields was most untimely. **There remains an urgent need for environmental capacity building at the national level, reflected also in more generous budgetary allocations.**

3.0 PEOPLE IMPACTS, COMPENSATION AND RESTORATIONS

3.1 Getting the balance right: development in the watershed

We have emphasized above the fundamental importance of getting the balance between conservation and development right in the watershed. This is doubly so because the two are intimately linked: the watershed dwellers cannot be expected to forsake old and proven ways of survival however environment unfriendly unless alternatives are available and seen to work. On the other hand, development activities which undermine the conservation imperatives have eventually to be set aside and more viable and sustainable options sought. Part of the answer is to **uncover conservation activities which contribute to development and development activities which underpin conservation**. Both sets of activities exist. The trick is to identify them and adapt them to the NNT NBCA context.

This is highly sensitive work which will call for dedicated and imaginative leadership in the villages and among others participating. The IAG has consistently pointed out that it is a more demanding operation than the plateau resettlement since there are so many more inhibitions on classic development ventures in the watershed. In a crude sense most problems in the plateau can be solved in the short term by throwing money at them. That easy (and ultimately unsustainable) way out is not an option upstream.

The IAG would at the same **time warn against reinventing the wheel**. Some excellent preparatory work on alternative livelihoods in the catchment area was undertaken nearly a decade ago. IUCN workers with experience on the ground, some knowledge of the local languages and a willingness to walk into the watershed villages and live and experiment alongside the people with new ways of cultivation and new crops found some at least of the answers now being sought. Their reports should be looked out and consulted---precious time will be saved in this way. It may also be that it would make sense to bring one or two of these initiators themselves back into the picture under new auspices (since IUCN apparently does not have the resources at this time). Similarly, the World Bank's District Upland Development and Conservation Project produced some useful lessons which should not be lost sight of. We commend these thoughts to the WMPA Secretariat.

How well has the fledgling Secretariat performed in its first few months in office? Pretty well in the IAG's estimation. Some of the achievements in the areas of patrolling and border demarcation are noted above. So what are the prospects for the immediate future? One indicator of direction and emphasis is the draft budget for the next several years. Drawing it up has been a priority-setting exercise. It is not the IAG's role to assess such documents in depth but since this is the first such effort and is thus setting precedents we have the following broad comments:

* first, while a degree of balance in allocations has been achieved it seems to the IAG that **the budget is light on funds for village level development activities.** Efforts are to be made to raise more funds for this work externally but that takes time to organize. With development programs on the adjacent plateau proceeding apace it would be wise to try to reallocate more funds to this item early on even if a reduction in initial staff totals is the cost. The PIZ villages also demand attention.

* secondly, there are one or two comparisons which could be made which seem anomalous---such as the item for monitoring being almost three times that for training and over a third of that for Livelihood Development for Conservation(LDC). Of course monitoring is an important element in the whole arrangement and cannot easily be done cheaply when there are expatriates from the developed world involved---but there are **monitoring alternatives from the developing world which would provide as good a service at significantly reduced cost.**

* thirdly, there is very little flexibility built into the budget, given that there are virtually no contingency funds set aside and that there is a quite incomprehensible proviso that individual line items in the budget may only be varied by up to 15%! Operating off a budget covering multiple years ahead is going to be demanding enough without such an arbitrary restriction being imposed. **The IAG cannot see who benefits from this inflexible provision.** We would suggest that it be dropped---and that the WMPA Board also require a **contingency provision in the annual budget of up to 10% of the total** so that the Director has some room to adjust to the adaptive management approach he is being enjoined to follow.

3.2 Social engineering: resettling the plateau dwellers

Several of the World Bank's policy directives come into play in the plateau zone of the project. OP 4.12 on involuntary resettlement, for example, appears to cover the situation of the NT2 resettlers whose traditional forest product-gathering areas on the plateau were seriously degraded in anticipation of the project starting. A second section of the same document precludes restrictions on access to protected areas before restoration measures are in place---yet the future resettlers were discouraged from gathering wildlife and other NTFPs from the upstream NBCA areas before the protected area was formally established. The result was "pre-project" impoverishment and considerable hardship for villagers having to walk much further and work harder to gather natural resources. **Such premature project fallout has to be either discouraged or adequately compensated for in the IAG's view.** It is not too late to move on this front in the case of those awaiting resettlement.

It is also arguable that time was lost through an overly literal interpretation of the ODs on involuntary resettlement and indigenous peoples. Both are important components of the Bank's suite of policy directives. But the situation on the plateau is that practically all the resettlement communities qualify as indigenous people so there is a substantial overlap between the requirements of OD 4.12 and OD 4.20 on indigenous peoples. It seems to the IAG that **with the display of a little flexibility one survey and one report could have covered most of the demands of both policy directives from the beginning.** Perhaps a supplementary paper on the especially vulnerable indigenous groups like the Vietics would still have been called for but the doubling up of effort in the early drafting stages might have been reduced in the circumstances of this project. In the final draft of the Social Development Plan(SDP) a degree of integration in reporting was achieved and that is to be commended.

The above observations do not detract from the **IAG's overall assessment that the resettlement plans as they now stand conform with the Bank's highly prescriptive requirements and are a model of their kind.** This has been achieved in part because an early start was made on the consultative and planning process and also because a pilot resettlement village was set up which enabled valuable lessons to be learned about several aspects of the initial plans. The IAG is of the view that **this pilot village venture is a useful precedent** for other such projects and might well be written into the appropriate OD as an option worth considering.

One of the outcomes of the pilot village experiment was that it became clear that the plateau soils were largely unsuitable for rice growing. This necessitated a rethink of the livelihood options. Some aspects of this exercise are still not finalized, in part because the **resettlers' rights to the designated lands, forest resources and future reservoir fisheries need reaffirming by the Lao side and in part because how the reservoir fishery will perform initially is a matter for conjecture.** There remains time to finalize the range of livelihood options---this should not be allowed to delay the Bank's decisions on the project.

If there is a concern on resettlement it derives from the **tightness of the schedule to move the remainder of the resettlers before rising waters threaten them.** As the POE has made clear in its Eighth Report there is much to be done in the next two dry seasons, including undertaking negotiations on how the costs of constructing a dam and irrigation scheme for the composite village(Ban Nam Pan) in Khamkerd District---and then constructing them, plus housing and improved village facilities and roads, in time for moving the people affected by rising waters. The delicacy of this exercise is enhanced because there is a host population involved, which brings in additional requirements under the relevant Safeguard Policy. The approach being followed seems a little casual in the circumstances.

A second concern derives in part from the application of the GOL's policy of **village consolidation.** Motivated also by more detailed inspection and assessment of proposed sites, the planners now say that a total of 15 villages will occupy eight sites. As it was explained to us, there will be groups of villages on some sites. While initially suspicious that all this was a cost-cutting measure we were assured by both GOL and NTPC representatives that no budget reductions were involved, that where there were now larger aggregations of people larger public facilities including bigger schools and clinics would be built and that the change of plan had been endorsed by the resettlers themselves. One of the new villages (sixty households) will be constructed relatively near to the existing pilot village but will still have its own school and clinic. **Monitoring of the progress of the resettlement operations should nevertheless involve early visits by the POE and the IAG to all the group sites now under development.**

Resettlers have demanded two other adaptations to earlier plans: they wish to live together in clans inside villages and want their new houses to be placed along the access roads, not clustered in one area as in the pilot village. The latter change may be advantageous if it enables people to live closer to their gardens. The former change may help provide a partial solution to the problem of the **highly vulnerable Vietic-speaking peoples.** If they are not to be resettled back in the watershed or in separate villages on the plateau then they should at least be enabled to **live in their own hamlets with their own school(s).**

The IAG underlines three points made in earlier reports. First, we remain convinced that **livelihood options would be widened were the plateau nursery more adventurous in its experimentation with new crops. The** There are some impressive new ventures underway in the pilot village(a furniture factory, an all-organic new mulch plant, breeding of eels, catfish, frogs, earthworms and local rabbits etc.). But there seems to be scope for the nursery to expand its experiments into high value crops like the range of legumes and tubers(have cluster beans, tofu, soya beans, mong beans, cassava been tried?) all of which may prove to have a comparative advantage as against production in Thailand, for example. What is needed at this point is a **hard-headed market survey of the import needs of neighbouring countries in order to inform the debate on future cultivation directions** in two very different project zones---the plateau and the XBF.

Our second reiteration relates to investment in the health field in the project area. The spectacular reductions achieved in malarial infestation rates following the distribution of bed nets impregnated with mosquito repellent are evidence of how big improvements in the quality of life---and productivity---can be achieved through modest investments in health. Big strides have been made in terms of a regional health approach but **village-level delivery of health services lags still across all project zones, not least the watershed.**

Our final observation has been prompted by the news from the RMU that around 50 households have drifted down from the NBCA area to the plateau area since the last survey and cannot easily be denied the benefits of resettlement though their legal entitlements are ambiguous at best. The word is clearly getting around that those to be resettled will be well treated. The attractant factor is at work. The IAG sees this development not as a reason for reducing the resettlers' entitlements---far from it---but as **an additional argument for moving quickly to improve the lot of those in the adjacent watershed, the PIZ villages and the Xe Bang Fai region.** If this is not done there will be mounting pressure from their neighbours on the resettled people and it will be the more difficult to ensure that exclusive access to the plateau's natural resources which is the basis for the resettlement plan.

3.3 Risks and opportunities: the Xe Bang Fai regions

Consistent with historical patterns, the areas downstream of the powerhouse are the least well prepared for the appraisal process. **Conflicts remain over the number of villages/people affected by the project, who will fund the more developmental work to be done and who will implement this.** At the same time it should be emphasized that none of these problems is insoluble and that all are close to resolution. There is no basis here for delaying approval of the project.

The question of how many people will be affected by NT2 has been in dispute for years. It appears that the figure of 75,000 is now being used---still only half of the numbers calculated by some NGOs. The total is made up of 40,000 people on the mainstream XBF, 10,200 in “the hinterland”, 18,000 on the Nam Phit and 6,300 on the lower XBF. These seem closer to reality than some of the low figures bandied about earlier.

The dispute over funding is the final element of the overall financial equation and is doubtless a standard feature at this point in project formulation, though as noted above(2.4) there is an underlying debate here over what is compensation and mitigation and what is “development”. There is also controversy over the degree to which the company should become involved in what some of its senior managers still see as development work. There is a readiness to contribute a cash grant of around US\$15m. but the preference is simply to hand the money over and have done with it. World Bank staff tend to think that the company has a useful role in coordinating disbursement as well.

The IAG is optimistic that all will be resolved in due course in part because there is no lack of interested donors for work on the XBF even if the various strands need pulling together. The Bank itself has three projects planned(Rural Livelihoods, Southern Provinces Electrification---an extension of an existing program---and the old NTSEP) while the French AFD is also reportedly interested in helping out on the livelihood side and the ADB is already working in irrigation management. For its part, the Lao Irrigation Department of MAF, long the neglected partner in the XBF, has got its act together and submitted design proposals for use of some of the turbined waters notably gravity feed schemes along the upraised water channel.

The remaining element of doubt over development funds has its roots in the fact that it is **not yet possible to forecast with any degree of accuracy what the final costs will be.** We visited four villages on the XBF, all within an hour’s travelling time. The situation and the needs were different in each one. Two with electricity and pumps available and hence dry season paddy and full fish ponds year-round will probably only require compensation for loss of river fish and for erosion in the early years though one was also holding out for its earth irrigation channels to be lined. But the situation in the other two villages will be dire. They have no dry season paddy, are nowhere near self-sufficiency in rice production, are highly vulnerable to regular loss of their wet season crop of rice through flooding and are thus almost totally reliant on catching and on-selling river fish to buy rice for much of the year. With the latest version of the EAMP

much less upbeat than the NTPC about the ability of many of the XBF fish species to survive the first years of the project's operation, more than a simple fish-for-fish approach to compensation is called for. **To provide a sustainable livelihood electrification and pumps will be required** so that the security of dry season production---not necessarily of rice, for in the porous XBF soils a more efficient use of the water may call for higher value crops---may be achieved in villages like these. Some may also need **enhanced flood control structures**.

It seems likely that electrification will occur: we were assured that all XBF villages from Gnommalat to the Mekong will be electrified within three years ie. before the turbinated waters are available. Some money will be available for pumps and perhaps flood control works. There may in addition be an **emerging requirement for a rural credit scheme to fund those works which fall through the cracks**.

4.0 CONCLUSIONS

There is no avoiding the conclusion that the Nam Theun 2 project will have **considerable and to some extent cumulative impacts on the physical, biological and human dimensions of three of the four zones** involved: the largely inundated plateau, the water-deprived Nam Theun below the dam and the capacity-challenged rivers below the powerhouse. Such impacts are the more inevitable when an inter-basin transfer of waters on a large scale is to occur. The risks have been heightened to a degree by the peaking regime for power production now to be followed. Unmitigated, the impacts and risks would be on an unacceptable scale.

The principal offset from the environmental angle is the conservation of one of the few remaining centres of biological diversity in South East Asia. As the authors of the EAMP put it:“ The project will contribute a total of US\$31.5 million to the management and conservation of the NNT NBCA, contributing in this way to the conservation of internationally important biodiversity.”

Is this, plus the substantial revenues generated for Lao poverty programs over several decades, sufficient justification for the hydrological and human interventions entailed? One answer is that if the alternative is a wholesale resort to exploitation of the country’s only other major resource---timber---then an affirmative response is called for. But the IAG has consistently argued on the more rational basis that the **NT2 proposals taken as a whole represent the most promising development package before Laos at this stage in its evolution. For the net environmental, economic and social benefits substantially outweigh the downside costs.**

It is the IAG’s view that the **array of plans now on the table conform broadly with the requirements of the World Bank’s safeguard policies and in some respects are an advance on them.** Implemented with vigour and enthusiasm and adapted as experience demands they have the **potential to help ensure that the poor of Laos are the final beneficiaries of the project.**

The IAG adheres to the opinion that the endeavour which has most surely undermined the success of other large dam projects — **resettling the displaced---is likely in this case to be the most problem-free aspect** complex though it may be. We are impressed also by the **gathering momentum of the effort to use the turbinised waters** to the benefit of those along the heavily populated banks of the Xe Bang Fai. We remain convinced that the **most challenging part of the whole exercise will be achieving a balance between conservation and development in the magnificent Nam Theun watershed.** It may be on the basis of how this operation goes that the success or otherwise of the project will come to be judged.

We suggested in our last report that the time has come to switch the emphasis in the project from planning and safety net construction to implementation. That will switch the focus for action from Washington, Paris, Manila and Vientiane to Thakkek and Nakai. That is as it should now be.

There remain some problems to solve. Overall project management and coordination is not fully effective. Too much of the cooperation and cross-sectoral exchanges appear to happen in part as the result of chance encounters or casual meetings. We endorse the general thrust of the POE's recent recommendation that a **mountains-to-the-Mekong approach now be adopted**, with regular exchanges of information ensured and a practical, realistic and widely accessible monitoring process set up. The new phase now to be embarked upon will call for new attitudes, new ways of working and new skills---and some new faces.

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