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Sustainable development and the social and cultural impact of a dam-induced development strategy--the Bakun experience*.

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Introduction

In the past few decades, manufacturing industries in Malaysia have expanded tremendously. For instance, they grew at an average annual rate of about 14 percent between 1987 and 1997. (1) In the same period, Malaysia's economy transformed rapidly from an agricultural base to an industrial orientation. It is the aim of "Vision 2020" that by the year 2020, Malaysia will become a fully industrialized country on par with the advanced nations of the world. Briefly noted, Vision 2020 is a long-term plan which aims to direct the country's future course of development through industrial restructuring, technological leapfrogging and human resource enhancement.

Undoubtedly, one of the major conditions for achieving this vision of growth is ensuring the availability of energy, particularly the supply of electricity. To meet this goal, Malaysia has realized that it needs to optimize the exploitation of Sarawak's hydro-electric potential. It is under this premise that the government has undertaken the construction of the largest dam in Southeast Asia--the Bakun Dam (see figure 1). The dam, which is located in Sarawak state (herein interchangeably referred to as the "state"), is 205 metres (m) high, 740 m long and 560 m wide. It has an installed capacity of 2,400 megawatts (MW). It is expected that 69,640 hectares of a genetically rich and diverse forest ecosystem will be completely submerged when the water behind Bakun's dam is impounded, representing an area larger than Singapore.

[FIGURE 1 OMITTED]

In general, the adoption of such a dam-induced industrialization strategy is largely based on a limited interpretation of "economic efficiency." The term economic efficiency refers to a protocol by which economic situations may be ranked on the scale of better or worse when determining whether a specific reallocation of resources actually increases the value of goods and services produced, or benefits the general welfare of a society. (2) The computation of economic surplus or net present value (NPV) of a project in a cost-benefit analysis provides a useful example. Basically, a project is considered economically viable if its NPV is positive. NPV is the sum of money that, if received now, would be regarded as equivalent to the future projected net benefit.

By its very nature, this profit maximization process does not inform us about the overall social and environmental impact of a given project on a society. This can be a great cause of concern because a project, especially a large dam project which is considered economically viable, will not necessarily contribute to the social development of a society. As empirically

demonstrated by the development of various large hydro projects in Asia, a large dam project is bound to be environmentally destructive and socially unsustainable. (3)

Against this background, one of the specific aims of this article is to investigate to what extent the Bakun project is socially sustainable. Social sustainability is defined as development that promotes social interaction and cultural enrichment, and the maintenance or improvement of a people's well-being over time. This article also discusses the competing value systems concerning the indigenous communities' land-use patterns in Bakun. It also aims to highlight the positive role of the community-based resource management system in harnessing an ecologically sustainable and socially equitable society in Bakun.

Bakun's Growth Vision and Resource Utilization: State Versus Indigenous Communities

The government claims that the Bakun project, when completed, would spur Sarawak towards achieving "Vision 2020" through the development of energy-intensive industries such as aluminum smelting or steel manufacturing. It further asserts that the project would promote greater "modernization and development" of the Bakun indigenous communities. According to the former chief minister of Sarawak, for instance, "We believe the Bakun project is the best opportunity to help the Orang Ulu (people of the interior) of Belaga. We want to bring the people into the progress that will culminate with Vision 2020." (4)

Furthermore, the chief executive of Ekran Berhad (a former company entrusted with the development of Bakun's project) claimed that, "They (the indigenous people) will be taken care of. They will be offered permanent jobs, free housing, free water, free electricity.... They will live in easy reach of Bintulu town. Isn't that something to look forward to?" (5)

It may be inferred from the above that, in its drive to rationalize the Bakun project, the state's perception of growth is entirely geared towards economic maximization. (6) Accordingly, irrevocable destruction of the entire forest ecosystem in Bakun may be offset by economic gains arising from the sale of electricity as well as from other industrial spillover effects. This approach to optimal resource utilization rests on the assumption that there is complete substitutability between natural capital ([K.sub.n]) and man-made capital ([K.sub.m])--a powerful assumption governing the weak sustainability concept of growth. Basically, this concept of growth allows an economy to deplete its stock of natural resources, provided it creates enough [K.sub.m] (e.g., a dam) to compensate for the loss of [K.sub.n] (e.g., a forest ecosystem), so that the aggregate value of [K.sub.m] and [K.sub.n], and hence consumption/welfare per capita, can be maintained at a constant level over time. So long as this condition is met, an economy is considered sustainable even if it irrevocably depletes its natural capital. This standard rule of resource maximization is often known as the Solow-Hartwick rule. (7)

Based on the above perspective, the state view on natural resources is one of commercial and economic exploitation. In other words, what the state is most concerned about is the direct use of land resources such as timber exploitation and physical conversion of land, while indirect uses and other non-use values are ignored. So long as the economic benefits generated from these activities are more than enough to compensate for their loss, it is immaterial whether the economic activities concerned are environmentally or socially destructive or not.

By contrast, the land use patterns of the indigenous communities differ substantially from those advocated by the state. Generally, their land use patterns fall under four categories. The first is temuda, the land area around the indigenous peoples' longhouses, often taking the form of farmland. The second is menoa, forested land which is used for game hunting and gathering. The menoa provides the people with all their daily subsistence needs such as wild boar meat, forest produce and raw materials such as rattan for their traditional weaving

activities. The third category is damp, or cultivated land which is located a distance away from their longhouse settlement. They may practice swidden agriculture here, which is their traditional form of farming. The fourth and last category is that of pulau, or protected forest area, which provides the indigenous communities with traditional resources such as water catchments.

Insofar as the indigenous communities are concerned, land values are often conceived of on an intrinsic rather than monetary basis. Land supplies not just food and resources (use values) but also forms an essential part of their social and cultural identity (non-use values). Non-use values which are independent of direct forestry resource use include an option value, i.e., a household's willingness to pay (WTP) to preserve the option of having an irreplaceable asset for future consumption; an existence value, i.e., a household's WTP for an assurance that the natural asset is preserved in a particular state; and a bequest value, i.e., satisfaction derived from knowing that the natural assets are available to future generations. The "adat" (moral code) of the indigenous communities imposes on them a duty to preserve all these values on behalf of future generations. Nonetheless, the state has deemed these environmentally-centred and equity-based land use patterns to be "unproductive" and a "barrier to development." (8)

The conflict between the state and the indigenous communities is particularly pronounced in the case of the Bakun dam project. Since the inception of the project, the indigenous communities have considered it to be a source of environmental destruction and social disintegration. In their view, the project will destroy all of their biological resources, cultivated/ancestral lands and burial grounds. It has also forced them to relocate to Sungai Asap, which is about 50 km from the dam site.

The indigenous communities' view on development highlights the potential conflicts between rapid economic growth and future resource scarcity as expounded by the Club of Rome. (9) The Club of Rome's position is that the greater the scale of economic activity, the higher the rate of environmental change. This perception of development differs sharply from the state's vision of "sustainable development." To put the matter in perspective, the indigenous communities' perception of sustainable development is built on a set of powerful assumptions that their socioeconomic existence and cultural identity cannot be dissociated from the natural environment. Furthermore, an economy also cannot keep on substituting [K.sub.n] with [K.sub.m] in order to maintain constant levels of per capita consumption over time. Sustainable development from this perspective calls for the need to observe the biophysical constraints governing the depletion of natural resources. It also places great priority on preserving critical natural capital, which is irreplaceable. This approach to development may be designated strong sustainable development. This development concept informs us that an economic system, together with its biosphere, can survive only if short-term-oriented, exploitative, improvident human behaviour is replaced by long-term-oriented, conservative and prudent action. (10)

In fact, the "pusaka" (heirloom) resource management system, as practiced by the indigenous communities, represents a remarkable example of this concept of development. Traditionally, the pusaka system requires the indigenous communities to take "long-term-oriented, conservative and prudent action" to protect the forest ecosystem from irreversible destruction so that it may be bequeathed intact to future generations. (11) Thus, the pusaka system respects the very essence of sustainable development: intergenerational equity.

The key point here is that the pusaka system enables the indigenous communities to yield a flow of productive services without at the same time irreversibly impairing the environment. The swidden agriculture or shifting cultivation as practiced by the indigenous communities is an obvious case in point. As noted by Rousseau, for instance, the indigenous communities use less than 0.025 hectare of the primary forest per year. This is equivalent to 125 hectares

in the entire region. (12) From this perspective, we may say that this form of agricultural practice is sustainable because it exerts a minimally destructive impact on the environment.

As indicated in figure 2, this land use process functions on a rotating basis, where all the cultivated lands will be maximized again after they have been allowed to regenerate. In this way, the indigenous communities have been able to avert widespread destruction and degradation of the forest ecosystem in the Bakun region. This may be contrasted to the staunch belief of the state that this form of agricultural activity causes irreparable damage to the forest biological resources. (13) In fact, given the hilly conditions and remote location of the Bakun region, shifting cultivation represents the most suitable form of agriculture, far more appropriate than the commercial or modern intensive agriculture recommended by the government.

[FIGURE 2 OMITTED]

The pusaka system, which precludes large-scale environmental destruction, ensures that the ecological resilience of the ecosystem is maintained. This ecological sustainable development strategy owes its theoretical insights to Holling. Indeed, Holling's sustainable resource management concept represents the single most important theoretical force governing the pusaka system. It postulates that, provided an economic activity (e.g., shifting cultivation) does not perturb the stability (Holling-resilience) of the natural environment (e.g., Bakun's ecosystem) as a whole, then the driving economic activity is considered sustainable. (14) Holling defines resilience as "the ability of a system to maintain its structure and patterns of behavior in the face of disturbance." (15) Thus, when one describes the Bakun ecosystem as resilient, it means that it has the adaptive capacity to absorb shocks and stresses arising from slash-and-burn activities carried out by the indigenous communities, and if damaged, it is able to reorganize itself. Thus the pusaka resource management system, which does not place much pressure on the Bakun environment, serves its role well in protecting and maintaining the adaptive capacity of the Bakun forest ecosystem as a whole. This in turn enables the indigenous communities to sustain their long-term socioeconomic security and cultural integrity under a resilient natural environment, with dense and almost untouched virgin forest.

Social and Cultural Impacts of the Bakun Project--Empirical Evidence

Fieldwork and interviews with the indigenous people were conducted in September 2000, November 2002 and August 2003 in the Sungai Asap resettlement area, at the Bakun Dam site and in the Bakun interior in Long Lawen, in order to assess the physical condition of the resettlement areas and to explore the actual social and cultural impact of the project (see figure 3). The research was carried out with the aid of a few native guides and translators. Interviews were also conducted with Friends of the Earth Malaysia (Sarawak based) and the Indigenous People Development Centre. Unless otherwise indicated, all the names of the interviewees are withheld in order to protect their privacy.

The specific aim of the research conducted in Long Lawen is to provide a fruitful source of comparative insight into the socio-economic and cultural impact of the government resettlement plan in Sungai Asap. In this regard, it is worth noting that many of the Kenyah Badeng families, in defiance of the government's directive, have refused to move to Sungai Asap from their original settlement in Long Geng. Instead, they have chosen to resettle in Long Lawen, which is about six kilometres from Long Geng (see figure 3). As the normal route to Long Lawen was interrupted by a broken bridge--a result of heavy rainfall--between Bakun's dam site and Long Lawen, the author had to reroute the journey through the Murum Basin. Although the redirection doubled the travelling time, it nonetheless enabled the author to observe more closely the natural environment in the Bakun interior.

[FIGURE 3 OMITTED]

During the three field surveys, it was observed that marked differences exist between the indigenous communities' present settlement (Sungai Asap) and their former settlement in the Bakun interior, in terms of their environmental conditions (see figures 4 and 5). This generates an ever more pressing source of dispute, as is reflected in the following interviews, which were conducted at random with a group of four to eight inhabitants of the Sungai Asap resettlement area in September 2002.

[FIGURE 4 OMITTED]

[FIGURE 5 OMITTED]

To begin with, when asked about their living conditions in the new settlement area, one of the women, in her late forties, said,

Life has been difficult for us since we moved to this area a few years ago. Now, we are running out of means to buy our foodstuffs or to pay our water and electricity bills. You just look at the electricity metres up there, supplies have been cut off as we have not been able to settle our electricity bills for a few months.

The rest of the interviewees in the group also agreed that the Bakun project does make life difficult for them. When asked about their diet, they had the following to say:

We cannot afford to take wild boar meat now as compared to when we were in our former settlement. It is too expensive. Sometimes, we consume frozen chicken wings brought in from Bintulu, but sometimes we have to consume rice with salt only. These kinds of things never happened before.

When asked if they would prefer to move back to their original settlement in Balui, they all agreed:

Of course! [The] [f]ormer settlement is better. Furthermore, when we are asked to pay for the house installment amounting to RM52,000 (US\$13,684), we are "habis" [finished]. Where do we have the means to pay? Makan pun susah! [Eating is also a problem.] By then, we have no choice but to go back to the jungle.

However, one of the young women in her early twenties from Uma Badang longhouse said that her family is not willing to return to the former settlement because they enjoy the facilities provided by the government: "Well, my family enjoys the modern facilities here. From here we could go to Bintulu town easily. Yah, it's good. We don't want to go back to the former settlement again." (However, it may be pointed out that the transportation cost from Sungai Asap to Bintulu, which ranges from RM18 (US\$4.70) to RM25 (US\$6.50) per person, can be very costly for the majority of the local inhabitants.)

Furthermore, three of the old men in their early sixties had the following to say:

Well, we are not particularly against the project, after all we are old. How long can we live? We also have problem[s] with our legs. From here, we could go to the clinic easily. It's very near. Frankly speaking, we stay here because of the medical facility provided by the government. However, if given a choice, we still want to go back to where we come from.

When asked about the socio-economic impact of the Bakun project, one of the indigenous men in his fifties made the following comment:

I don't think the Bakun project has brought us social and economic development as claimed by the government. The environment here is just not suitable for us.... Last time, we did not have to worry about our daily consumption because we got every thing free from the forest. Now every thing is so different. No money, no food. Just look at the three acres of farmland allocated to me, it takes me about 20 to 25 minutes by land cruiser to get there. Yes, the government built the road for us but where is the means of transport? A return trip from here (Sungai Kojan) to my farmland in Sungai Asap cost me RM4 (US\$1.05). That is very costly for me. (It may be noted that there is no public transport within the Sungai Asap resettlement area and movement from one place to another is only possible by hiring a land cruiser.)

My translator (a university graduate) who has resettled in Sungai Asap with his family, interjected with the following statement:

What he has said is true. Life for most the indigenous communities doesn't seem to have improved since moving here. It is also feared that some of our cultures may become extinct. For instance, the people here don't practice their tradition in welcoming their guests by performing "ngajat" [a traditional dance] anymore although this custom is still maintained in the original settlement. Everyone is too busy looking for money in order to survive. Many young people have left here in order to look for jobs elsewhere. Many families have also moved back to their former settlement.

My driver added, "That's right, 23 families in my area in Lepo Kulit have already moved back to Balui."

Similar views were also expressed in interviews conducted with the late James Lawai (a longhouse chief) in September 2000, with the indigenous communities in Sungai Asap in August 2003, with two officers (including Ronald Bette) from the Sarawak-based Friends of the Earth Malaysia in September 2002 and August 2003, and with Sem Kiong, president of the Indigenous People's Development Centre (Sarawak) in September 2002 and August 2003. During an interview conducted in August 2003 in Bintulu, Sem Kiong stressed the issue of cultural practices:

[W]hen the high-ranking people visit Sungai Asap, no "ngajat" is performed as the people have no time to bother about them. But, this is still practiced by Kenyah Badeng communities in Long Lawen, Kayan communities in Batu Kalo, Kenyah Uma Kulit communities in Long Jawe, as well as other communities in Sang Anau. These people who refused to move to Sungai Asap are happy with their present lifestyle. For instance, formerly, there were about 200 Kenyah Badeng families living in Long Geng, and out of these, about 140 families have moved to Sungai Asap as directed by the government, while the rest of the families refused to follow the government's directive. Those who refused to move found their alternative settlement in Long Lawen, where extensive hunting grounds, fishing areas and farmland are available. As compared to the Kenyah Badeng families in Sungai Asap resettlement area, the Kenyah Badeng families in Long Lawen are satisfied with their present environment. To be fair, there is no complaint by the people in Sungai Asap over the facilities provided by the government, but the environment there is just not suitable.

In August 2003, fieldwork and several interviews were conducted at random--both through house visits and encounters in public places--with the indigenous people in the Long Lawen settlement area. The community chief's son, Tingum Gara, aided me in this by serving as my guide as well as my translator. During the fieldwork, I noticed that the environment in Long Lawen differs substantially from that around the Sungai Asap resettlement area (figure 5). Extensive land and forest as well as hunting grounds are available to enable the local people to continue their subsistence economy and traditional way of life. All families grow their own vegetables and raise their own poultry. All longhouses get their free water supplies from the mountain through pipelines connected to their houses, and electricity is supplied at RM2 (US52 cents)/bulb/month through a mini-hydroelectric project which was launched in April 2002. Traditional music was played and "ngajat" was performed when I arrived at the longhouse.

When asked whether they are satisfied with the life in Long Lawen, all those who were interviewed replied in the affirmative. For instance, the following reply by one of the indigenous men by the name of Ali Siting is particularly telling:

Yes! I am happy and satisfied with the life here. I am happy to live here because this is part of our ancestral land. I am satisfied because I don't have to worry about my food supplies or water/electricity bills as compared to those who are living in Sungai Asap. We get most of the things from the forest free of charge. We can survive easily even without money. But the only problem here is the communication system. It is really bad and there is no one to help us.

When asked for her view on the Bakun project, one of the ladies in her fifties replied, "The project causes a lot of hardship to our people. Fortunately, we did not move to Sungai Asap or else we [would] suffer too. Well, we are happy living here. Life is relaxing and [there are] no worries."

By contrast, it is worth noting that various house visits and field observations conducted in August 2003 in the Sungai Asap resettlement area indicated that the living conditions for most of the indigenous communities have not improved since my last visit in September 2002.

Overall, the above surveys and interviews reveal that although the Bakun project has resulted in better facilities in the Sungai Asap resettlement area in terms of water and electricity supplies, infrastructure development and better health, medical and educational facilities, the research also identifies formidable issues which, if unresolved, will render the settlement socially and culturally unsustainable. These issues are discussed below.

Drastic changes to the environmental conditions, insufficient land allotments, unsuitable farm locations and poor soil quality have resulted in adverse impacts on the socio-economic structure of the local communities. The people in Sungai Asap have become socially and culturally vulnerable; dispossession of their territorial domains (pemakai menoa) is akin to removing the foundation of their economic, social and cultural security. The pusaka culture has disappeared, as the insufficient allocation of farmland to individual families has rendered this kind of sustainable resource management system impractical. The terms "existence value," "option value" and "bequeath value" are becoming less appealing to the local communities as everyone is too busy trying to find enough money to survive. Maximizing utility is now constrained to the economic imperative, as families concentrate on working their farmland.

Furthermore, since the indigenous communities' traditional way of life is closely associated with the dense forest, they find it difficult to fully adapt to the cash crop economic model introduced by the government. Compared to conditions in their original settlement, their movement is now restricted due to the lack of dense or extensive forests and hunting grounds. All these factors have led to the erosion of their socio-cultural identity and to a deprivation of their sources of psychological and spiritual satisfaction. The situation also paves the way for eventual cultural extinction, which can be defined under Matutinovi's terms as "the abandonment of traditional subsistence activities and economic arrangements which were adapted to local ecosystems, or the complete loss of knowledge of these practices within the local population." (16)

Because of the lack of transport, the infrastructure development has not brought many tangible benefits to the majority of the indigenous communities within the resettlement area. On the contrary, the development has only served to expose the communities to external influence. It has also helped to encourage a mass exodus of young people of both genders to other parts of Sarawak to look for material or monetary gains, leaving women, old folks and children behind. This trend undermines the social cohesion of the indigenous society. Moreover, water, electricity and housing are not provided free of charge as promised, thus imposing an immense economic burden on the communities. Poverty has become a common problem for many families once they have run through the monetary compensation they received for relocating.

By contrast, despite the paucity of public amenities or facilities and infrastructure in Long Lawen in comparison with the Sungai Asap resettlement area, the local community has remained socially and culturally undisturbed. The present densely forested environment, which is only about six kilometres from their original settlement in Long Geng, provides them with a sense of social identity. They consider this environment part of their ancestral land, which enables them to continue their traditional agricultural activities and to maintain their cultural identity. The present environment is also a horn of plenty, providing them with an ample and free supply of food and forest products. They also receive free tap water supplies from the water catchment in the mountain. It may be said that the indigenous communities in Long Lawen are economically secure, socially sustainable and culturally resilient. In short, the fieldwork clearly indicates that once the indigenous communities are forced to dissociate themselves from nature, their socioeconomic structures and cultural identity will be adversely affected.

Policy implications

The analysis presented so far represents an attempt to gain an improved understanding of the social and cultural sustainability of the Bakun project. I have also discussed the ecological sustainability of the project. More importantly, the above analysis reflects clearly that in fostering sustainable development, the state must recognize that mere monetary compensation or the provision of conventional benefits such as water and electricity supplies are far from adequate in meeting the socio-economic and cultural needs of the indigenous peoples. Put another way, insofar as the survival of the socioeconomic and cultural systems of indigenous communities depends on their access to the natural environment, the resettlement process should be implemented based on land and forest-based re-establishment schemes. This will enable indigenous people to build and restore their social fabric and cultural identity to pre-displacement levels. The success of the relocation plan also depends on institutional support for land-intensive or traditional agricultural activities through the greater allocation of land and the provision of secured access to communal common resources. As it is, the present allocation of three acres of land per household is certainly inadequate in assuring the sustainability of the relocation process.

One of the ways to circumvent this formidable issue is to follow Rousseau's option of

relocating the entire population in the vicinity of their formal settlement, along the Upper Balui River or the nearby tributaries. (17) In comparison to Sungai Asap, this region presents an optimal site, because its physical location, geomorphic landscape and the quality of agricultural land are far superior. In fact, the field surveys conducted in areas surrounding the Bakun Dam and the Bakun interior, in Murum Basin and Long Lawen in 2002 and 2003 respectively, indicate that this region, which is densely covered with rich Dipterocarp forest, represents one of the most suitable locations for resettlement. As noted below, there are about 2,000 plant species found in the region. The dense forest in this region also houses a rich diversity of terrestrial fauna. For instance, as noted under the Murum Environment Impact Assessment (EIA), about 130 species of mammals, 318 species of birds and 68 species of amphibians can be found around Murum Basin alone. (18) This option is also more socially sustainable because extensive land and forest is available for the indigenous communities to sustain their traditional way of life, thus averting a potential cause of social or cultural impoverishment. The Long Lawen fieldwork clearly establishes that optimal environmental conditions, in terms of an abundant supply of agricultural land and forest, is a necessary precondition for averting chronic economic problems and social and cultural disintegration.

Another option which may be regarded as the most sustainable but which requires extreme political will is to stop the project immediately and thus maintain the present status quo of the indigenous communities in their original settlement area. This could be achieved by modifying the existing plan by constructing a smaller dam which would be socially desirable, ecologically sustainable and economically viable. It is worth noting that there are about 155 potential dam sites found in various parts of Sarawak. Out of these, the Murum site, located in the vicinity of the Bakun Dam site, represents one of the best alternatives to the Bakun Dam project in terms of its exploitable hydroelectric capacity, which is estimated at 900 MW. (19)

As compared to the Bakun project, the development of a dam in Murum would submerge only 24,500 hectares, i.e., about one-third of the Bakun forest ecosystem or terrestrial habitat in the region. Since the Bakun and Murum regions have a homogeneous vegetation composition and terrestrial environment, one can deduce that about three times as much biodiversity will be destroyed in the Bakun region as would be in the Murum area. In terms of its impact on various species, it is expected that the Murum project would be less traumatic. For example, the number of plant species that will be destroyed under the Bakun project is about five times more than could be expected in Murum. Specifically, about 1,680 plant species, including 287 species of valuable medicinal plants, will be affected under the Bakun project, as compared to the Murum case, where a total of 306 species would be affected if the project was implemented. (20) Furthermore, it has been disclosed under the Murum Environmental Impact Assessment that no species would disappear completely if the Murum project was implemented, as long as the flora and fauna in the Murum region, which are also found in the nearby area (such as the Bakun region), were adequately protected. (21) Given this information, we can deduce that the Murum project would be ecologically less destructive than the Bakun project.

The Murum project is also more socially defensible because the indigenous inhabitants would not face the same level of physical deprivation of their environmental assets. It may be noted that the Bakun submersion would completely destroy 43,945 hectares of shifting cultivation land, which is about 10 times greater than the projected impact--4,000 to 5,000 hectares--of the Murum project. (22) Moreover, the Murum project is also socially less destructive because it would require resettling about 758 people (23) as compared to about 10,000 inhabitants under the Bakun project. (24) Hence, the overall negative welfare impact under the Murum case is lower than for the Bakun project. Furthermore, with proper consultation and appropriate monetary compensation, the overall welfare of the affected communities in the Murum region could be maintained. The generating capacity of Murum is also more than adequate to satisfy the electricity demand in Sarawak. It may be noted that the prevailing electricity generation installed capacity of Sarawak is 1,046 MW with a projected demand of

up to 839 MW by 2005. Thus, there is a reserve margin of 25 percent. (25)

As the field survey reveals, the Sungai Asap resettlement area is environmentally unsuited to sustaining the social value and cultural identity of the indigenous communities affected by the Bakun Dam project. This may be contrasted with the Murum case, where, when the need arises, the affected local communities (the Penans) could be relocated further upstream to Sungai Plieran and Sungai Danum, which are actually their preferred locations. (26) These surroundings would ensure them sufficient ecological resources to reconstitute themselves under a new socio-environmental setting. The relocation would also allow them to remobilize their cultural heritage under a new environmental setting which includes intact, undisturbed and unlogged forests located in the vicinity of their longhouses, thus averting an irreversible course of cultural disintegration. Again, the fieldwork conducted in Long Lawen indicates unequivocally that this solution is indeed feasible and sustainable due to the presence of dense forests and extensive agricultural lands. However, I do not intend to imply that it is inherently desirable to dislocate the Penans or to completely submerge the Murum reservoir area. That said, insofar as a tradeoff must be made between economic growth and socio-environmental sustainability, the least destructive option in term of lesser socio-environmental impacts should be made.

Concluding Remarks

The current Bakun strategy is premised on a powerful assumption about the ability of an economic system to function independently of its environment. Its approach to development, which is geared towards the maximization of monetary or material gains, represents a radical departure from the traditional socio-economic structures of the indigenous communities. Given its dominant style of development, one could hardly expect the Malaysian government to seriously consider the socio-cultural issues governing the indigenous communities in Bakun. This highlights the very problem the state intends to remedy, as by contrast, welfare maximization from the indigenous communities' perspective takes on a very different meaning. The communities are concerned not only with economic progress but also with their spiritual satisfaction, which is reliant on satisfying the non-use values of the Bakun forest ecosystem. Ultimately, when the communities are displaced from their original environment, social welfare maximization becomes a difficult endeavour. The overwhelming empirical evidence on the different socio-economic impacts of resettlement in Sungai Asap and Long Lawen reflects this point succinctly.

Clearly, when a project or dislocation plan has an irreversible impact on the social and cultural identities of the indigenous communities, its development process, which might appear to be progressive from a weak sustainability perspective, will instead be revealed as unsustainable and destructive. Indeed, it is worth noting that economic growth or an increase in material affluence does not do much to change individual perceptions of human happiness, as has been empirically demonstrated under the "Easterlin paradox" of economic growth and welfare improvement. (27)

To address this formidable issue of resettlement, two options have been suggested in this article. If the state is determined to proceed with the present half-completed project, as seems most likely, Rousseau's option may be used to relocate the indigenous communities along the Upper Balui River region. This would avert an acute disruption of their environmental conditions, and would enable them to reorganize themselves to their pre-resettlement level, since extensive lands and forest are available to allow them to continue their original lifestyle. Again, the empirical evidence from Long Lawen fieldwork indicates clearly that this is indeed a sustainable solution in terms of environmental abundance, cultural existence and spiritual satisfaction.

However, another option, which would require extreme political will, would be to scrap the

project immediately and construct a smaller dam such as the Murum Dam, which would be ecologically and socially less destructive. Although it is unlikely that the state will embrace this option, the analysis, nevertheless, represents a remarkable tour de force in terms of the theoretical insights and empirical force it yields about the destructive impact of developing a large dam. In particular, it serves as a warning to the government that the development of a large dam involves multi-dimensional concepts of sustainability which, if unaccounted for, will render its development strategy counterproductive and elusive. That said, policy debate covering the development of a large dam must be informed by the understanding that the resilience of the natural environment--on which economic activity and social and environmental sustainability depend--may be threatened by the state's exploitative mode of development. Consequently, in order to avert massive ecological destruction or social disintegration, mega-dam projects should not be planned in the future. Instead, when the need arises, other dam sites which are less ecologically and socially destructive should be identified and pursued.

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(1) See Athukorala Prema-Chandra, "The Macroeconomy up to 1997," in Colin Barlow, ed., *Modern Malaysia in the Global Economy. Political and Social Change into 21st Century* (Cheltenham, UK: Edward Elgar, 2001), pp. 13-27.

(2) See, for example, E.J. Mishan, "How Valid Are Economic Evaluations of Allocative Changes," *Journal of Economic Issues*, vol. 14, no. 1 (1980), pp. 146-149; Lee G. Anderson and Russell F. Settle, *Benefit-Cost Analysis: A Practical Guide* (Lexington, MA: Lexington Books, 1977).

(3) For example, the relocations arising from the construction of the Mahaweli Hydro and Irrigation Project in Sri Lanka, the Nam Ngum Hydro Dam and the Theun Hinboun Hydro Project in Lao PDR, the Singkarak Hydropower Project in Indonesia, the Batang Ai Hydropower Project in Malaysia, the Mae Moh Power Project and the Pak Mun Dam in Thailand, the Tarbela Dam in Pakistan, the Tucurui Dam in Brazil and the Kariba Dam along the border between Zambia and Zimbabwe, have all resulted in immense socio-economic hardship to those affected inhabitants who have lost their communal access to their land and forest. The relocations have also given rise to social disintegration, broken community structures or the loss of cultural identity for the indigenous communities, due to a drastic change of environment in the new resettlement areas. See, for example, Grainne Ryder, "Creating Poverty: The ADB in Asia, Focus on the Global South: Why consumers and citizens should pull the plug on the Asian Development Bank--part 2 of 2," *Probe International Report*, Probe International (3 May 2000). Online, cited October 2003. Available at <<http://www.probeinternational.org/pi/index.cfm?DSP=content&ContentID=712>>, site last accessed 23 February 2004; also see the following reports prepared for the United Nations World Commission on Dams, Cape Town, November 2000: A. Sakchai, P. Annez, S. Vongvisessomjai, S. Choowaew, Thailand Development Research Institute (TDRI) Bangkok, P. Kunurat, J. Nippanon, R. Schouten, P. Sripapatprasite, C. Vaddhanaphuti, C. Vidthayanon, W. Wirojanagud and E. Watana, "Pak Mun Dam Mekong River Basin, Thailand"; La Rovere, E.L. Mendes and F. E. Mendes, "Tucurui Hydropower Complex Brazil: Final Report"; R. Rangachari, N. Sengupta, Ramaswamy R. Iyer, P. Banerji and S. Singh, "Large Dams: India's Experience"; Asianics Agro-Dev. International (Pvt) Ltd, "Tarbela Dam and

related aspects of the Indus River Basin, Pakistan"; and Soils Incorporated (Pty) Ltd and Chalo Environmental and Sustainable Development Consultants, "Kariba Dam Case Study." All of these reports are available online, at <http://www.dams.org/>. Cited October 2003, site last accessed 23 February 2004.

(4) Gabungan, Empty Promises, Damned Lives: Final Report of the Fact Finding Mission 7th-14th May 1999. Evidence from the Bakun Resettlement Scheme in Sarawak (Kuala Lumpur: Suaram Komunikasi, 1999), p. 19.

(5) Gabungan, Empty Promises, Damned Lives, p. 19.

(6) A distinction may be made between economic growth and economic development. While the former refers to non-declining or increasing levels of production and consumption under the quantitative physical dimension of an economy, the latter refers to non-declining or increasing utility or the non-declining stock of natural resource use. In this article, their meanings may be used interchangeably.

(7) Technically speaking, the Solow-Hartwick rule requires one to invest the rents derived from efficient use of $[K.sub.n]$ in $[K.sub.m]$ so as to guarantee a constant flow of consumption over time. See John M. Hartwick, "Intergenerational Equity and the Investing of Rent from Exhaustible Resources," American Economic Review, vol. 67, no. 5 (1977), pp. 972-974; Robert M. Solow, "International Equity and Exhaustible Resources," Review of Economic Studies, vol. 41 (1974), pp. 29-45; Robert M. Solow, "The Economics of Resource or the Resource of Economics?" American Economic Review, vol. 64, no. 2 (1974), pp. 1-14.

(8) See Gabungan, "The resettlement of indigenous people affected by the Bakun Hydro-electric project, Sarawak, Malaysia-Final Report," prepared for Thematic Review 1.2: "Dams, Indigenous People and vulnerable ethnic minorities," World Commissions on Dams (WCD), United Nations, December 1999. Available online at <http://www.dams.org/docs/kbase/contrib/soc198.pdf>, p. 4. Cited October 2003, site last accessed February 23, 2004.

(9) Donella H. Meadows, Dennis L. Meadows, Jorgen Randers and William W. Behrens III, The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind, 2nd edition (New York: Universe Books, 1974).

(10) See Kenneth E. Boulding, "The Economics of the Coming Spaceship Earth," in Henry Janett, ed., Environmental Quality in a Growing Economy (Baltimore: John Hopkins Press, 1966), pp. 3-14; Herman E. Daly, "The World Dynamics of Economic Growth: the Economics of the Steady State," American Economic Review, vol. 64, no. 2 (1974), pp. 15-21; Charles Perrings, Economy and Environment-A Theoretical Essay on the Interdependence of Economic and Environmental Systems (Cambridge, New York: Cambridge University Press, 1987); Robert U. Ayres, "Cowboys, Cornucopians and Long-Run Sustainability," Ecological Economics, vol. 8, no. 3 (1993), pp. 189-207.

(11) See, for example, IDEAL (Integrated Development for Eco-Friendly and Appropriate Lifestyle) Tanah Pengidup Kitai (Our Land is Our Livelihood) (Sarawak, Malaysia: IDEAL Time Sdn. Bhd., 1999), chapter 2; SAM (Sahabat Alam Malaysia--Friends of the Earth Malaysia), "The Social Impact of the Bakun Hydroelectric Dam Project on the Indigenous Peoples of Balui Region, Sarawak, Malaysia," a report by Friends of the Earth Malaysia (Friends of the Earth Malaysia, Penang, Malaysia, 1996).

(12) Jerome Rousseau, "The Bakun Hydro-electric Project and Resettlement: A Failure of Planning," conference on the Bakun Hydro-electric Project (Kuala Lumpur, 2-3 December 1995), p. 9.

- (13) Peter Dauvergne, "The Politics of Deforestation in Indonesia," *Pacific Affairs*, vol. 66, no. 4 (1993-1994), p. 499.
- (14) C.S. Holling, "Resilience and Stability of Ecological Systems," *Annual Review of Ecology and Systematics*, vol. 4 (1973), pp. 1-23; C.S. Holling, ed., *Adaptive Environmental Assessment: International Series on Applied System Analysis* (Chichester, New York: John Wiley & Sons, 1978).
- (15) C.S. Holling, "The Resilience of Terrestrial Ecosystems: Local Surprise and Global Change," in William C. Clark and R. E. Munn, eds., *Sustainable Development of the Biosphere* (Laxenburg, Austria: Cambridge University Press, 1986), p. 296.
- (16) Igor Matutinovi, "The aspects and the role of diversity in socioeconomic systems: an evolutionary perspective," *Ecological Economics*, vol. 39, no. 2 (2001), p. 241.
- (17) Jerome Rousseau, *The Bakun Project-Review of Socio-Economic Studies and Preliminary Recommendations for the Resettlement of the Kayan and Lahanan of the Upper Balui: A Report Submitted to the State Planning Unit, Chief Minister Department, Sarawak* (State Planning Unit, Chief Minister Department, Sarawak, Malaysia, 1994).
- (18) Murum EIA, *Murum Hydroelectric Project Feasibility Study: Final Report. Volume 3A: Environmental Impact Assessment* (Sarawak Electricity Supply Corporation [SESCO], Sarawak, November, 1994a).
- (19) Institute of Social Analysis (INSAN), *Power Play: Why We Condemn the Bakun Hydroelectric Project*, 2nd edition (Kuala Lumpur, Malaysia: INSAN, 1996), p. 1.
- (20) Bakun EIA, *Privatization of Bakun Hydroelectric Project. Vegetation and Forest Resources. Appendix 4a: Vegetation* (Ekran Berhad, Sarawak, March 1995); Murum EIA, *Murum Hydroelectric Project Feasibility Study. Final Report. Volume 3B: Environmental Impact Assessment (Annexes) Sectoral Studies* (Sarawak Electricity Supply Corporation [SESCO], Sarawak, November 1994b).
- (21) Murum EIA, 1994b, section 2, p. 14.
- (22) Murum EIA, 1994b, sec. 5, p. 47.
- (23) Murum EIA, 1994b, sec. 5, p. 15.
- (24) Gabungan, *Empty Promises, Damned Lives*, p. 11.
- (25) See EPU, *Eighth Malaysia Plan 2001-2005* (Economic Planning Unit, Prime Minister Department, Malaysia, 2001), p. 318.
- (26) Murum EIA, 1994a, p. 49; 1994b, sec. 5, pp. 57-59.
- (27) Richard A. Easterlin, "Does Economic Growth Improve the Human Lot? Some Empirical Evidence," in Paul A.A. David and Melvin W. Reder, eds., *Nations and Households in Economic Growth* (New York: Academic Press, 1974), pp. 89-125.

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