

## C H A N G N O I



## How much is a tree worth?

30 September 1999

How much is a tree worth? For example, one of the golden trees in the Mae Yom National Park. Simple, you might say. What would you get if you cut it down and sold the timber.

But lots of trees together in a forest have other values. They create an environment for lots of other plants and animals – including fungi, shoots, herbs, insects and game which collect, consume and sell. Cut down the trees, and these other things disappear too.

They also create an environment which is pleasant to visit, and which can have value for tourism. As the coverage of forest dwindles, these sites become rarer and more valuable.

They also help the planet. Forests store carbon. Every hectare chopped down releases more carbon into the atmosphere and adds to global warming.

They are also a stock of biodiversity – especially areas like the Mae Yom park, "the best natural teak forest in Thailand". The high-value golden teak is a unique result of the local soil and other environmental conditions. Of course, there are other teak forests elsewhere. But cutting down any of them statistically reduces the potential for maintaining or improving the future quality of teak production. In the case of the exceptional Mae Yom golden teak, this reduction is more than usual.

Finally, many people who will never visit Mae Yom may still want it to exist and be available for their kids and their kids' to enjoy. Doesn't this desire also have some value?

Cutting down the trees destroys all these other values – the produce, the tourism potential, the contribution against global warming, the biodiversity store, the legacy for future

But when the government wants to cut down trees to build a dam, road, or pipeline it calculates only the cubic metres of timber. If the irrigation or electricity provided by the dam is worth more than the timber lost, then cost-benefit accounting says the dam should be built.

This has bothered environmentalists for some time. It means authorities go on building dams and other projects which not get built if these other values entered into the accounting. Villagers lose their income from gathering forest products. future costs of rectifying global warming increase. The for tourism and other future uses is destroyed. The gene pool shrinks.

But the problem is that these other values are difficult to calculate. Estimating the cubic metres of timber is relatively simple. Putting a value on the contribution to global warming a lot more difficult.

But now an attempt has been made. The work is a team effort between Thai and international academics, headed by Dr Khunying Suthawan Sathirathai. It focuses on the Kaeng Sua Ten dam project in the Mae Yom National Park in Phrae. It combines the sweat of field research and the sophistication of econometric modelling. And the results are both shocking and hopeful.

To calculate the value of forest products, the team spent a year interviewing villagers. Some two thousand households are involved in gathering. The main ten products sold in the in significant quantities - four types of mushroom, three of bamboo shoot, two vegetables, and red ants' eggs - deliver total net income of 72 million baht a year. This more than doubles these households' total income. It is especially for the poor.

To calculate the potential value of the site for ecotourism, the team designed a series of tourist packages - rafting, elephant treks, hikes, tree study - and surveyed 300 Thai and 200 tourists to find out the potential market value, and in particular the additional value conveyed by the teak forest.

To calculate how much people in general value the forest, the team made a survey of 915 people across 12 provinces. They were asked how much they would give in a one-off "*tham*" donation to preserve the forest for future generations.

On global warming, the team calculated what would be the of replanting trees elsewhere to repair the damage done by cutting down the Mae Yom forest To examine the impact on biodiversity, the team constructed a sophisticated model with pages of econometric equations and computer simulations.

In the area which will be flooded by the Kaeng Sua Ten dam, there are around half-a-million golden teak trees. In 1991, the dam project calculated the expected future income from sustainable logging and concluded that this forest had a capital value (NPV, 50 years, 5 percent) of 60 million baht. Just 120 baht per tree. In 1997, TDRI reworked the data using more realistic pricing and upped the capital value to 400 million, or 800 baht a tree. But this calculation still took account only of timber, not all the other things.

This new study reckons that the forest - apart from the timber

value – has a capital value of 3.8 to 6.4 billion baht, between 7,600 and 12,800 baht per tree.

The largest element (2.2 billion) is the value which people on keeping this forest in existence for future generations. Next comes the capital value of the forest produce at 1.4 billion (the mid-point estimate). The genetic value is small but still important. The team disagreed on the calculation regarding global warming so the estimates range from very little to billion.

The size of these figures, and the difference from the simple timber estimates used by all other project evaluations, is shocking. It indicates how much damage other projects have done simply because these other costs are not evaluated. The capital value of forest products is especially striking. It is than the (generous) estimate of the timber value. Other have casually deprived villagers of this resource by simply not attributing it any value.

The figures will, of course, be controversial. This research is experimental on a world scale. Those in favour of the Kaeng Sua Ten dam have dismissed earlier, less sophisticated as mere "academic exercises". This report will run into the flak. The people supporting such dam projects have a narrow rather than a broad focus. If the Irrigation Department has no such dam projects, it has no reason to exist, and no under-the-table cashflow. Local politicians want the glory of bringing projects to fruition. Contractors, timber-merchants and land speculators want profits. None of these people are interested in forest gathering, ecotourism, global warming or the gene pool.

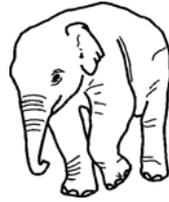
But this report is also a beacon of hope. Cutting down forests build dams might have made sense some decades ago when were lots of forest. But cutting down a forest like Mae Yom is an act of vandalism on a global scale. This research the cost-benefit accounting which enables such vandalism to continue. The methodology needs to be simplified and applied to other projects which are pending. At the Pong Khun Petch dam project in Chaiyaphum, for example, forest gathering is more extensive than in Mae Yom. People come from all over northeast. Putting a value on this gathering would totally the cost-benefit result.

Recently, Chuan Leekpai indicated that he wanted the Kaeng Sua Ten project to go ahead. If it meant cutting down a forest, he said, then they would just have to plant another one somewhere else.

But forests are more than the sum of their trees. After this it is not that simple.

*['Khrongkan kan suksa lae phatthana kan pramoen kha thang khong pa mai', by Centre for Environmental Economics, University]*

## C H A N G N O I



## **Kaeng Sua Ten dam is not worth investment**

21 January 1998

The Kaeng Sua Ten dam project does not pay.

The project has been attacked because of the earthquake risks, the disruption of local communities, the threat to species, and the destruction of a unique golden teak forest. Yet the of the project have shrugged off these attacks and kept the project alive. But now the project faces a new threat. Recalculations show it is simply not worth the investment. Economically, it's a bad idea.

In 1996 the Irrigation Department prepared a cost-benefit which showed the Kaeng Sua Ten project was financially worthwhile. On the basis of this paper, the Banharn Cabinet reactivated the project.

The cost-benefit study had originally been prepared by the in 1991. The Irrigation Department had just updated the figures. The Budget Bureau suggested the analysis should be redone more thoroughly. It contracted the work to the Development Research Institute. The TDRI's recalculation, completed in July 1997, concludes: "The net benefits, according to standard international procedures, are less than costs. Hence this investment project should not be supported from the national budget."

The change is not only about numbers. It also reflects shifts in what 'development' means and in how it is managed.

1. From "logger mentality" to sustainable environmentalism. the original calculation, the revenue from harvesting the teak from the flood zone accounted for over half of the profit on the whole project.

This revenue has to be offset against the loss of future revenue which would be gained by conserving the forest, and sustainably by cutting and replacing trees in the long term. In the original study this figure was very low, for two reasons. the study vastly underestimated the number and size of the trees in the zone. Second, it assumed that the international

of teak would not rise after the year 2000.

TDRI asked the Forestry Department to count the trees again, and used World Bank long-term projections of timber prices. a result, the value of this lost revenue increases four times the original study. And the financial implication of cutting or keeping this forest is quite transformed.

This is much more than a change of arithmetic. It is also a of mentality. The earlier calculation suited a "logger Cut the trees down. Sell them off. Pocket the money. This is surprising given that the Forestry Department is still oriented making short-term profits from forests rather than conserving them. Supporters of the project have argued that the golden forests around Kaeng Sua Ten are nothing special (Montri Pongpanich claimed they did not even exist) and could easily replaced elsewhere.

The new calculation has a very different implication. The is unique - the best examples of a natural golden teak forest remaining in Thailand. The area is large. The trees are well-developed. Replicating this forest would require a large investment, a long time, and a new location which does not exist.

2. From institutional bias to transparency. The Irrigation Department in charge of the project has an institutional bias towards building large flood dams for supporting rice cultivation. This is what the Department was set up to do. This is what it is good at. The Department tends to oppose suggestions. Some engineers showed that a series of small on the Yom river could also render the irrigation benefit disrupting communities, species and trees. The Irrigation Department brushed the suggestion aside.

The new TDRI calculation notes that many of the figures used in the 1996 calculation were shaky. Labour was costed at 25-baht a day (now and forever) even though the realistic rate is already 2-3 times higher than this. The exchange rate was assumed constant for the next 50 years. Export and import would not change after 2000. The calculation of basic costs benefits based on 1991 was lumped together with mitigation costs from 1994, resettlement costs from 1995, and watershed repair costs from 1996 - without any adjustment to reflect the price shifts over this period.

All of this may just have been careless. But equally the result support the Irrigation Department's institutional bias to big flood dams. The TDRI's careful recalculation using exchange rates and World Bank projections of future price further reduces the financial feasibility of the project. More realistic labour costing in particular helps to double the estimated costs of construction and maintenance.

3. From political dreams to social realities. As the Kaeng Sua project has become controversial, the politicians and backing the project have played up the secondary benefits of electricity generation and flood control. They claim electricity from the dam would feed industrial projects in Phrae. After the

bad floods in the central plain in 1995 and 1996, some claimed the dam would reduce the risk of flooding, even as far away as Bangkok.

The original FAO study calculated these secondary benefits as negligible. The dam is not big enough to hold back serious waters for more than a few days. The dam is too far upriver, most of the Yom catchment area is below it. The Yom is the smallest of the four tributaries of the Chaophraya. The dam would not do much to prevent flooding in the lower Yom and would do nothing for Bangkok.

As for electricity, Phrae is already supplied from the national grid. Plus in the management of such a dam, there is a trade-between the irrigation benefit and electricity generation. Including the electricity part in the calculation actually the overall return to the project.

The dam-supporters have played up these sub-benefits because they appeal to the urban population. Politicians have tried to the dam to build up urban political support. But the TDRI follows the FAO line. These subsidiary benefits are negligible. The dam must stand or fall on its benefit in irrigation.

The TDRI study has resisted the temptation to calculate other costs which were not included in the FAO version. But these costs are considerable. The area which would be flooded by dam is not a steep narrow V-shaped valley but a broad, gently-sloping plain. The resulting lake would be large and shallow. the flood area, there are long-settled villages, an elegant small town, farms, fisheries, and forests. The recent Chulalongkorn University study shows a much more severe and costly impact the environment than the earlier study used for the cost-benefit calculations.

On top of this there are new methods for assessing the social impact of such projects which would add further to the costs. And the baht slide will inflate the construction costs since over half will require foreign exchange.

Despite the report's clearly negative conclusion, this is not the last word on Kaeng Sua Ten. The project has a long history, littered with reports, assessments, feasibility studies and cost-benefit analyses. Supporters of the project have brushed aside environmental, geological and social data which condemn the project. They will not give up because one report says the dam not worth the investment. The Irrigation Department needs to build more dams to justify its existence. Politicians want to the dam to show form to their urban constituents. The logging profits and construction commissions are enticing. Already the Irrigation Department has sat on this report for six months. Some officials have dismissed it as "only a technical exercise".

But the TDRI report is important not just for Kaeng Sua Ten but for the whole process of planning development. It uses standard cost-benefit technique, but demands that we update our ideas about what are the real costs and the real benefits. It moves beyond the old "logger mentality" of short-term gain, beyond the institutional bias towards dam-fed wet rice, and

beyond the political tilt towards powerful urban lobbies and profiteers.

Net Present Value (baht millions) FAO, 1991 TDRI, 1997

Major investment costs (dam construction) 1157 2098

Other investment costs (highway, resettlement) 470 1214

Environmental impact mitigation - 453

Foregone production (crops, sustained logging) 124 491

Operating costs 203 570

Total costs 1955 4827

Benefits: Crops 2438 3755

Timber stumpage 600 709

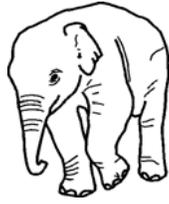
Other 52 131

Total benefits 3090 4596

Net benefit-cost 1136 (232)

Report on the suitability and feasibility study of the Kaeng  
Ten project, Phrae province (TDRI, July 1997, in Thai)

## C H A N G N O I



## Dam officials and dammed people

31 July 1997

Supporters and opponents of the Kaeng Sua Ten dam project rallied at this week's Chiang Rai cabinet. The minister promoting the project complained the protesters were not local people. But Kaeng Sua Ten is not just a local issue.

The Eighth Plan and the draft constitution promise a new era development. A higher priority for the environment. More participation. And a focus on sustainable development. The Kaeng Sua Ten dam project is a test case for the transition to new era.

The strains of this transition are now on show. The project was born in an earlier era. Some government agencies made their commitment to Kaeng Sua Ten under a different philosophy. Changing course is difficult. Environmental concerns are an unnecessary complication. Participation gets in the way. Sustainability is less important than short-term cost-benefit. clashes between these old and new approaches are through the bodies reviewing the project.

Many of the government agencies involved (especially the Irrigation Department and the NESDB) approach evaluation in a particular way. They ask: is there a benefit which justifies investment cost. If so, then the social and environmental can be managed somehow.

Kaeng Sua Ten has a clear a benefit in terms of irrigation. So these agencies, if some forest has to be flooded and some moved, these are just necessary costs.

But the environmental pressure groups approach evaluation in different way. They ask: do the risks and costs outweigh the benefits. In the case of Kaeng Sua Ten, the recent Chula study was quite clear that they do. Invaluable forest will be lost, destroyed, fisheries disrupted. The site is "too valuable a biological area to allow a dam to destroy it". The priorities been reversed. The environmental threat is too great. If we the irrigation, we will have to do it in some other way.

The Irrigation Department, which owns the project, finds this

very frustrating. The Department is good at building dams for irrigating rice. Its whole history is bound up with this activity. Kaeng Sua Ten will irrigate a lot of rice. "Our duty is to water", a Department official said in exasperation at a recent meeting, "our job is not about protecting the environment".

Khon Kaen University has proposed an alternative plan with 5,000 small-scale weirs rather than one big dam. It costs a fraction of the dam scheme, does not threaten the ecology, and provides some irrigation, though less than the dam. But the Irrigation Department is not interested. Such a scheme, said a Department official, "is not our kind of work".

The official agencies treat the ritual of ecological impact as just a matter of form. At the start of this year, the Irrigation Department produced a report claiming that the social and environmental impact is manageable. Recently, the of Mineral Resources (DMR) submitted a report claiming is no earthquake risk from the geological fault lines in the

But under the Environment Act, there is now the Office of Environmental Policy and Planning (OEPP), which watches for impact reports which have been compiled for form's sake. labelled the DMR survey as "crude", "not detailed enough", "not using proper methods". The DMR has reacted with pique. "We are not a research institute", a department official said. A survey of the required level of detail, according to the Deputy Director General, would take 200 years.

Among all these official bodies, there is a growing The project has clear benefits. The "side-effects" can be managed. "If we take research so seriously," said the DMR official, "we will get nowhere. If we were a private company acting this way, we would go bankrupt." At Chiang Rai, the cabinet fell in with this view: the DMR report is not perfect, good enough. It's okay to build a dam in a geologically high-area on the basis of a report which the government's own environmental watchdog calls "crude".

These official bodies, and the political backers of the dam, have no interest in the environmental consequences. They are equally uneasy with participation.

Participation is very much about information. Who creates the information. Who controls it. Who has access to it.

On Kaeng Sua Ten, there is now a lot of information. Thirty million baht worth of studies stretching over almost two But the studies conflict. Will three villages be inundated or fourteen. Is the forest destroyed worth 600 million baht or 4.4 billion. What really is the planned height of the dam. Who decides which version of all this information is right? has sent back the recent Chula study and asked for changes in the data. Who keeps the information? Some years ago there a detailed contour map showing the impact of the dam at different heights. Many people remember seeing it. Officials deny it ever existed.

What information is good information? Take flooding. The political supporters of the dam have seized on the issue of flooding to drum up public support for the project. They give the impression that the dam will prevent flooding in the lower Yom valley, and possibly even in Bangkok. But this is deceitful. The dam was not designed to prevent flooding. of the feasibility studies claim any benefit in this respect.

The Yom river accounts for only eight percent of the flow in Chaophraya system, so any impact on flooding from Nakhon Sawan to Bangkok will be minimal. Even in the Yom basin, Kaeng Sua Ten will have little effect. The dam is too far so seven-eighths of the area draining into the river is below the dam. The dam is too small. It could hold flood waters back for only 2-3 days. At best Kaeng Sua Ten will delay one-eighth of the flood for a few days. The people who think the dam will keep them dry are being fooled.

The real test of participation is the role allotted to the villagers directly affected by the project.

A few years ago, villagers in the affected area were surprised find that the project had been revived. They had not been informed or consulted. The officials explained, quite that they did not want to panic the villages until after the had decided that the project was definitely going ahead. In words, until it was too late for the villagers to object.

More recently, officials have stage-managed public meetings support of the project. Villagers who turned up to listen have been claimed as "supporters" of the dam. Some subsequently were ostracised by their neighbours as a result.

Now the villagers don't go to these meetings. They won't let officials into the site area. And they don't trust what the government says.

Yingphan, the Science Minister and strong supporter of the project, says there is 22,000 rai of land available for The Irrigation Department claims to have created "sufficient infrastructure" at the resettlement site. The villagers have been look. As everywhere, the land is theoretically empty (i.e. but in reality occupied by long-established settler families. villagers have also been to look at other dam resettlement projects. And the experience does not fill them with This emerged in a recent meeting on the project:

Village leader: "Why should we believe your resettlement We have seen what happened in past dam projects."

Official: "But we must build this dam. The villagers need to sacrifice for society. Suppose this time, the government gives a firm promise that things will work out."

Village leader (playfully): "Yes we can sacrifice, if you us a million baht compensation per household if the government's promise turns out to be false."

Official (ruffled): "On that basis, we have nothing to discuss."

## C H A N G N O I



## Kaeng Sua Ten: big dam issue

10 December 1996

Why has the Kaeng Sua Ten dam project become such an emotive issue?

Partly because of the complexity of the interests involved. Sa-iab villagers want to protect their homes and livelihood. Regional: residents of the Yom valley believe the dam will them irrigation, flood control, and electricity. National: environmentalists defend the Mae Yom forests as unique and irreplaceable national assets.

More importantly because Kaeng Sua Ten is not one battle but three, and because all three touch on larger issues. At the core, Kaeng Sua Ten is part of the long-running battle between city and locality over the control of resources. On top, Kaeng Sua Ten has become a focus for conflict between officials and environmentalists over the meaning of "development". And more recently, Kaeng Sua Ten is at the centre of the struggle between established authority and popular participation. For involved, Kaeng Sua Ten is no longer just a dam, but a an issue, a cause.

**City vs Locality.** Along with golf courses, waste disposal and eucalyptus plantations, dams are the flashpoints of the locality battle over resources.

For the city, dams bring benefits of electricity, water supply, flood control, and opportunities for profit from logging and construction. For the locality, dams mean displacement of people, destruction of the forest, and disruption of fish stocks.

Beyond this simple profit-loss account, dams have become powerful visual symbols of the resource battle. Every brochure on "development" has a shot of a large hydro-dam, angled to stress its sheer size, its clean swooping lines, its massed But in the locality, dams are a visual intrusion. Their dull greyness violates the green-brown tones of the forest. Their mass contrasts with the fine detail of nature. Their enormity disrupts the scale of the environment.

**Officials vs Environmentalists.** In the 1960s and 1970s, dam

building was one of the major crusades of official-led development. Then the environmentalists pointed out that Thailand had lost half of its forests in a generation, partly through dam building. They joined with villagers to oppose Nam Choan dam project which would destroy a large chunk of the largest remaining forest in mainland southeast Asia. In a acrimonious battle, the project was shelved in 1982, revived in 1986, and then abandoned completely in 1988. In the wake of this victory, the environmental lobby managed to block four other hydro-dam projects.

The authorities changed strategy. They abandoned projects for big hydro-dams which would flood tracts of beautiful forest. They concentrated on smaller projects, with irrigation benefits for local people, located in less scenic and sensitive areas. The most important was the Pak Mun dam, sited where the main river system of the northeast flows into the Mekhong. The authorities claimed it was a "run-of-the-river" dam which not flood forest, disrupt the river flow, or force many people to relocate.

Still there was a long and bitter battle. The environmental complained that it was nonsense to label such a large structure "run-of-the-river"; that the whole northeast river system would be affected; and that fish would never negotiate the dam's fish ladder because "Thai fish cannot jump". But the authorities dismissed these environmental concerns. And the authorities won. Fish attracted less popular emotional support than The dam was completed in 1994.

This evened the score to one-all, with the authorities on strike. In triumph, the electricity authority vaunted the "success" of Pak Mun project and its notorious fish ladder in press and TV advertising. The irrigation department launched several new projects in the northeast. Since the Nam Choan debacle, the authorities had been nervous about proposing projects which would flood forest and destroy trees. But the Pak Mun victory gave them new confidence. They revived four shelved projects the north. One of these was Kaeng Sua Ten.

The Kaeng Sua Ten dam was first planned in 1982 as a hydro-power project. After the Nam Choan affair, it was reborn as an irrigation scheme. During the Pak Mun struggle, the project on the shelf. When Bangkok and much of the country was flooded in the rainy season of 1995, supporters of the project claimed it was really a flood-control scheme. When large the north and central regions were again flooded in 1996, this argument surfaced again.

In fact Kaeng Sua Ten remains an irrigation dam with the option to include some hydro power generation. If built, it will probably contribute power and water supply to new industrial areas in Phrae, as well as providing irrigation water down the Yom valley in Phichit, Phitsanulok and Nakhon Sawan. But constant redefinition of the dam's purpose has raised doubts. the authorities want to build a dam, or win another victory?

**Authority vs participation.** The scale of the conflict the start of the Banharn government. Several ministers swung

their weight behind the dam project. And the combination of officials and ministers tried to steamroller all doubts and about the project.

Agriculture minister Montri Pongpanich, science minister Yingphan Manasikarn, and deputy PM Samak Sundaravej backed the project. Motives were mixed and complex. wanted the political kudos of godfathering a project which would bring irrigation benefits to his own constituency. other MPs in Samak's party came from the irrigation zone. Montri's interests were less clear. The logging value of the was estimated at 2 billion baht.

Like the official authorities, these political figures seemed ardent to have the dam built. Montri brazenly announced that the golden teak forest, which opponents claimed would be destroyed by the project, simply did not exist. Environmental journalists rushed up to Phrae to take photographs showing Montri was lying. When NGOs demanded a public hearing, Samak opposed the idea on grounds that the dam "would be built" if people were allowed to express their views. called meetings in the downstream area, told the attendees that the dam would save them from flooding, and claimed the subsequent show of support was a public hearing. When even the World Bank stalled its funding because the environmental impact study was inadequate, Yingphan set up a committee staffed by the same "experts" who had made the rejected Army TV Channel Five made a two-part documentary on the controversy, aired the portion in support of the project, and suppressed the second part which detailed the downside.

The revival of the issue in recent weeks shows the same desire railroad the project, and the same impatience with opposition. Banharn unblocked the project in the very dying days of his government. Official supporters are dismissive about the need for environmental studies. Samak called the project's "barbarians".

But the opposition to the dam has some added strengths. Local organisations have better information and support networks in the past. From the experience of Pak Mun and other they know that official promises of compensation need to be treated with caution. They get support from the Forum of the Poor and the network of local organisations which have in recent years. They are discussing using some of the passive resistance techniques which have proved effective in other protests.

The environment lobby has also learnt from the failure of the Pak Mun campaign. It is building its campaign around a issue which symbolises the arguments about sustainable development. The golden teak forest is old, extensive, and priceless as a natural laboratory of biodiversity. Why destroy something which is totally unique and irreplaceable.

The attempt to railroad the project is creating its own within officialdom, among groups which question the top-steamroller approach. The Forestry Department sponsored an environmental study which challenges the bona fides of those

supporting the project. The National Parks Department is grumbling about the decision to site the dam in one of its sanctuaries. The Ministry of Interior's Damrong Rajanupharp Institute has accused irrigation officials of doctoring about the dam. The Office of Environmental Policy and Planning and the National Environment Board have both opposed the dam and the attempts to ignore the 1992 Environment Act.

Kaeng Sua Ten is not such a big dam. But it is a very big. The proposed dam is located near a geological fault line. It lies right across three major fault-lines in society, politics and economy - locality against city, cost-benefit against development, top-down authoritarianism against participation. It involved a simple trade-off between a certain volume of teak and a certain volume of irrigation and flood control, then the resolution would just involve a choice. But Kaeng Sua Ten more difficult than that because it raises big issues about what sort of future society we want to build: equitable, sustainable participatory. Or urban-biased, short-term and authoritarian.