Mekong development plan: It is time to awaken the 'sleeping giant'

by Uwe Henke v. Parpart

For almost four decades, war, the hopes for lasting peace in Indochina, and the Mekong Project of large-scale hydroelectric and irrigation development in the lower basin of Asia's third largest river have been closely intertwined. On three separate occasions since World War II, when peace seemed close at hand—upon the signing of the 1954 Geneva Accords, in 1972-73 as the Vietnam War was winding down, and again in 1990—plans for harnessing the Mekong River have been put forward to foster regional stability and cooperation. And even in the midst of war, in the 1960s, P.T. Tan, one of the project's main architects, wrote: "If we wait until wars are over before starting any project, we will all be finished before even having made the first step. We have nothing to lose in starting a project which will raise the standards of living of the people in the Lower Mekong Basin. Perhaps by raising their standards of living, the warring factions will realize that poverty is the real enemy of the people and that they should stop fighting against each other and join hands, pool their resources to fight poverty, and achieve the objective of prosperity for all."

This idea was struck again during the visit of American statesman Lyndon LaRouche to Southeast Asia in the summer of 1983. Upon his return, LaRouche wrote a report published by *EIR,* "The Development of the Asia-Pacific Basin," which specified five "great projects" designed to unleash the tremendous productive potential of the region and encourage regional cooperation across political, factional, religious, and ethnic lines. Along with the construction of a second Panama Canal, a Kra Canal through southern Thailand, the development of the Ganges-Brahmaputra river basins, and the construction of the North-South Canal in mainland China, LaRouche specified the development of the Mekong River basin as opening the possibility of creating an agricultural and industrial powerhouse in Southeast Asia.

Today the lower Mekong drainage basin has a population of approximately 50 million, representing over one-third of the total population of the four riparian countries of Laos, Cambodia, Thailand, and Vietnam **Table 1.** At average per capita annual incomes of $100-350, the basin area's people, including those in rural northeastern Thailand, are among the world's poorest.

In startling contrast to such abject poverty, the basin's water resources potential is unquestionably among the world's highest for regions of comparable size. Current consumptive use of the basin waters for irrigation and water supply amounts to less than 1%. At 254 megawatts of installed capacity, the degree of exploitation of hydroelectric potential is also estimated currently to be 1%. By any measure, the river's energy and irrigation potentials are immense.

The Mekong is the world's eighth largest river in annual flow. Like the Yangtze Kiang and Burma's Salween, it rises in the Tanghla Range of northeastern Tibet, at an elevation of 5,000 meters. Running initially in a southeasterly direction, it soon turns due south, and flanked in the west by the Salween and in the east by the Yangtze, cuts through the eastern mountains and plateaus of China's Yunnan province. Leaving Yunnan, the river has traveled almost 2,000 kilometers, dropped 4,500 meters, and reached a width of 400 meters. After forming the border between Burma and Laos for the next 160 km, it enters its lower basin area at the common Burma-Laos-Thailand frontier point.

Below Burma, the Mekong still has some 2,400 km to go before reaching the South China Sea, draining on its way the Korat Plateau of Thailand, most of Cambodia, and the westward slopes of the Annamite mountain chain. At the junction with Thailand's Mun River, where it ceases to form the Thai-Lao border, its span has widened to 1,600 meters. After traversing southern Laos, plunging over the Khone Falls, and running through northeastern Cambodia, the Mekong becomes navigable for small ocean-going craft below Kratie. At Phnom Penh, it becomes connected to Cambodia's natural catch-basin, the Tonle Sap, alternately—depending on the season—feeding or being fed by the Great Lake. After the point of conjunction with the Tonle Sap River, the mainstream divides into two forks, and as these twin streams continue south and enter Vietnam, they in turn divide and fan out over a vast, fertile delta, emptying into the South China Sea through numerous mouths.

Along its course, the Mekong drains a total catchment area of 795,000 square kilometers—well over twice the land area of Japan—including some 185,000 sq km along its upper reaches in China and Burma. The over 609,000 sq km of its lower reaches drainage basin comprise almost the whole of Laos and Cambodia, one-third of Thailand, and one-fifth of Vietnam. The average annual discharge is more than 475,000 million cubic meters of water, with large seasonal variations.

TABLE 1

Population and economic data for the Mekong Basin

	Cambodia (1985)	Laos (1987)	Thailand (1987)	Vietnam (1988)	Total
Total population (millions)	7.97	3.88	54.34	63.73	129.9
Basin population* (millions/% of total)	7.41/ 93	3.67/ 95	19.78/ 36	15.00/ 23	145.85/ 35
GDP					
National ($ bil)	0.7	0.7	48.0	10.8	60.2
Basin ($ bil/%)	0.7/ 95	0.6/ 98	6.0/ 13	4.0/ 37	11.2/ 19
Per capita income					
National ($)	100	156	1,014	180	
Basic ($)	100	140	325	240	

*All population figures for 1988.

The tremendous power potential of this river can be precisely specified. Based on total average annual discharge into the sea, runoff from various parts of the basin, and differences in elevation between the center of each unit surface and the mean sea level, the theoretical hydroelectric potential has been calculated to be 58,000 megawatts of installed capacity and 505,000 gigawatt-hours of annual energy generation. Of this, 37,650 and 194,000 GWh per year have been found to be technically feasible by latest studies.

By comparison, Thailand's total present electricity consumption is only about 40,000 GWh, or 20% of that generation potential. However, between now and the end of the century, electricity demand in the four riparian countries can be expected to rise by close to 100,000 GWh over present levels, and by another 100,000 GWh by 2005, and thus will rapidly approach the total Mekong potential. A full 84% of the Mekong's potential power would come from Laos and Cambodia, with Thailand and Cambodia providing the market.

The lower Mekong's irrigation potential is estimated to be a minimum of 6 million hectares of cultivable land. This is about ten times the present reliably irrigated area. Since crop yields per hectare in irrigated areas are two to three times higher than in naturally rainfed areas, there exists a massive agricultural production increase potential, even with partial utilization. Furthermore, the development of the Mekong will end the cycle of flood and drought that afflicts many in its basin, particularly in Thailand's Northeast.

Rich history of regional development

The Mekong has been described as a "sleeping giant—neither spanned by bridge nor slowed by dam." Although it is bridged in China at several points, including by an iron suspension bridge where the famous Burma Road crosses the Mekong east of Baoshan, for the lower reaches of the river, the description is apt.

This was not always the case. The ancient, strongly Indian-influenced Mekong delta civilization of Funan (first through sixth centuries A.D.), with its capital of Vyadhapura in the modern Cambodian province of Prey Veng, had laced the delta with a complex series of irrigation and communications canals. Many of these are still in use. Others, long silted and overgrown, have been revealed by aerial photography. There is good evidence that the second delta fork of the Mekong, the Bassac, was originally a man-made canal, which, if true, would constitute a remarkable hydraulic engineering feat.

In the seventh century, Funan was absorbed into the newly emerging Khmer state of Chenla, located in present-day southern Laos and northeastern Cambodia, with its capital of Isanapura at the modern site of Sambor Prei Kuk, in the lowlands between the Mekong and the Tonle Sap. The Khmers of Chenla developed sophisticated hydraulical techniques for agriculture, notably the "captive water" technique, which dammed water to be distributed by canals to less-elevated regions. This technique was later to be exploited to its full in the complex irrigation systems of Angkor.

The Angkor period of the Khmer Empire dates from the early ninth century to its final demise and the abandonment of the Angkor site in 1444. The first, great artificial reservoir-based irrigation works of the Angkor period were constructed under King Indravarman I (877-889) near Roluos, west of the Tonle Sap and just below Angkor. His successor, Yasavarman I (889-900), added a new system, fed from a large reservoir, the *baray oriental,* or eastern baray of modern times, fed by the Siemreap River. A final system, based on another large reservoir, the western baray, and again substantially increasing the cultivable area in the region around Angkor was built under Udayadityavarman II (1050-66).

These elaborate artificial irrigation systems, permitting

The Mekong River development plan is one of the great projects Lyndon LaRouche presented to this historic meeting in Bangkok in 1983, for developing the Pacific and Indian Ocean basins.

the assured exploitation of lands that otherwise would have remained unproductive, allowed the Khmers at Angkor to maintain a densely populated and highly centralized state in a relatively limited area. The Angkorian state reached its high point of advanced cultural development and influence in the early 12th century. After that, employing its manpower resources in costly and futile wars of conquest and squandering its engineering skills in the construction of huge monolithic temples, it went into decline. The temple complex of Angkor Wat, completed in 1150, in all its apparent magnificence, marked the beginning of the end of the Khmer Empire.

The modern efforts to develop the Lower Mekong Basin began shortly after World War II with the creation in 1947 of the U.N. Economic Commission for Asia and the Far East (ECAFE), headquartered in Bangkok, Thailand. In May 1952, ECAFE's Bureau of Flood Control produced a study under the title "Preliminary Report on Technical Problems Relating to Flood Control and Water Resources Development of the Mekong—An International River." The study cited exciting specific engineering possibilities such as the development of hydropower between the Lao capital of Vientiane and Luang Prabang and the diversion of the flow of the Mekong for irrigating vast areas of northeastern Thailand.

But military action in the eastern part of the basin precluded any immediate followup. After the 1954 signing of the Geneva Accords attention turned again to the Mekong. In 1956, the U.S. Bureau of Reclamation, at the request of the riparian states, produced a "Reconnaissance Report—Lower Mekong River Basin," which became a basic document for planning the river's development. In addition, in April-May 1956, the above-quoted P.T. Tan of ECAFE, with a team of special consultants from France, India, and Japan, surveyed the Mekong basin. Their report—"Development of Water Resources in the Lower Mekong Basin"—identified five mainstream multi-purpose dam projects: at Pa Mong and Khemarat between Laos and Thailand; Khone Dalls on the Laos-Cambodia border; and Sambor and Tonle Sap in Cambodia. These would provide over 32,000 million kilowatt-hours of electricity per year.

The Mekong Committee is formed

The report also cited the need "to establish an international clearing channel or clearing house for the exchange of information and plans and the coordination of projects." On ECAFE's recommendation, a "preparatory meeting" of the four riparian countries—excluding Burma and China for political reasons—was held in Bangkok in September 1957, and adopted the "Statute of the Committee for Coordination of Investigations of the Lower Mekong Basin." The "Mekong Committee" was born, and has overseen Mekong project studies, planning, and implementation ever since.

The "Preparatory Meeting" also asked the U.N. Technical Assistance Administration to help recruit a team of water resources experts to review the Mekong development studies already carried out. The U.N. Technical Assistance team under the chairmanship of Lt. Gen. Raymond Wheeler (ret.) of the U.S. Army Corps of Engineers produced a report in 1958, entitled "Program of Studies and Investigations for Comprehensive Development of the Lower Mekong Basin." The "Wheeler Report" called for a five-year program of investigations and an initial investment of $9.2 million for development. The "Wheeler Report" formed the basis for much of the work done on the Mekong through the 1960s, along with a 1962 Ford Foundation study of the economic and social impact of the proposed projects, and a 1959 reconnaissance survey of Mekong tributaries under the leadership of Yutaka Kubota. The work centered on the five project-sites as the 1956 report of P.T. Tan—Pa Mong, Khemarat, Khone, Sambor, and Tonle Sap, and in addition, called for four top-priority projects on Mekong tributaries—at Nam Ngum, Nam Pong, Stung Battambang, and Aw Ab. Costs for the hydropower portion of the projects were estimated by the Ford Foundation to be $6-7 billion.

TABLE 2
National projects: key parameters, 1987 revised indicative plan

Projects	Unit	Laos	Thailand[1]	Vietnam	Total
Power					
Generation capacity	MW	—	536	504	1,040
Energy production	GWh/year—[2]	492	2,850	3,342	
Total investment	Mil. 1987 U.S.$	8.3	245.8	547.4	801.5
Irrigation					
Total area	Hectares	19,800	100,000	300,000	419,800
Incremental paddy production	Tons/yr.	53,000	247,000	1,450,000	1,750,000
Direct employment	Labor places	7,300	46,000	260,000	313,300
Total investment	Mil. 1987 U.S.$	32.4	244.7	413.9	691.0

1. Including investments in the period 2001-2005 (U.S. $171.7 million)
2. Transmission line

By 1969, data collection and feasibility evaluations had been carried out for several major projects, and several smaller projects, such as the 150 MW Nam Ngum dam in Laos, were under construction. But work on the larger projects such as Pa Mong were stalled, due to the Vietnam War. In 1970, the Mekong Committee commissioned a team of independent international consultants to prepare a new comprehensive development plan for 1970-2000. This plan came to be called the "1970 Indicative Basin Plan." The 600-page report identified a total of 180 possible development projects. Those listed as "short-range," indicating smaller-scale projects for construction 1970-80, have been largely completed in Laos and Thailand, but war and lack of funds precluded construction in Cambodia and Vietnam. The Cambodia conflict has also acted to forestall the implementation of the long-range scheme, which called for the five major projects put forward in the Tan report and seconded in the Wheeler report.

Since 1976, Cambodia has had no representative on the Mekong Committee, and hence it has been dubbed the "Interim Mekong Committee." Still, it has not only survived but by 1988 had managed to increase its funding from negligible amounts in the mid-1970s to $10 million in 1989. The Mekong Secretariat in Bangkok comprises 91 staff, including 44 professional staff. In 1987, the committee updated the 1970 report, publishing "Perspectives for Mekong Development."

For reasons of "political and financial realism," the only mainstream dam included in the 1987 Interim Basin Plan of the five listed in the long-range category in the 1970 report is the Pa Mong, reduced in elevation from 250 meters to 210 meters (see **Table 2**). Nonetheless, project planners and engineers at the Mekong Secretariat are confident of the technical and economic feasibility of the full range of the 1970 projects, although with some significant modifications.

The Mekong Project outlined here then includes the full mainstream "Mekong Cascade." Total project costs would be in the range of $20 billion (1990)—that is, 4% of the annual take from the world drug trade.

How the Mekong Cascade would work

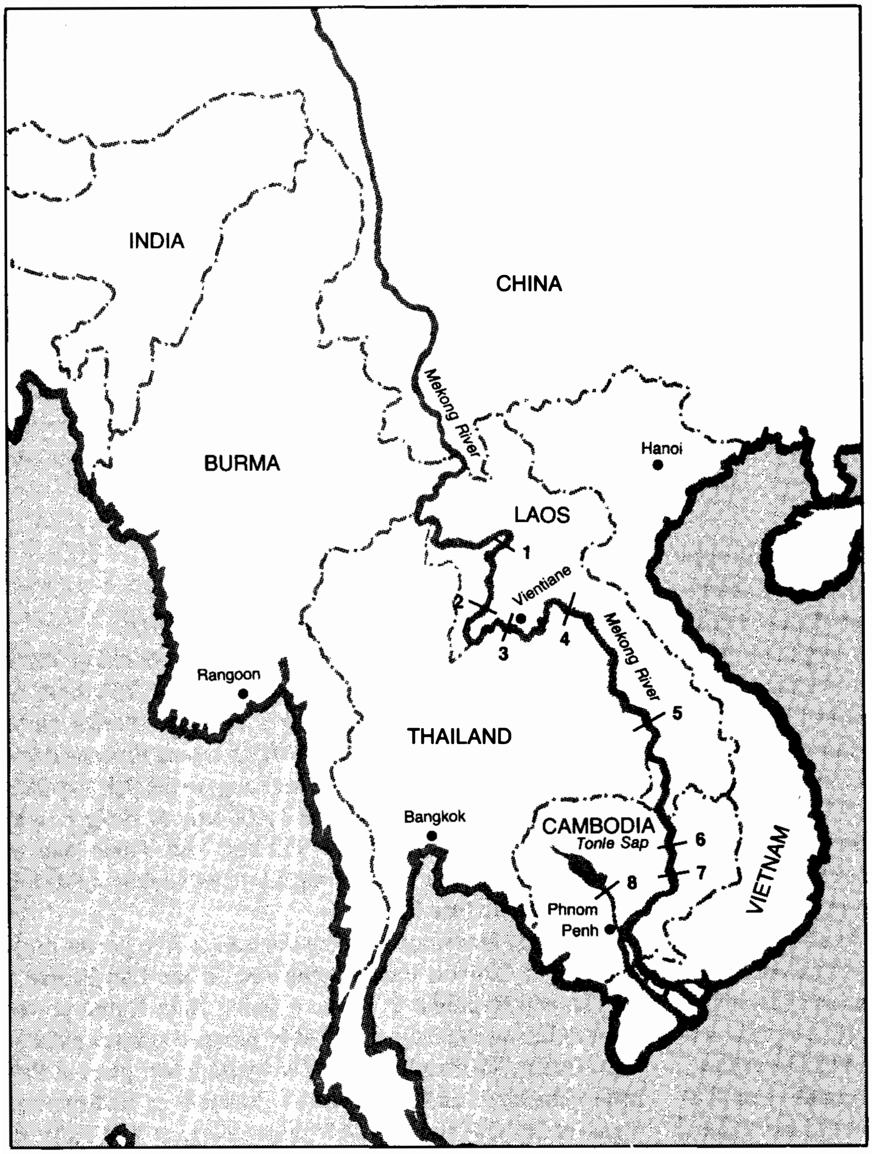
The Mekong Cascade is an integrated system of dams and reservoirs that would regulate the lower 2,000 km of mainstream flow of the numerous systems studied since 1956. The cascade begins with the High Luang Prabang dam, 2000 km from the mouth of the Mekong, to the Pak Lay dam at 1,800 km; to the Pa Mong at 1,600 km; to Bung Kan at 1,400 km; to Ban Koum at 950 km; and Tonle Sap at 700 km; to the Stung Treng alongside it; to Sambor at 500 km from the mouth (**see Figure 2**).

The plan envisions the construction of five power projects: a 115 kilovolt transmission line in the Lao People's Democratic Republic from the existing Nam Ngum power plant to Luang Prabang; a 400 MW pumped storage plant at Nam Chern, Thailand; a 136 MW hydropower plant at Pak Mun, Thailand; and a staged development of hydropower plants at 24 MW and 480 MW respectively at Yali Falls, in the Central Highlands of Vietnam. The last projects would act to provide electricity to Ho Chi Minh City in Vietnam (formerly Saigon), which often goes without power for hours at a time.

Aside from electric power supply, the cascade's main economic impact will derive from river flow regulation (see **Table 3**).

As a snow-fed river, the Mekong has a perennial flow. Lower basin flow, however, is dominated by the large annual rainfall variation. The river begins to rise at the onset of the southwest monsoon and the "wet season" in May-June, attains maximum water level between August and October, then rapidly falls until December, and afterwards recedes slowly during the "dry season" to reach its lowest level in mid-April. The enormous volume of excess water during the wet season results in severe flooding and crop and property damage in lowland areas along the mainstream and tributaries almost every year. By contrast, serious flow reduction in the

FIGURE 2
The proposed Mekong Cascade



1 Luang Prabang
2 Pak Lay
3 Pa Mong
4 Bung Kan
5 Ban Koum
6 Stung Treng
7 Sambor
8 Tonle Sap

TABLE 3
The Mekong Cascade

Project*	Reservoir elevation	Reservoir area (sq km)	Net Storage (mil.m)	Installed capacity (MW)	Annual energy GWh	Lowflow increase m/s	(mil. $)
High Luang Prabang	355/320	780	15,390	3,200	16,210	850	2,560
Pak Lay	275/255	370	5,580	2,500	12,730	430	2,190
Pa Mong	210/192	610	7,310	2,250	10,700	470	2,000
Bung Kan Regulator Dam	NA	NA	NA	NA	NA	NA	NA
Ban Koum	125/123	400	620	2,400	11,230	120	2,260
Stung Treng	80/75	5,000	18,900	5,400	25,840	1,460	4,100
Sambor	40/38	1,160	2,500	3,200	16.200	260	2,850
Subtotals		8,320	50,300	18,950	92,910	3,590	15,960
Tonle Sap	10/3	61,360	54,470	NA	NA	2,500	2,600
Totals		69,680	104,770	18,950	92,910	6,090	18,560

*Numbers such as 355/320 indicate elevation in meters above MSL (mean sea level) of reservoir full supply level (FSL) and low water level (LWL) respectively.

dry season, when the river discharge even in normal years drops to 2,000 cubic meters per second, results in deep intrusion of salt water into the coastal plain of the Mekong delta, where an area of 2.1 million hectares is regularly affected by salinity intrusion.

In combination, the Mekong Cascade projects would augment low flows by some 6,000 cu m/s, quadrupling current natural flows. Not only would this go a long way toward solving the delta salinity intrusion problem, but it is also the precondition for realization of the full irrigation potential in other basin areas. And while by themselves the cascade reservoirs cannot entirely prevent lowland flooding during peak flow periods, inundation depths would be considerably reduced. Embankments in the delta and elsewhere could then accomplish the rest.

The Pa Mong controversy

The Pa Mong site some 20 km upstream from Vientiane where the Mekong breaks out of the uplands into the plain, is easily the most studied location for a major mainstream dam as the centerpiece of the entire cascade. The Interim Mekong Committee has contracted Acres International Ltd. of Canada to carry out new studies on the dam. A sedimentation study has already been accomplished by the Asian Institute of Technology, and an irrigation study by a Thai-Lao consultant will be completed in June 1991. The Japanese government has indicated interest in carrying out the environmental studies, and the Interim Committee will carry out a power system study with the Thai and Lao electricity authorities.

The current Interim Mekong Committee plan calls for the dam to be 210 meters, scaled down from the original proposal to have Pa Mong be 250 meters proposed by the U.S. Bureau of Reclamation study of 1963.

The Bureau of Reclamation proposed a concrete gravity dam, 115 meters high, with a crest length of 1,360 meters. The reservoir would have a storage capacity of 98,300 cubic meters and a surface area of 3,722 sq km, necessitating resettlement of some 250,000 people. Stage I electricity generating capacity was to be 4,800 MW and ultimate peak capacity 10,200 MW. Irrigation potential was estimated to be 40,000 hectares initially, ultimately increasing to 1-2 million hectares in the dam region and by another 2 million hectares downstream.

The Pa Mong dam was scaled down, due to concerns about the large number of people to be resettled. However, the former director of the Mekong Secretariat's Agriculture Division, W.J. van Liere, has argued that substituting Low Pa Mong for High Pa Mong could be a big and systematic mistake. His principal argument is that Pa Mong 250, but not Pa Mong 210, is able to perform the crucial task of dramatically improving the hydraulic conditions of the lowlands all along the Mekong mainstream and tributaries below the dam site.

When in flood, the Mekong peak flow at Vientiane is 17,000 cu m/s in normal years and as high as 26,000 cu m/s in flood years. This flow does not remain confined to the river channel, but enters extensive floodways on both sides of the river as well as the low, wide floodplains of the tributaries in Laos, Thailand, and Cambodia. So much of the peak flow may be diverted into the tributaries that the Mekong is sometimes called "the river that flows backwards."

Pa Mong 250 would allow regulation of even the highest peak flow, reducing it to 10,000-20,000 cu m/s. All tributaries would drain into the mainstream year round. Flooding as far down as Cambodia would be regulated to the extent that 75,000 hectares of the most fertile land on the riverbanks there would become cultivable year round. On the other hand, Pa Mong 250 would by itself help increase dry season flow by 3,000 cu m/s. Furthermore, Pa Mong 250 would not only improve the hydraulic conditions of the lowlands along the mainstream and tributaries, it would also permit gravity irrigation of significant portions of northeast Thailand. Pa Mong 210 has virtually no such potential.

Thus, "social acceptability" and environmental concerns and the introduction of the ill-defined concept of "sustainable development" into Mekong Secretariat planning may have fostered a planning decision which in the long run will turn out to be neither environmentally sound nor lead to the optimizing impact for the entire project.

Although the resettlement problem is both real and difficult to overcome politically under current conditions, implementation of High Pa Mong, rather than Low Pa Mong, will create large, positive economic, social and environmental spinoffs that will readily offset the drawbacks of large-scale resettlement.

First, large-scale resettlement under environmental duress is already ongoing in parts of Laos and northeast Thailand without the dam, precisely because of unsatisfactory lowlands hydraulics. In recent years, with implementation of few measures to break the perennial lowlands cycle of floods and droughts, and simultaneous greater market value of upland cash crops, there has been a surge of people towards the uplands. As a result, the uplands are becoming deforested and denuded at an ever-increasing pace. In Thailand, there has also been large-scale migration from the deforested and drought-plagued Northeast to the already hopelessly overcrowded Bangkok region. A similar situation exists in Vietnam, where the delta region is grossly underpopulated.

High Pa Mong could do a great deal to reverse these uncontrolled and economically, socially, and environmentally unsound population movements, in comparison with which well-thought-out resettlement of even several hundred thousand people displaced by the Pa Mong reservoir is a relatively minor problem in terms of social cost. High Pa Mong's effect of creating stable lowlands land use practices will induce movement of people back from the uplands. It will permit, for example, the cities of Vientiane and Udon Thani to become agro-industrial centers, and will create the conditions for uplands reforestation.